A treatise on the 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.

Contributors

Tytler, James, 1745-1804.

Publication/Creation

Salem: Printed by J. Cushing, for B.B. Macanulty, 1799.

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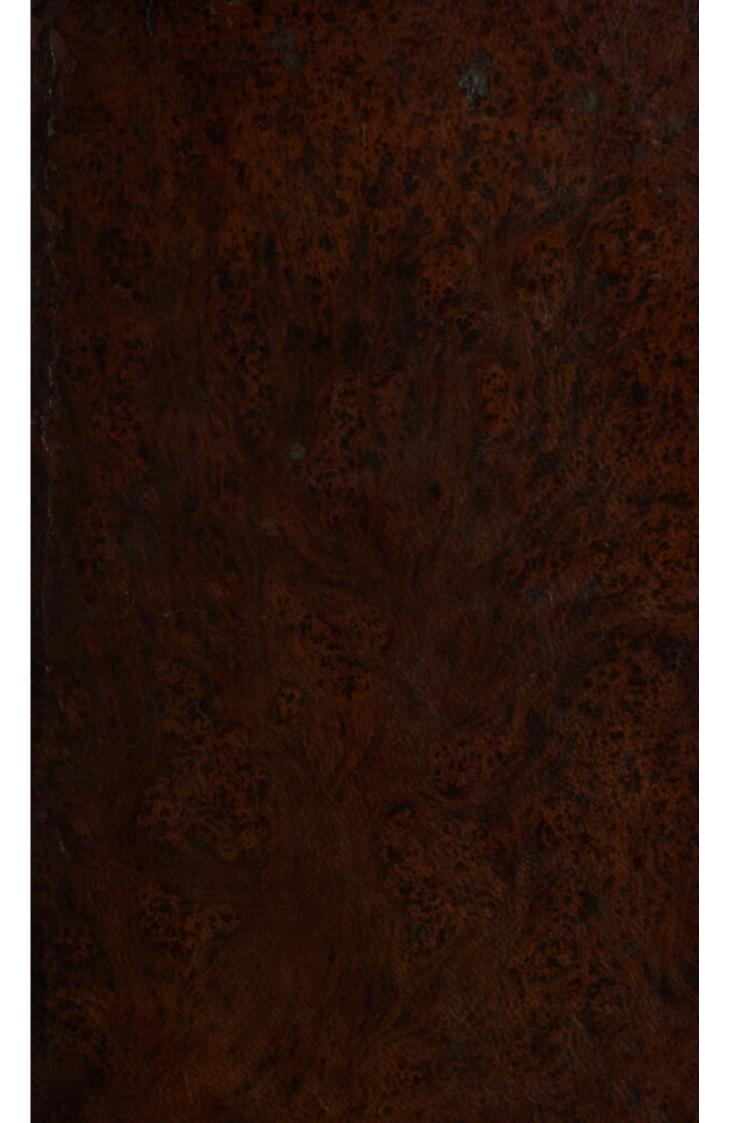
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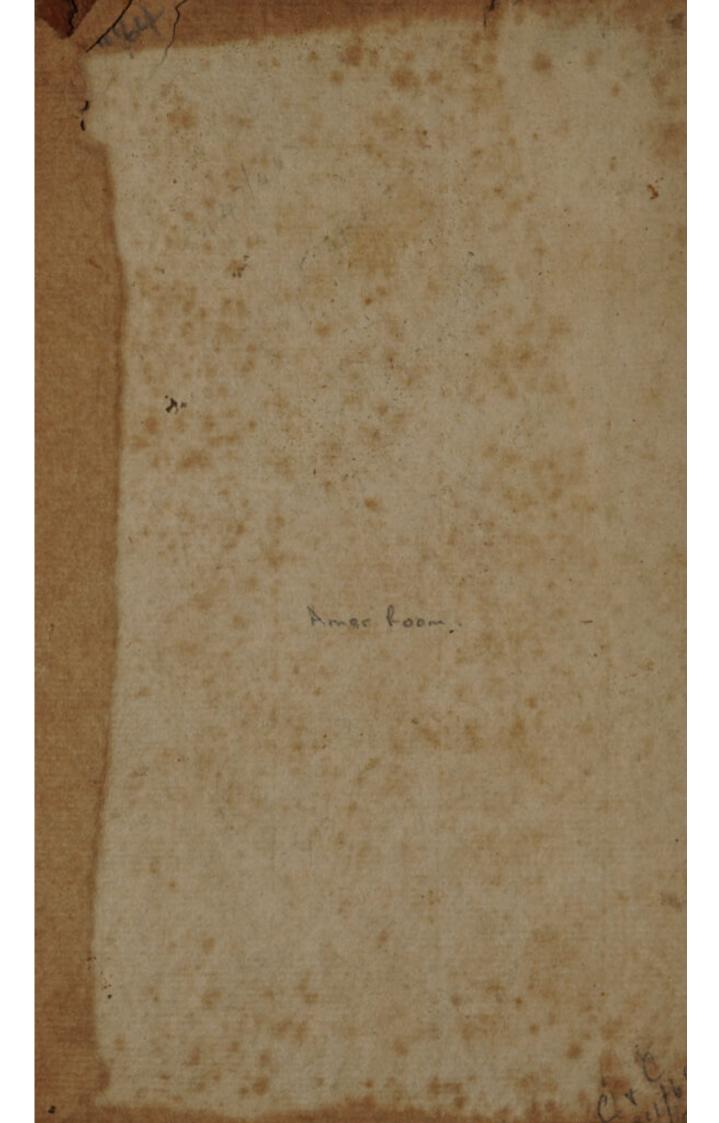
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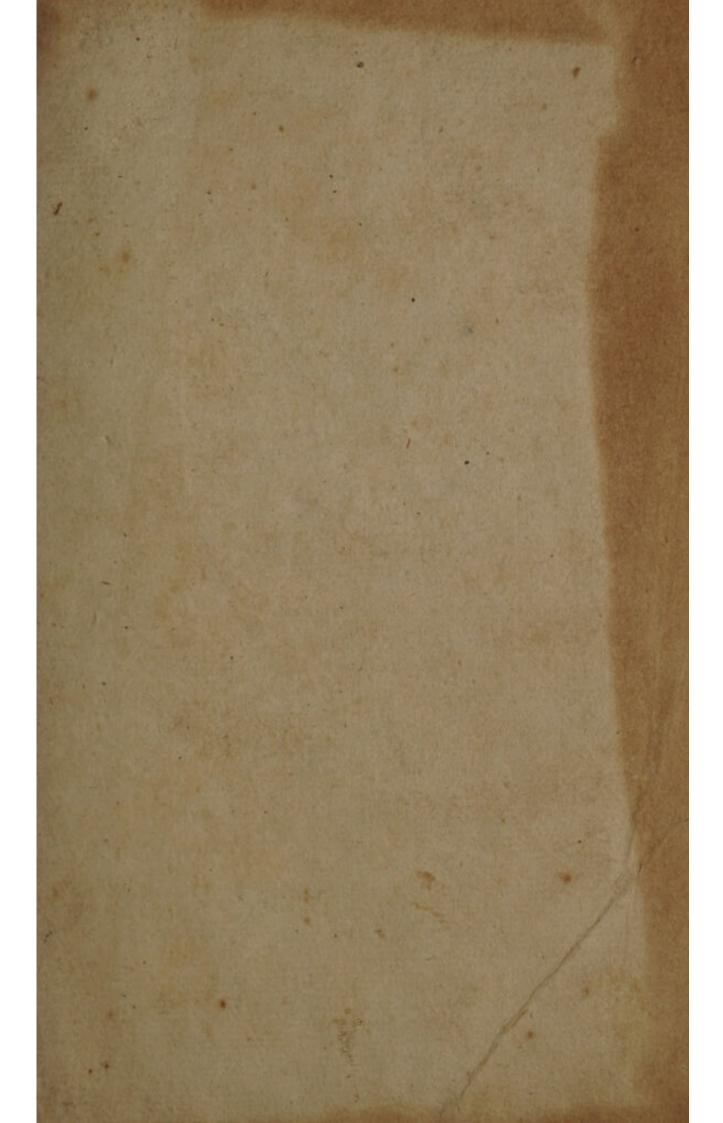
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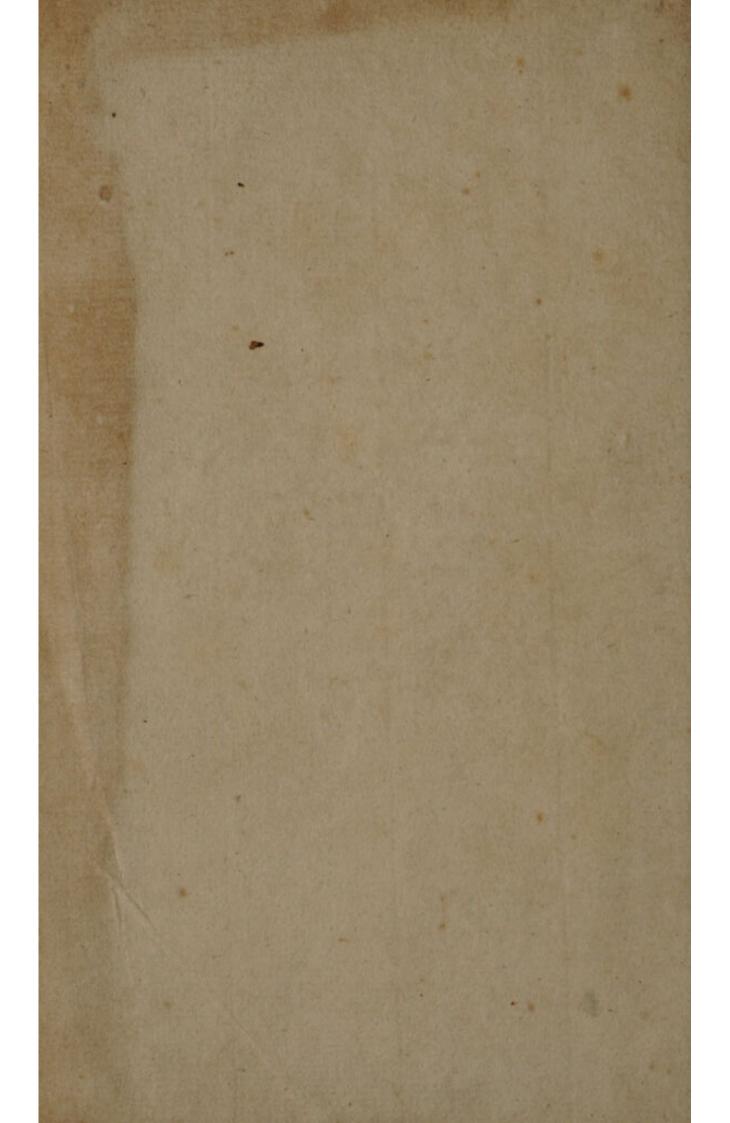


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TREATISE

ON THE

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 fentiments about it ; let him assign any credible account of its rife, or the causes strong enough, in his opinion, to introduce so terrible a scene.

THUCYDIDES.

*Twas all the bufiness then To tend the fick, and in their turns to die. In heaps they fell.

ARMSTRONG.

Published according to AET of Congress.

SALEM:

PRINTED BY JOSHUA CUSHING, FOR B. B. MACANULTY.

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TREATISE

ON THE

Plague and Yellow Fever.

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.

MONG the many diseases which afflict the human race, we find one, upon record, so irrefistible 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 difeases sent by way of punishment or correction from God; as the pestilence, infection, the leprofy, sudden deaths, famines, tem-

Greek it is called loimos, from luo, to destroy; in Latin, pestis, from pession, 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 fins.

Other distempers, called by the general name of Epidemics, have at different times infested whole cities, and even overspread extensive regions; but these, though fometimes very fatal, have always been found fo much inferior to the diftemper of which we treat. that, on a comparison, we may justly say, though epidemics have sain their thousands, the true plague has Aain 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 defolated the world in his time, compares the number of the dead to the fand of the fea; 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;

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

Parkhurst derives the Greek term loimes, either from lue, as above, or from another Greek word fignifying to faint; the same from which the English word eclipse has its origin; or it may be from the Hebrew lebem, to consume.

A friend observes, that "we no where find the word perdition in our verfion of the Old Testament. We have, however, the word desirution, 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 fister dialect of the Hebrew, difters, radically, but little from it. The Syriac of the two places referred to
above is abdua; 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 Exodical 13. ii. Sam. xxiv. 21, &c." On this last occasion, however, as the word pessilence had been used before, in the same chapter, we can searce doubt its having been really some kind of disease: and we know that moders 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 Bafforah (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 feventy-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 claffifiers, 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 characterife 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 fo univerfally fail in the true plague, that, notwithstanding the improved state of medicine, we may yet fay, it stands among difeases, in a great meafure, 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

^{*} Tranfact of Society for improving Medical Knowledge.

unprincipled to rapine, or even to murder. Nor are the cruel modes of prevention, fometimes practised even by the authority of the magistrate, less abhorrent to humanity, than the lawless outrages of the thief or murderer. Inftances of all this will appear in the course of the work; the following are fo remarkable, that I cannot help inferting them in this place. In the great plague at Marfeilles, in 1720, the town being almost deserted, and few choosing to venture into it, "three sea-captains, and some hundreds " of failors, having the courage to enter the city, from "the fea-fide, 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 gunfmith, 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, left they should have brought the infection along with them. + Even this is not equal to what Mr. Howard informs us was practifed in a hamlet of Dalmatia, where, the plague having raged with fuch 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 fays of the fituation 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 affift the diffrested, 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 felects "the victim: while ‡ vengeance frequently overtakes * Political State for 1720. + Political flate, ibid.

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

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

Whether the world hath been in the fame predicament ever fince the human race began to multiply, or whether plagues have originated at fome 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 fcarce any of plagues. Diodorus Siculus indeed makes mention of a plague which happened in Greece, after the flood of Deucalion; and which, he fays, was occafioned by the general corruption of vegetables, &c. consequent on the flood. Deucalion's flood is suppofed 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 fome 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 a time; but we hear of nothing happening to the. nation at large. Again, when Mofes and Aaron went in before Pharaoh, they faid to him, "Let us go and facrifice to the Lord our God; left he fall upon us with the fword, 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 fince. 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 fimilarity to the difease 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; fuch as, in the beginning of it, is faid frequently to kill fuddenly, as by lightning; but whether it was fo 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 prosance and wicked wretches, expelled "them

them out of their coafts." This he tells us was a reafon 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 manher of wor-" thip was quite loft and forgotten. Hence the natural "inhabitants concluded, that unless the strangers were "driven out, they should never be freed from their " miferies. 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 defert aud uninhabited. Their leader "was one Moses, a very wife 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 themfelves, as well as the facred 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 pations, or favour the one more than the other.

In diseases inflicted on the human body, we are affured 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 feventh 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 diffemper) 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 fpeaks, 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 fit down fupinely, 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 unfcriptural and abfurd.

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 sever 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. They were not the same with the pestilence; because we find, that after they had been threatened with fever, confumption, and extreme burning, it is added, "I will make the pestilence cleave unto thee:" as if it had been faid, 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, feems to be that which was inflicted on the Tews on account of the fin 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 likewife took place in the camp of the Greeks; and that too for the fin of their king in carrying off the daughter of the priest of Apollo, and refuling to restore her at the entreaty of her father.

In comparing the account of the facred historian with that given by Homer, we cannot help observing a striking similarity between them. Both plagues were inflicted on the people for the fin 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 fays, that, from the top of Olympus, Apollo that his arrows into the Grecian camp. Laftly, both were stopped in a fimilar manner: David offered facrifices to the true God; and Agamemnon returned Chryseis; his captive, to her father, the priest of Apollo. by whose prayers and facrifices the plague was stopped. Hence it feems 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

fcarce

^{*} 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 fettled, tends to excite a suspicion that both arose from the same infection. its ravages at Athens we have an excellent account by the historian Thucydides, + who was an eye witness of what he writes. He fays, 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 feems scarce probable, that fuch 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 fame. 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 confuls. The mortality was fo great, that no place of sepulture could be found for the dead bodies, but they were thrown promiscuously into the Tiber. thort, 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 eafily able to carry the city; but in this they were disappointed. The fituation 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 fireets, and the furvivors giving themselves up to all manner of licentiousness. 1

^{*} 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. J.

As it feems probable that the fame infection defolated both Rome and Athens, so it seems not unlikely that it was a continuance of the fame which destroyed the Carthaginian army in Sicily, while carrying on a fuccessful war against Dionysius, tyrant of Syracuse. The plague, as we are informed by the Universal Hittory, was common in the Carthaginian territories, especially those on the continent of Africa; and this pestilence broke out foon 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 feeds of it along with them into Sicily. But, whatever was the origin, the distemper soon became so malignant, that the living were not fufficient to bury the dead; and those who attended the fick perished in fuch 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 furvivors fo 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 confiderable body " of Africans and Iberians furvived the dreadful calami-"ty. It is worth observation, that not a single person " of those who attended the fick furvived." The miferable remains of this army, confilling at first of more than three hundred thousand, were now attacked by their enemies, whom they were no longer able to refift. 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 funk. On his arrival at Carthage, he found the whole city not only in mourning, but in despair: " the wretched in-" habitants giving full yent 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 fordid 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, faid he, may rejoice at our mifery, but " have no reason to glory in it. The troops we have " loft 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 Syracufians, 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 "Syracufians in poffession 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 affish 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 affish the sick, for sear of being infected by them; and the bodies of the dead were, for

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 Orofius, " a great part of Africa was covered with locusts, which " destroyed all the produce of the earth, and even devour-"ed dry wood. But, at last, they were all carried by the " wind into the fea, out of which being thrown in vaft " heaps upon the shore, a plague ensued, which swept " away an infinite number of animals of all kinds. " 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 f' with fuch 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 sour hundred thousand, to be massacred.

maffacred. But they foon 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 defolated, 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 fuch a degree, that flaves, gladiators, and even the banditti of Dilmatia and Dardania, were enlifted 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 fides, and could scarcely be repulsed; infomuch 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 fection; but in those times the destruction by the sword was so extraordinary, that less mention is made by history of any pestilential diforder. In the time of Justinian, however, about fixty-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 eaftern 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 pef-

"tilence was not checked, nor alleviated, by any difference of seasons. The numbers that perished in this
extraordinary mortality have not been recorded; only
we find that, during three months, there died at Conftantinople five, and at last ten thousand a day. Many
cities of the east were left vacant, and, in several diftricts 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
fpecies, 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 croffed that river to invade the Roman territories. The reign of Phocas, fuccessor to Mauritius, was still more unfortunate. "Great numbers were swept off, either " by famine or pestilence; the earth refused her fruits " in feafon; 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 fuch 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 diftemper still raging, and the fame dreadful phenomena of nature still continuing. The plague, we are now told, broke out in Calabria in Italy; whence it foon

^{*} Gibbon's Hist. vol. iv. Procopius, in speaking of the numbers who died in this extraordinary plague, compares them to the fand of the sea; and afterwards expresses them by a phrase which has been translated swo bundred 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 grainmar is rectified by reading myriades instead of myriads.

spread over Greece, Sicily, the islands in the Ægean sea, and at last reached Constantinople; where it raged for three years together, with fuch fury, that the living were scarce sufficient to bury the dead. The earthquakes, which accompanied or preceded this pestilence, were fuch as had never been known in any age. In Syria and Palestine several cities were swallowed up; others, entirely ruined; and fome, if we may give credit to Nicephorus, removed without any confiderable damage, fix miles and upwards from their former feats. 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 fuch 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 fufficiently strong to bear the heaviest carriages. When the frost broke, mountains of ice and frozen fnow, 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 ftruck with terror and amazement at the fight 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 fuch 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 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 slame.

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 fay, as in the time of the invasion by the northern barbarians, that the fword, and not the pestilence, was the plague of those times. A most violent and universal pestilence, however, now took place; though, for want of fuch 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 feems 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 fet at liberty; as we hear, not long after, of plagues being very frequent in different parts of that continent. In England it affumed 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 propenfity to fweat, the difease appears not to have differed from the true plague. The sweating fickness 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; fince which time it has not been known in Britain. In 1517 it was extremely violent and mortal; fometimes killing the fick 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 fick fometimes 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 fince that time. In the course of the 17th century, various parts of Europe have fuffered very much from the plague in its usual form. Indeed (for reasons given in the subsequent fection) 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 fame 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 fay, that four hundred thoufand 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 publithed 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 feveral 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 fixty 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 .

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 Treatife 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 "ftreets 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 fufficient 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 flations, 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 feveral public examples."

In the Turkish dominions, though we have not read of fuch extraordinary devastations as formerly took place. yet we are affured that the pestilence rages there very frequently. From 1756 to 1762 we have histories of it by Dr. Ruffel 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 Ruffians, it found its way to Moscow, which city it invaded in 1771. M. Savary fays, 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 fixth volume of the Medical Commentaries, however, we are told that it was brought from the army by two foldiers; both of whom were carried into the military hospital, and both died. The anatomist who diffected 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 fome time checked by the cold; but its ravages became greater as the fummer advanced. It raged most violently during the months of July, August and September; in which time there were inftances of its destroying twelve hundred persons in a day. Twentyfive thousand died in the month of September; in the course of which month scarce one in an hundred of the infected recovered. Only feventy thousand, according to this account, perished by the disease. The year 1773 proved very fatal to Bafforah; where, as formerly mentioned, two hundred and feventy-five thousand perished in the fummer feafon, through the violence of the diftemper.* But in countries where the plague rages fo 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 Treatife admit of a detail of them, though there were. We know, however, that fince the year we fpeak 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 fome 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, preferved himself from the insection by retiring to a mud-house, where he had no communication with the inhabitants. Having a large quantity of Bengal cotton, he fold 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 Instuence of Climate in producing Diseases—And of the Moral Conduct of the Human Race in producing and instuencing the same.

IN confidering the origin of a calamity fo dreadful and fo 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 faid 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 Australia Incognita, or fome 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 fins 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 fins in particular. In former times Egypt and Ethiopia were marked out as the two great fources 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 vifited and refided in Egypt, affure 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 to Constantinople from Egypt; but the united testimonies of Savary, Volney, Mariti and Russel, who all agree that Egypt receives the infection from Constan-

tinople, must undoubtedly preponderate.

"The pestilence (fays 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 affured me that this epidemic "disease was brought thither by the Turks, though it " has committed great ravages. I myfelf faw the cara-" velles of the Grand Signior, in 1778, unlade, according " to custom, the filks 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 feafon. The veffels fet fail, 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 dif-" eased without injury to the inhabitants. It is an ob-" fervation 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 feafons, " 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 feaports " 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 66 greater fury, and fometimes (weer's 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."

informs

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 seacoasts 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 refide in Syria, nor is this "the place where it usually begins. It receives this "fatal prefent from Egypt, where its usual feat 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, " feldom 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 dissiculty. 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 us, that some parts of Turky are visited by the plague once in fix or feven years; and M. Savary fays, that Egypt is visited with it once in four or five years; but if Egypt never receives it but from Turky, it would feem 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 feeds 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 Abysfinia (the ancient Ethiopia) do not mention the plague as more common in that country than fome 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 likewife 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

treatile

treatife on the diseases incident to Europeans in hot climates, feems 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 fufficiently healthy. Next to this, Bengal is most subject to sickness; for which he affigns the following reason: "The " rainy feafon 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 fun, the air is then greatly polluted by "the vapours from the flime and mud left by the Ganges, " and by the corruption of dead fish and other animals. "Difeases then rage, attacking chiefly fuch as are lately arrived. The distempers are fevers of the remitting or " intermitting kind; for, though fometimes they may " continue several days without sensible remission, yet "they have in general a great tendency to it. If the fea-" fon be very fickly, some are seized with a malignant fe-" ver, of which they foon die. The body is covered with " blotches of a livid colour, and the corpfe, in a few "hours, turns quite livid and corrupted. At this time " fluxes prevail, which may be called bilious or putrid, "the better to diffinguish 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 falt " 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-

"Batavia, the capital of the Dutch East India do"minions, is annually subject to a fatal and consuming
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" 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 fickness rages with the " greatest violence when the rains have abated, and the " fun has evaporated the water in the ditches, fo that the " mud begins to appear. This happened in 1764, when " fome 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; fome were " fuddenly feized with a delirium, and died in the first "fit; but none survived the attack of a third. Nor was "the fickness 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-" fes to their graves. At that time a flight 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, confumed the flesh, even "to the bone. Besides these malignant and remitting fe-" vers, which rage during the wet feafon 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 " coaft."

In the same work we have an extract from Mr. Ives's journal 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 severs, 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 essluvia with which the air is contaminated, from the great quantities of blubber sish 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 "diftemper was far from being mortal. Here we were " informed that the Arabs had broken down the banks " of the river near Bafforah, with a defign to cover with "water the deferts in its neighbourhood. This, it feems, " is the usual method of revenge taken by the Arabs for "any injury done them by the Turks at Bafforah; and " was represented to us as an act of the most shocking "barbarity, fince a general confuming fickness 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 Bafforah " 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 fettled 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 " ftomach was often so weak, that it could receive only "a little milk. Several of us became feverish through "the exceffive 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 chiefs, " could procure, and had laid in a quantity of excellent " madeira, claret, and other provisions, &c. yet most " of us fuffered in our constitutions by this long and fa-" tiguing journey."

On these climates in general Dr. Lind observes, that in well cultivated countries, fuch 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 feafon. "There is a place " near Indrapour, in Sumatra, where no European can " venture to remain, or fleep one night on shore, during "the rainy feafon, without running the hazard of his " life, or at least of a dangerous fit of fickness; and at "Podang, a Dutch settlement on Sumatra, the air has " been found to 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-

" ftroys all the white inhabitants."

In treating of the diseases of Africa, the same author takes notice of those of Egypt; which country, he fays, is rendered unwholesome by the annual inundation of the Nile, and being furrounded on three fides by large and extensive deserts of fand, by which means it is exposed to the effects of that noisome vapour, which, during the fummer months, arises from fultry, hot fand. He doth not, however, fay, 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 affert the contrary. " Mr. Pauw (fays he) pretends, that at pre-" fent Egypt is become, by the negligence of the Turks " and Arabs, the cradle of the pestilence; that another " epidemical difeafe, 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 vilruence that ferments the humours of the human "body, &c." "These affertions (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-" fetta. The plains are nearly on a level with the fea; " neither hill nor height impedes the refreshing breath of "the north, which drives the clouds and exhalations off "the flooded fields fouthwards, continually purifies the " atmosphere, and preserves the health of the people; " fo that the husbandmen who cultivate the rice are not " more subject to diseases than those who do not. The "heats of the Thebais certainly furpass those of many " countries under the equator. Reamur's thermometer, "when the burning breath of the fouth is felt, fome-"times rifes to thirty-eight degrees above the freezing " point,* often to thirty-fix. Were heat the principle " of diseases, the Said (Upper Egypt) would not be habi-"table; but it only feems to occasion a burning fever, " to which the inhabitants are fubject; 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 " feafon contributes much to the prefervation 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 "fun'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 fouth 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 rifes twelve degrees. The inhabitants call this fea-

^{*} Water boils at eighty degrees of this thermometer,

" fon Khamsin, fifty; because these winds are most felt " between Easter and Whitsuntide; during which sea-" fon 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 Khamfin. But it must not "be supposed that this wind, which corrupts meat in a " few hours, blows fifty days. Egypt would become a "defert. It feldom blows three days together; and " fometimes is only an impetuous whirlwind, which ra-" pidly paffes, and injures only the traveller overtaken in "the deferts. When at Alexandria a tempest of this "kind fuddenly arose, driving before it torrents of burn-"ing fand, the ferenity of the fky 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 deferts were suffocated, and several "I faw brought to appearance dead; fome of whom, "by bathing in cold water, were reftored to life."

The internal parts of the continent of Africa are but little known. The northern parts, containing the States of Barbary, are fufficiently healthy; the middle parts of the western coast, known by the names of Negroland, Guinea, &c. are extremely unhealthy and pernicious to strangers. Dr. Lind informs us, that, at a diffance, this country appears in most places flat, covered 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 pleafant and perpetual verdure, 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 refort of wild beafts. The banks of the rivers and rivulets are overgrown with bushes and weeds, continually covered with flime, which fends forth an intolerable stench. All places however are not equally unhealthy; nor is any place equally unwholefome

wholesome at all times of the year. It is only with the rainy feafon that the fickness 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 feems 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 (fays 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 feason. We were thirty miles distant from the " fea, in a country altogether uncultivated, overflowed "with water, furrounded with thick, impenetrable " woods, and overrun with flime. The air was vitiated, " noifome and thick, infomuch that the lighted torches " or candles burnt dim, and feemed 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 infects swarming every where, both on the " ground and in the air; which, as they feemed to be " produced and cherished by the putrefaction of the atmosphere, 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 fwarms of cock-roaches often darkened "the air, and extinguished even the candles in their " flight; but the greatest plague was the musquetoes " and fand-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 fuch a constant and " difagreeable croaking, that nothing but being accuf-" tomed to fuch an hideous noife, could permit the en-" joyment of natural fleep. 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 flinking flime."

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 Catchon; but "a fickness 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 fame manner) we have not been able to find either moift heat or dry heat, even when aided by putrefaction, infects, and naftinefs of all kinds (not justly chargeable upon any climate;) I fay, 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 fo willing to afcribe every thing to climate, feems embarraffed in this respect. "There " are many difficulties (fays he) which occur in affigning " a fatisfactory reason, why in some countries, as in those " between the tropics, heavy and continual rains should " produce fickness; while in other places, especially in "the fouthern parts of Europe, a want of rain for two or " three months in fummer brings on difeases almost simi-"lar. Upon this occasion (adds the Doctor) I cannot "help observing, that there is hardly a physical cause " which can be affigned for the produce of any difeafe, " that will not admit of fome exceptions: thus, not only "the woods and moraffes in Guinea are tolerably heal-"thy, with some exceptions, in the dry season; but a few " inftances might be produced of towns furrounded with " marshes and a foggy air, where the inhabitants suffer es no

" other

on inconvenience from their fituation, even during the rainy feason. Do the impetuous torrents of water poured from the clouds during the rainy feafons, in tropical " countries, contain what is unfriendly to health? Thus " much is certain, that the natives of fuch countries, efpe-"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 fuch times the water of springs. Is the " fickness of these seasons to be ascribed to the intense " heat of the then almost vertical fun; 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 feafon of those sudden and terrible " ftorms, 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 fickness at those times? It was remark-" able one year at Senegal, that, in the beginning of the " rainy feafon, in the night fucceeding one of these tor-" nadoes, a great number of the foldiers, 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 feafon, 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 fostens, 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 diffatisfied with his theory; and that, though in the outfet he thought heat and moifture, affifted 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 fomething inexplicable still remains. This he now wishes to solve by unknown properties in the water, by confined exhalations, &c. But as the confideration of these things belongs properly to the next fection, I shall here only remark. that there hath not yet been given any fatisfactory 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 ferpent Python above other ferpents.

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 sever and dysentery, which begin in August, and continue till November. During the beginning of the epidemic, the sever is attended with extreme massinguity 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 remissions are very imperceptible; in October they become more distinct; and, as the cold weather comes on, the sever becomes a regular intermittent. At that time, too, the putrid dysentery begins to rage

" with the fever. These diseases were very fatal to maor 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 fickly feafons at Bengal, the un-" certainty of life is fo great, that it frequently happens "that one may leave a friend at night in perfect health, "who shall not furvive next day. There have been " feveral infrances of perfons 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 " feason, 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 diarrhoea. Fluxes and fevers are then " feldom epidemic; and, when they do happen, are not " attended with much danger. "At Batavia the rainy season is from November to

"At Batavia the rainy season is from November to May, during which time malignant, remitting and continued severs and the dysentery rage with great fatality. 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 experienced 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 seeble 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.

"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 sever; which spread by contagion at sea, and carried off great numbers. I visited several in this ship, when she arrived at China, who were reduced to mere skeletons, by the duration of the sever 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-" fome fogs arife, 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 infelted with a variety of infects. " 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 feized with a fever, " whereof none recovered: but although the ship went " out to fea, none, except the twelve who went on " fhore, 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 generally 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 sew in number, no great mortality can take place among them. But seamen, who never observe much regularity 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 (severs 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 enseebled; and they become subject to
"habitual fluxes and other complaints, the usual con-

" fequences of too great relaxation."

The climate of the fouthern 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 fudden change of wind, sinding it necessary to wear a flannel waistcoat."

On the subject of climate, therefore, I must conclude with the following observations:-First: That, as the difeases 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 univerfally afcribed 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:

may, indeed, that they are equally bad. Nobody will pretend to argue, that the climate of Afia 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 Afia Minor, while we have not one of its visiting Catchou. Ancient Greece, the Peloponnesus (Morea) and Afia Minor, were accounted healthy and fine countries; and modern travellers affure us, that they have not degenerated in this respect; yet these countries are defolated by the plague, while the unwholesome regions above described are entirely free from it, unless imported from some other quarter. give this matter, however, as fair a discussion as possible, I shall here consider the account we have of the climate of Bafforah, given by the gentleman refiding 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 Bafforah. The great floods from the melting of " the fnow on the mountains of Diarbekir, the ancient "Affyria, 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 Bafforah, is, for many miles, incrusted " with a furface of falt; 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 furrounded by a falt 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 flench more " disagreeable

" difagreeable and putrid than any thing I ever experienced in my life. As to the degree of folar 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 refembled the approach of an heated substance " to the body. The quickfilver, 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 "Bafforah 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 " ftill higher, even at feven in the morning, the hour "which we accounted the coolest in the day. Once "the heat was faid to be so intolerable, that no one * could expose himself to it long enough to observe the * thermometer in the fun. Some of the oldest inhabi-"tants of Bassorah said that they never remembered to " have heard of fuch 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 Bafforah for Aleppo on the " goth of May. On our arrival at Zabira, the heat was " fo intense, that even the Arabs funk under it."

From this account it was natural to expect that violent fickness would ensue. This was the opinion of the inhabitants, and they were not deceived. The fickness, 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 it did not spread more than twenty miles into the desert.*

I might now proceed to give an abstract of what has been faid of the power of climate in producing difeases on the Western Continent, and West India islands; but as this belongs more especially to the second part of this Treatife, I shall here pass it over, as well as what Dr. Smith has faid 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 confider what difeases 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 abfurd question; for as man is now, by nature, subject to death, it feems to follow, that he is also naturally subject to disease, as the means of bringing on death. But, however plaufible 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. the other hand, a disease destroys by attacking some particular organ, and either totally confuming or altering it in fuch a manner, that it diffurbs 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 confumed; and death from difease, to the blowing out of a candle while a part of it remains, and might have burned for a confiderably longer time. Thus I am inclined to confider all difeases 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 confequence 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 fingle disease from the causes we assign. No person in his senses will fay that Adam, in consequence of eating the forbidden fruit, became liable to the venereal disease. As little can we fay 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 fay that any kind of difease became natural to him in consequence of his transgreffion. 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 confequence of his first transgression, we have equal reason to believe that these difeases 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 confider, that, long after mankind became subject to death, we find difeases, 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.

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 fo conformable to what is generally faid 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 fubject, 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 diffillation feems to have been unknown; fo 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 otherwife have been. Dr. Cleghorn, having spoken largely of the manner of living of the natives in Minorca, proceeds thus: "I should next give a circum-" flantial account of the diet and way of life of the "British soldiers in this island; but as this would be a " difagreeable task, I shall only observe, that the excess " of drinking is among them an universal vice, con-" firmed into habit. But, however different the Spa-" niards be from the English, in their meat, drink, exer-" cife, affections of the mind, and habit of body; yet "the health of both nations is equally influenced by

"the feasons. 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 foldiers, who, without meat and clothes, frequently lie abroad drunk, exposed to all weathers, have diseases 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 themfelves from the plague by the use of strong liquors, have generally fallen facrifices to it; * but this cannot prove that fuch 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 difease, by an exhaustion, or evaporation (if we please to call it fo) 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, fo neither will the body, though ever fo 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 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 difeases, 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. faid to have spread all over the world. This coincides with the time of Pul, king of Affyria; who, having overthrown the ancient kingdom of Syria, turned his arms against that of Ifrael, and no doubt extended his conquests among the eaftern nations, as we know very well the Affyrian 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 Mofes, was very common, or, as phyficians 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 Ifrael and Judah, this dreadful pestilence might begin; but, as to its being all over the world in any particular year, I do not fee how it can be afcertained; 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 thoufand of his men being destroyed in one night, there can be no doubt that the remains of his army would carry with them the feeds of a most malignant pestilence, capable of spreading destruction far and wide. It is true, we are not directly told, in Scripture, that the Affyrian army was destoyed by a plague, but that the angel of the Lord destroyed them; but, as this expression is quite fimilar 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. Iofephus expressly fays, 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 fick, 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; fo that from them the diffemper might be communicated in fuch a manner as to be almost endemic; and thus hardly an army could be fent 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 fustained a most dreadful siege, and the obstinate and wretched inhabitants had endured fuch calamities as

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, purchafing the infected goods, fell them indifcriminately 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, diffeminated among them in great plenty. Dr. Ruffel 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 (fays 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 fell 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, " fell the plague to muffulmen, who purchase it with-" out fear, and fleep with it, till, renewed of itself, it "hurries them to the grave." M. Volney, though he does not mention the Jews in fuch express terms as Mariti and Ruffel, yet agrees as to the mode of its propagation in Constantinople, and the reason of its continuance in that city. "It is certain (fays he) that the " plague originates in Constantinople, where it is per-" petuated by the abfurd negligence of the Turks, "which is fo great, that they publicly fell 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 fold in Constantinople, or exported freely to all parts to which their veffels fail, 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 fmall number of veffels 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 faid, '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 predifpoling causes to epidemic diforders, 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 fometimes 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 prefent, 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. Ruffel. 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 Carlifle. He tells us, that in the course of the winter many perished through cold; that the inhabitants were reduced to fuch extremities. by the fingle failure of the crop in 1757, that women

were

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

⁺ Philof. Tranfact. vol. liv.

were known to eat their own children as foon as they expired in their arms with hunger; and that human creatures might be feen 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 fixty thousand in the

city of Aleppo.

It is probable that in this case the samine 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 samine. 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 samine would not have been selt. As far, therefore, as the plague was connected with the samine, 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 trisling,

to fay no worfe.

But famines are occasioned not only by natural causes, but by wars; in which mankind, acting in direct oppofition 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 foon after, they have been afflicted

with pestilence. To begin with the great plague of 767 B. C. which coincides with the rife of the Affyrian 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 affembled in order to gratify the pride and ambition of an individual. The Affyrians, 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 feems 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 faid of the plague which broke out among them in the time of Marcellus. That in the time of Jugurtha, indeed, is faid 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 fuch 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 Severus

ander's reign, the Perfians, having overthrown the ancient empire of the Parthians, turned their arms against the Romans, and, though frequently defeated at that time with great flaughter, 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, haraffed them in other parts. In the reign of Decius, who ascended the throne in 249, they became extremely formidable, infomuch that the emperor himfelf, with his whole army, was at last cut off by them. The consequence of this was, that the empire was inftantly invaded in many different parts, and, though the barbarians were at times defeated, we never find that the empire regained its former tranquillity. The Perfians 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 Perfians.

This difafter, as may well be imagined, produced an immediate invasion by numberless barbarians, while fuch multitudes of pretenders to the imperial crown were fet up, each afferting his claim by force of arms, that the whole Roman territories were filled with bloodshed and saughter. At this time Gallienus, the son of Valerian, was the lawful emperor, if indeed we may apply the word to the domination of fuch a monster. His mode of government may be imagined from the following letter written to one of his officers in confequence of a victory gained over an usurper named Ingenuus. " I shall not be satisfied with your putting to death only " fuch 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 " fon of Valerian, the father and brother of princes. 44 Ingenuus emperor! Tear, kill, cut in pieces, without

"I would do, who have written to you with my own hand." In consequence of this horrible order, not a single male child was lest alive in some of the cities

of Moesia, where this inhuman tragedy was acted.

In the midft 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 eafy 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 refembled the shores of the Red Sea strewed "with the carcafes of the drowned Egyptians: the fea " 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 fame time. The fun 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 feveral places and fwallowed up great numbers of people in their habitations. The fea, 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

"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 maffacres enfued. At last, on the accession of Dioclesian to the empire, it was thought proper, on account of the present emergences, to divide fuch 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 repreffed. and the Persians reduced so low, that they were obliged to yield up a great part of their territories; and it is faid that their country might even have been reduced to a Roman province, had the emperor fo inclined. We know not whether, in his eaftern 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 diftemper, however, feems 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 preferving the worship of the gods. But, if this was really the cafe, he foon found his gods unable to protect him; for, foon after the accession of Constantine the great, and his embracing christianity, the dominions of Maximin were afflicted with famine accompanied with peftilence, and that attended by fymptoms 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 fins of Maximin; but it must be observed, that to his other fins 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 fins of Maximin brought on the plague, the piety of Constantine could not keep it off; fince we find that in the year 332, a confiderable time after the death of Maximin, the territories of Constantine were ravaged by a dreadful plague, and the famine was fo fevere, that, at Antioch, wheat was fold at four hundred pieces of filver 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 fent directly from heaven. His eyes and tongue are faid 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 " fkeleton; his whole body was covered over with a "kind of leprofy, and devoured by fwarms of vermin: " he could not be prevailed upon to take any nourish-" ment, but greedily fwallowed handfuls of earth, as if " he had hoped by that means to affuage 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

after being defeated in battle; but the symptoms are

unaccountable.

After the death of Constantine, the empire being again parted, civil diffensions took place; the northern barbarians and Perfians renewed their incursions, and at length the battle of Murfa, 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 fide. In 261, 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 fea, in feveral places, broke in upon the land, and destroyed whole cities with their inhabitants. At Alexandria, the sea, retiring during an earthquake, returned again with fuch violence, that it drowned feveral 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 fo; for he not only had always a large army along with him, which confumed 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 feems 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 fubfift nor return; while the enemy, imitating his example, destroyed all before him. The consequence was,

that, by the time Julian was killed, the famine raged in the Roman camp to fuch a degree, that not a fingle perfon 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, "Theffaly, 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, (fays Gregory Nazianzen) have we not feen or "heard of! Whole countries have been destroyed with "fire and fword; many thousand persons of all ranks "and ages have been inhumanly maffacred; 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 diffracted 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 occafioned by multitudes of grashoppers, 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 befieged by Alaric the Goth, the city was reduced to fuch straits, that human flesh was publicly fold, and some mothers are said to have devoured their children. This terrible famine was occasioned

which had lain wafte 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 " affault, pillaged for feveral days together, and laid in " ashes; not a fingle 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 fuch fury as can hardly " be expressed or conceived, and putting all to the " fword, without diffinction of fex, 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 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 likewife at continual variance with the Perfians. 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 fecond conquest of Italy, and the invasion of the Gothic territories, new defolations overspread the west. Thus, for a great number of ages, mankind had been preparing themselves for the dreadful pestilence which was about to enfue. Whatever infection could be communicated to the air by multitudes of carcales 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 fomething 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 univerfality, to the general mixture of all nations, and the unrestrained intercourse they had with one another. "No "reftraints (fays 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 fuccessively visited; the places which had escaped "the fury of its first passage, were alone exposed to the " contagion of the enfuing 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 their health, or the air refumed its pure and

" falubrious qualities."

Thus Mr. Gibbon endeavours to explain the causes of this plague from an alteration in the falubrity 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 feveral 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 rife 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 fome 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

flavery.

In this manner were the eaftern 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 loft three hundred and feventy-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 maffacred 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 foldiers to throw a stone into it. Such an army could have spared the number in question.

⁺ See Sec. i.

are filent. In 636, particularly, we hear of violent storms of hail throughout the Arabian Peninfula, and of Syria being ravaged by epidemic diftempers. It would feem. 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 hiftorians 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 fealed, and the thing determined, they found it impossible to save him." This diftemper was attended with fuch 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 refolved to proceed: but his heart failed him when he faw 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 feems 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 feems 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 fo extraordinary, that we can scarcely account them any other than miraculous. Some of these have been described in the

former section, on the authority of the Greek historians: the Arabians make mention of others fimilar. 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 fun himfelf lofing his light? a phenomenon acknowledged even by Mr. Gibbon; though that author huddles things together in fuch a manner as feems totally inconfistent 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 fun. 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 funrife, the folar light was loft without an eclipfe, 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 figns in the fun and in the moon, diffress and perplexity of nations, the fea 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

That fuch accounts are not to be looked upon as entirely fabulous, may be gathered from what is related by Mr. Thomson in his travels through Palefrine, 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 stame 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 sine a polish as black marble, and are likewise said to be met with of con-bierable size in the neighbouring mountains."

vain to destroy each other, at last united in a romantic design of conquering Palestine from the Insidels; 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 affiftance. They fent 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 Tangrolipin, and by the Afiatics Togral Beg. Being a man of ability, the Sultan of Persia, by his affiftance, got the better of his adversary; but, refufing to let the Turks depart, Tangrolipix with his army withdrew to the defert of Carbonitis, where, being joined by numbers of discontented Persians, he began to invade the territories of the Saracens. The Sultan of Perfia fent against him an army of twenty thousand men, whom Tangrolipix furprised and defeated, acquiring at the fame 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; fo that he foon found himfelf at the head of fifty thoufand. 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 fultan inftantly thought of destroying other fultans 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 unfuccessfully against the Arabians, but afterwards more fuccessfully 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 crufades, 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 feven 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 loft; 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 fet out. In 1097 they began their conquests, but foon 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 feveral centuries, the western part of Asia was rendered a scene of bloodshed and desolation. When they had contended for fomething more than two hundred years, Jenghiz Khan, the Mogul, feems to have formed the noble defign 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

however,

his exploits. Voltaire, speaking of the irruption of the Moguls, fays, that the people fled every where before them, like wild beafts roused from their dens by other beafts more favage 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 miferable 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 refisted 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 fides, while human blood ran in streams for five or fix 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 fovereignty 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 800, 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 inslict 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 deseated by thirty thousand Scots. But Robert was not contented with afferting 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 inslicted, or was willing to inslict, upon the people among whom he came. In destroying them he destroyed his own army. They were reduced to the most dreadful straits by samine, 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 fee 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 feemed to be but a common affair. Indeed the hiftory 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 beafts, 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 belieged by the Goths under Vitiges, and under Totila. In this last fiege the unhappy citizens were reduced to fuch straits, that they confumed 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 fuch dreadful emergences, it is fcarcely 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 feems 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 fold at eighty dinars, a dog at five, and a cat at three. The Vifir, 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 fold. A violent plague followed, which fwept 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, fo that people were fain to fell 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 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 over-spread 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 foon 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 fo many ages. The crusades had also for some time been discontinued, and the world hath fince 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 insected, that the dittemper could not but prevail for a long time, even though it had not been kept up by the almost continual

wars of the Europeans with one another, which was too much the case. Dr. Sydenham informs us that before his time the plague commonly vifited 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, fays, that the plague was almost continually among the diseases enumerated in their bills of mortality; fo that we may fairly conclude it to have been endemic in that city. Now let us fee 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 fixteenth 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 feems to have languished and died in England, as a plant in a foil not natural to it.

But, though England has fince 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 filently 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 fixty thousand inhabi-

tants 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 with-

out 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 peftilence 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 mifchief 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 disaf-" ters (earthquakes) the architect becomes the enemy " of mankind. The hut of a favage, 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

or 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 fection. At present we may conclude, that, the pestilential contagion having originally fallen upon mankind for their fins, it is still kept alive by the same causes; and, as far as we can conjecture, thefe fins are, the propenfity 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 wafte and now uninhabitable deferts, fit only for ferpents and the most destructive animals. Thus the very climate is changed from what it ought to be; the elements become hoftile 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 fection with a few extracts from his works. Of the fmall pox he fays, 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 " fo long confined to its native foil, without spreading "into diftant countries, I pray him to confider, 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 " feldom or never undertook long voyages by fea, as we 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 vaft " 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 fays, "It appears, I think, very plainly, " that the plague is a real poison, which, being bred in "the fouthern 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, " difeafed persons give it to one another, and from them " contagious matter is lodged in goods of a foft, loofe " texture, which, being packed up and carried into other " countries, let out, when opened, the imprisoned feeds 66 OF

" of the contagion, and produce the disease whenever the " air is disposed to give them force; otherwise they may be diffipated without any confiderable 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 " fpread through all nations, chiefly by means of the " wars with the Saracens. The sweating fickness 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 " fome to have been brought from the famous fiege of "Rhodes, three or four years before, as may be collected " from one place of what Dr. Keyes fays in his treatife 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 " foldiers from that place. This; probably, had its origi-" nal from the plague which broke out at Dantzick a " few years before, and continued fome time among the " cities of the north."

I now take leave, for the present, of this subject, which exhibits the conduct of mankind in fuch a difagreeable 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 inferted in this fection 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

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.

TITHERTO we have confidered the origin of the plague entirely in a moral point of view. We have feen, 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 themfelves 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 insected 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, sew seem to be unexceptionable. that of Dr. Fordyce seems to be among the clearest and most expressive. "Disease (says he) is such an al"teration in the chemical properties of the sluids or folids, or of their organization, or of the action of the moving powers, as produces an inability or diffi"culty of performing the functions of the whole or any part of the system, or pain, or preternatural eva"cuation." 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 folid 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 fome uneasy sensations, and which is called DISEASE. I fay it is commonly attended with uneafiness, 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 fo he continues in health; but let him breathe the vapour of burning charcoal, or of fermenting liquor, mixed in confiderable 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 confequently very different. The various appearances of disease in the human body are called symptoms of that disease, from a Greek word fignifying appearance.*

5. A difease proves mortal only by the DISORGANI-ZATION of the body. By diforganization I mean any confiderable alteration in the structure of the body, vifible or invisible. The truth of this will appear from a confideration 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 iffues from the ground. It rifes but a fmall way, fo that a man may fafely enter, because his head is above the vapour; but, if he brings a finall dog with him, the animal, in consequence of breathing the pernicious fluid, falls down as if dead, and would very foon 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

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 diffection 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 veffels 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 differtation upon the suspension of vital action, quotes fome 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 immerfed, recovered spontaneously. He further adds, that if it be not attempted before the convultions of the animal cease, which on an average of many experiments happens in about eleven minutes and a half, it will not be fufficient to renew the vital motions. But, "among the human species (says Dr. Fothergill) there are not wanting well authenticated instances of fpontaneous recovery at an incomparably longer interval, and after every external 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 fecret springs of life, surmounts the barriers of the resisting blood, and restores circulation with all the other functions. Hence the unexpected recoveries from death-like syncope brought on by sudden terror, or great essusisten of blood, even after the funeral obsequies have been prepared. Hence 44 fome persons have ascidentally been brought to life, even after interment, by ** the rude motion produced in facrelegious attempts to wrest rings or brace** lets from the apparently dead body."

Several furprifing 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 feems 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 feized with the difease, 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 singer. The undertakers being acquainted with this circumstance, next night came to the church where the was buried, opened the fepulchre, and prepared to take off the ring; when to their utter aftonishment the began to raife herfelf up in the coffia. 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 herfelf, returned to her own house. Here being known by her voice, and the ring she wore, the found admittance, and by means of a generous diet gradually regained her health; bringing her husband afterwards three children. and furviving the accident many years.

7. When the organization of the body is injured, the action of the natural powers themselves occasions uneafiness, and increases the disease. The cure then is, to fubstitute instead of the natural power, as far as polfible, the action of fome 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 confumption of the lungs; where, that part being very much diforganized, pure air renders the disease worse; and the fick are relieved by mixing with the common atmofphere fuch kinds of air or vapour as would prove pernicious to people in health. But, supposing this method to be fuccessful, and the consumption to be entirely removed, it is plain that the use of the pure atmosphere must be refumed, 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.

A fecond 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 shood 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 configning their friends and relations to the dust from whence they

were taken.

to. 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 affimilation 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. fays, that " the stomach is the principal feat of many of "the most remarkable sympathetic affections which "happen in valetudinary states of the body. Every " diforder accompanied with fevere pain affects the sto-" mach, whilft this vifcus affects not only in its dif-" eafed 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 faid to fympathize 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 companions are washing with rose-water, never fails to produce this effect; nor does she recover of her indisposition in less than two hours."

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 feemingly 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 precifely 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 foon as it is full; and in the time that the auricle fills, the ventricle contracts. fo that it may be empty, and ready to receive the blood from the auricle. By the contraction of the right ventricle

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tricle the blood is driven into the pulmonary artery, and paffes 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 inferted into the left auricle of the heart, which, as foon 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 fmall branches, which terminate in veins equally fmall 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 fuck 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 veffels. The veins from all parts of the body unite into larger veffels, 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 lest. 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 bronchia; one of which goes to the right and the other to the lest 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 treatife 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 foon dies."*

17. The modern discoveries in the composition of air, have tended greatly to elucidate the use of this sluid 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 moift, and loaded with vapour. An effential change is also made in the nature of the air itfelf; for it now affumes 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 fecond 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 paffage through the lungs, fomething 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. Prieftley 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 fubtile matter is which the blood receives, shall be afterwards inquired into; at present it is sufficient to take notice that it is abfolutely 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

^{*} The discoveries of modern chemists have determined that the aerial fluids 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 sume of burning charcoal, is not a simple but a compound substance; one part confisting of the pure part of the atmosphere, or exygene, the other of real charcoal. The proportions, according to M. Chaptal, are 12,0288 parts of charcoal to 56,687 of exygen.

"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 fomething 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 foft pulpy fubftance, 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 feems composed of fine fibres. The whole of the medullary part of the brain terminates in a substance called the cerebellum, very much refembling the brain, but fmaller. The cerebellum terminates in another fubstance 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 fubstances, viz. the brain, the cerebellum, the medulla oblongata, and spinal marrow. As they pass to all parts

^{*} The name of the veffels 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 sluid, 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 fenses, 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 faid, 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 fame. As therefore the blood is found to receive fomething from the air, and as it loses this when paffing through the arteries, and as the nerves lofe their power when the communication with the blood is cut off, it feems 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 fenfation. 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 fensation originates in the organ appointed for that fensation. 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 reafon

reason to believe that the animal spirits, nervous stuid, 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

confider a little farther the blood-veffels.

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 affured that it does, it feems natural to suppose that these four should be exactly equal. This, however, hath been denied; and fome, from its accommodating the human frame to their theory, have fancied that they faw 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 condenfing it, hinders it from burfting the " veffels. 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 confiderably con-" denfed by the inspired air, that an equal quantity of blood may be received, in one and the same time, by

" 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, afferting 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 fame and equal "time, or a fatal deluge would foon 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 " ftate, 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

[&]quot;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 sound, by accurate mensuration, that when an artery divides, if the diameters of the two branches are made the two thorter sides of a right-angled triangle, the diameter of the trunk will be the hypothenule; 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 flagnates in that place, and at length eats through the flesh and skin.

heart to be equal, and the capacities of the blood veffels 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 paffing 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 confiderable 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 lystem, and which indeed cannot be dispensed with, can only take place in those remoter branches of the arteries in which the blood has reaffumed its former state of dilation or rarefaction.

23. If we confider this matter attentively, we shall find it not a little mysterious. Every time we breathe out the air we have fucked into our lungs, a confiderable quantity of moift 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 confequently 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 precifely as much heat as it carries off, and therefore, though we breathe ever fo 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

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 sluids 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 ensure

25. To fum up then what has been faid concerning the blood and nerves: The whole mass of fluid passes from the right fide of the heart to the lungs. In the lungs it receives from the air fomething * necessary to the functions of life and fenfation, and purifies itself from those matters which might prove pernicious. 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 fenfation, and to the brain, where the whole powers of perception being united form our intellectual faculties, and, as far as our fenfes 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 fide of the heart, from whence it is again fent 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 BRITAN-NICA, second edition, under the article BLOOD, in the year 1778. It has been fince 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 feems now to be proved beyond a doubt that this fomething fo long unknown is that fluid called by Dr. Priestley dephlogisticated air, and by Lavoisier exygen.

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 fweat, but oftener in an invisible vapour from all parts of the body, called infensible perspiration. The latter has been thought to be the great fource of wafte to the human body; and it is certain, that if any person in health be weighed when he rifes in the morning, he will be found confiderably 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 paffes off by the one, and how much by the other, nor indeed does it appear eafy to make fuch an experiment. Galen plainly overlooks the perspiration from the lungs entirely. "This excremen-"titious vapour (fays he) is expelled through fmall ori-"fices, which the Greeks call pores, difperfed all over "the body, and especially over the skin, partly by sweat, "and partly by infenfible perspiration, which escapes " the fight, and is known to few." Sanctorius, and the fucceeding writers, have claffed both together indifcriminately; 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 fays, that the difcharge by the skin "is even much larger than this (the " discharge from the lungs we may suppose) fince it " not only throws off a quantity of the aliment, but "likewife what is added to the blood by inhalation. "which, entering often in a very confiderable quantity, " is thus again expelled." The fame author likewife fays, that the "perspirable matter from the skin is principally water," and that it iffues in fuch quantity as to be feen in fubterraneous caverns evidently flying off from the furface of the body like a denfe vapour. But other physiologists, particularly Dr. Blumenbach, inform us, that the matter of infensible perspiration is quite fimilar to the discharge from the lungs, particularly containing

have

taining a great quantity of fixed air. The fame account is given in Chaptal's chemistry, on the authority of Meffrs. 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 fays 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 (fomething 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, fo does the infentible discharge from the skin purify the folid parts from those particles which are no longer useful. The probability of this also becomes greater by confidering, that in diseases, when the quantity of matter to be thrown off is very great, the skin becomes foul, the teeth furred with black fordes, &c. all which difappear as foon 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 fuch a case our clothes would always be moift; and in the night time the accumulation of moisture would certainly be perceptible. The sweat is entirely of a different nature from the infensible perspiration, and blood and even fand has been known to iffue through the fkin along with it. (See the Anatomical System above quoted.)

27. This very confiderable waste of the body is repaired by the aliment taken into the stomach. In the mouth it is mixed with a confiderable 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 sluids; 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 severs in Bengal, mentions some patients who

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 fecond 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 folution. Dr. Moore has fummed up the discoveries concerning digestion in the following words: "The food, being previously " divided and blended with the faliva and air by mafti-" cation, (chewing) is swallowed, and meets in the sto-" mach with the gastric juice, whose dissolving power, " affisted by the natural heat of the place, is the princi-" pal agent in digeftion. 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 groffer parts " thrown out."

29. The infide of the stomach and intestines are full of the mouths of innumerable small veffels, which continually fuck 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 paffing 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 refervoir called the thoracic due; and this again opens into a large vein on the left fide, called the fubclavian, which conveys the blood from half the upper part of the body; foon after terminating in the vena cava, by which the chyle is conveyed to the heart, thence to the lungs, and fo on in the common courfe

course of circulation. The conversion of the chyle into

bood is called the process of fanguification.

wallow, 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 sound that a portion of black blood assumed a bright, slorid 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 loft that portion of its spirit which it imbibes from the air. When a fluid is to be fecreted, fometimes 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 fuch are the fluids which moisten the infide of the body, and which are carried off by the breath, or by fweat. 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 sluid 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 moift; and the moifture is furnished by the small vessels above described, and which separate part of the lymph from the blood. By fuch 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 " furface of the breaft, belly, and every cavity of the " body; they also overspread the whole external surface " of the body, and large lymphatic veffels 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.) "viscera generally have two sets of lymphatics, one " lying on the furface of the vifcus, and the other " accompanying the blood veffels 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 fame time the notion that any of the " lymphatics are continuations of arteries, and establish-"ing, beyond a doubt, that all are abforbent veffels."* All the lymphatics terminate in the thoracic duct; fo that the liquid separated by the exhalant arteries (so the veffels

veffels 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, flight 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 feen that the body, in general, confifts principally of four great parts, the blood-veffels, the lymphatic veffels, the nerves, and the muscles. Besides these we enumerate the glands and membranes; the former being nearly allied to the blood-veffels, the latter apparently to the nerves. The bones, having no concern with our prefent inquiry, are not taken notice of. The stomach and intestines, being principally composed of muscular fibres, nerves, and blood-veffels, must be considered as belonging to these departments. Each of these large divisions has obtained the name of fystem; and even the subdivision of the blood-veffels into arteries and veins. Thus the arteries of the body, taken collectively, are called the arterial [yftem; the veins the venous system; the brain and nerves the nervous fustem; the muscles the muscular sustem; the lymphatics the lymphatic fystem; 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. Infignificant 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 fight appears an homogeneous fluid; and Boerhaave and others have ascribed diseases to some defect or bad quality of the blood. But this fluid confifts of three parts, each, as far as we can perceive, effentially diffinct from the other;

viz. the lymph, ferum, 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, befides thefe general difeases arifing from what, like the blood, is common to the whole body, each component part of the body has an arterial fystem, a venous fystem, a nervous and lymphatic fystem, &c. belonging to itself; all of which, though dependent on the body at large, have yet laws of their own, in confequence of which any one of them may be confiderably difeafed without much affecting the general fystem; 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 fuch a manner as to produce a general difease; 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 difeases 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 fuch an height as to be evident to our fenfes. In fome 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 phyficians 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; fo 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 faid 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, vel. iv, p. 133-

have been the cause of the intermittent. From a confideration 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 incomprehenfible 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 fay, when we confider all these things, the boldest theorist must be humbled when he attempts to account for the phenomena of disease in any one instance. The exceffive 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 diffemper. "We are ignorant (fays he) by what laws the body pof-" fesses 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 fystematic to despair."

Notwithstanding all these difficulties, however, phyficians 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

Medical theorifts have exerted their greatest abilities in explaining the nature of those general diseases affecting the whole body, denominated fevers; and which are likewife called acute difeases, from the violence with which they fometimes attack, and the rapidity with which they run through their course. Dr. Fordyce fays, that fever will fometimes kill in five minutes from the first sensation of uneafiness. 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; fo that a bare detail of the names which they have given to their divisions and fubdivisions, would constitute a very formidable catalogue; but the latest practitioners are decidedly of opinion that there is but one kind of fever, varying itfelf according to circumstances. Dr. Rush declares himself of this opinion in the most express and positive terms. "There is (fays he) but one fever. However "different the predifposing, remote or exciting causes " may be, ftill, 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 sever. 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.

"I have said that there is but one fever. Of course and species; and species which seem do not be seen designated, like plants and animals, by unchangeable characters.

"I have said that there is but one fever. Of course and species; and species which seem designated, which are designated arrangements of diseases. They erect imaginary boundaries between things which are of an homo-species 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 varying state of the system, &c." I have seen designated.

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

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 treatife on the subject, endeavours to prove that there is not any fingle symptom from the existence of which we can certainly determine the presence of this disease. "Fever (fays 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 finks the thermometer below the natural standard; while the patient fometimes finds himself cold when the thermometer shows him to be really hot, and hot while the fame 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 fenfation of cold. Frequency of the pulse also is no certain fign; and having discussed this last symptom he concludes thus. " If we examine the restlessness, anxiety, "flate of the tongue, head-ach, or any other of the " fymptoms 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 fymptom of fever." Dr. Rush declines giving any definition of fever ; but, with all due deference to these two very experienced physicians, we must account fuch 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 fingle fymptom 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 infifting upon it in various parts of the work, we must certainly be induced to suppose that it was by this fign principally that he determined whether his patients had a fever or not. "The first appear-"ance (fays he) which generally takes place is uneafinefs "and restlessness; a general uneafiness, the patient feel-"ing himself ill, but incapable of fixing on any particular " part of the body. This uneafiness affects the mind " at the same time. Perhaps in this case it is the mind "that is first affected. Along with this uneafiness "there is a restlessness, the patient wishing to change " his place or posture frequently; the mind cannot like-" wife 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 exercifing "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 thefe " appearances are very rarely absent, although indeed "they may also happen in other diseases."

Dr. Rush accounts the lassitude with which sever 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

feet.

This depressed state of sever more frequently when left to itself terminates in petechiæ, buboes, carbuncles, abscesses and mortifications, according as the serum, lymph, or red blood, is essued 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, breaft or fides.

3. The BILIOUS state of sever; 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 seels 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 RE-MITTING 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, pleurify,

rheumatism, hectic and intermitting states.

7. The FAINTING state; occurring in the plague, yel-

low fever, small pox, and some states of pleurify.

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

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 HEMORRHAGIC 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 petechia.

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 fingle diffemper 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 faying that the plague belongs to one kind of fever, ought to fay 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 fore 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 diffemper 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 " claffed among fudden deaths, and all of these have "been very erroneously called apoplexy, or fyncopy " (fainting.) When the attack is fatal, it fometimes "kills in five minutes, sometimes it requires half an " hour, feldom longer than that time. While the pa-"tient is yet fenfible, violent head-ach with great fenfe of chilliness takes place, the extremities become very " cold, and perfectly infenfible; there is great proftration " 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 fomewhat contracted. If the patient goes off very " foon, 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 fubfide, " and the patient is carried off. Of this the author has " feen instances, sometimes at the first attack, oftener in "the returns of the difease, although very few."

This no doubt is very terrible, and no plague whatever can exceed it. Indeed, when death is the termination, it fignifies little what the disease is called. But the question is not whether sever or plague is the most dreadful, but whether they are the same. Now, from the above description, is is plain that sever 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 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 fays, "it is so rare, subtile, volatile and fine, that it in-" finuates into, and refides in, the very pores and inter-"flices of the aerial particles. It is faid 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 arfenical minerals, the most poisonous ani-" mals or infects, 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 fo fecret, that perfons feized "with it feem to be fallen into an ambuscade or a " fnare, of which there feems to be no fuspicion. "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 " fpots, 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 phyfician had prognosticated. A fever, " however, did for the most part shew itself, and was " always of the worst kind. Sometimes it seemed to re-" femble a quotidian, fometimes a tertian; there never " was a total ceffation, but every exacerbation was worfe "than before." In like manner the author of the Iournal of the Plague Year informs us that many, fuppoling

posing themselves, and supposed by others, to be in good health, would suddenly find themselves seized with great fickness, crawl to a bench, and instantly expire. "Ma-"ny (says Dr. Hodges) in the middle of their employ, "with their friends and other engagements, would sud-"denly fall into prosound, 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 severs; in one still inferior it produces severs 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,

The vampire is a kind of bat, of a very large fize, met with in fome 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 sound himself exceedingly weak and faint. He selt 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, less the patient should awake, it keeps sanning 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 ofear'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 difease. many there are mortifications of various parts of the body, but all these are foft, and seemingly corruptions of the flesh. When a person dies of any ordinary distemper, the flesh foon corrupts and diffolves, 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 deftroy the texture of it entirely, and to reduce it to a cinder. This power feems 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 outfide. The tokens themfelves are by Dr. Hodges called "minute distinct blasts, " which had their origin from within, and rose up in " little pyramidal protuberances, fometimes as small as " pins' heads, at others as large as a filver penny; hav-"ing 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 Deufingius. "What is called the "pestilence is most properly remarked by Galen. not to be a genus of any known disease. For whatever diseases and symptoms are affociated 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 fomething dif-

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

er 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, fince a fever does " not effentially belong to it. . . . A pestilential feer 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 dif-" charge the infected humours; which for this reason " putrefy and acquire a preternatural heat, and fo excite "a fever; which by reason of the foresaid secondary " cause, is different and distinct from the plague, and a " fymptom 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 sever 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 cala-

mities 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 sever itself is only manifest by certain changes in the human body. Before we can investigate the nature of sever, 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 fystems of medicine before the time of Boerhaave. are now fo 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 fucceeding theorists, viz. the cohesion of the parts of the body. That, he did so is evident, from his having written upon the difeases 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. microfcopical 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, fince each of them was composed of fix; four touching one another in the middle, with one above, and one below, thus . The ferum was faid to be composed of fingle globules, and by this attenuation it was supposed that the fluid, instead of red, appeared of a yellow colour. however, this was infufficient. Each of the yellow globules was difcovered (either by fancied observations or by conjecture, it matters not which) to be composed of fix others, which, fingly taken, might constitute the lymph or some other fluid; and thus, like the number of the Beaft, we might go on by fixes to the end of the chapter, and folve all the phenomena of nature. justice to the microscopists, however, it must be observed, that fome 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 fubstances, with a black spot in the middle. These vesicles dissolved in pure water, but kept their original form, which he fays was as flat as a shilling, when a fmall portion of neutral falt was added to the fluid. The folid particles he supposed to be produced

by

by the lymphatic fystem; the black particles by the

fpleen.

The supposed observations of Lewenhoeck were of confiderable use to Boerhaave in the forming of his fystem of medicine, though they feem not to have accorded very well with his doctrine of lentor or viscidity in the blood. But, let this be as it will, having laid it down as the foundation of his theory, that the difeases 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 fuch 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 faponaceous 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 fomething. 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-

ous to write or speak against it; and the person who had the audacity to do so underwent a kind of medical profcription 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 feen with nerves proceeding from it long before the heart or any blood-veffet 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 effentially 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 fuch 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; fince the nerves can alter its confistence, or that of any of the fluids secreted from it, by a mere affection of that fystem, 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 fystem, by producing therein a debility. The immediate effect of this debility is a spasm, or preternatural contraction of the capillary veffels, or extremely small arteries. Hence the blood finds fome difficulty in circulating, and the patient is feized with shivering, and has a fense of cold. When this has continued for some time the fystem 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 plaufibly 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 himfelf, 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 fuch 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 fuch 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 confidered 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 flimulus; the opposite would have been a fedative; but according to this fystem 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 fimulants. The total subduction of these reduces the excitability to nothing; of confequence no power can act against it in a state of non-existence. What other physicians call fedatives, therefore, according to the new system, are only weak stimulants. The fallacy of fuch reasoning is obvious; but as it does not affect the practice, we shall not spend any time in confidering it further.

On the principles just now laid down, the Brunonian fystem 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 fuch 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 plaufibility 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 fyftem hath been confiderably 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 belides 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 sever where mercury is found by others to be fo 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 felect 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 dole 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 fkin appearing, it was feared he could not be falivated; this eruption being a fign that no falivation could be produced. The fame mode of treatment, however, was perfifted 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 fix of opium were given every two hours. At the fame 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 faid, nor indeed is it easy to be discovered. At one in the morning, however, the patient died; an event not at all furprifing. Our authors excuse themselves for this failure by faying that the vifcera of the patient were difeafed, as was evinced by the impossibility of exciting a falivation; 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 affent to both these affertions; 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.

Q DAYS

DAYS OF THE

MEDICINES TAKEN.

SYMPTOME.

August Spreceding.

Sept. 182.

Ordinary doses of mercury and opium.

Opium and mercury, two grains each, every two hours; befides opiate draughts.

The opium and 3d mercury as before, but now given every hour; half an ounce of mercurial ointment, with 60 grains calomel.

4th Pills as ufual. Ointmt. thrice rubbed in, once with 120 grains of mercury.

5th Medicines as before.

Medicines as be-6th fore.

7th Pills as before, with four grains of calomel. Mercury in the ointment increafed to half an ounce. Warm bath. At night an ounce of mercurial ointment, with two ounces calomel.

Pain of bowels. and frequent stools, growing worfe.

Still increasing.

Stools very frequent, with violent pain in the bowels; extreme thirst, tongue furred, and no fleep.

Vomiting during the night. Tongue brown and furred.

Violent pain in bowels.

Extreme pain on preffing the arch of the colon; frequent stools, profuse fweats, great dejection of spirits.

As yesterday. An eruption on the fkin. At night inceffant stools, with violent pain in the belly; profuse sweat.

Pills, ointment & Sth calomel as before. Warm bath thrice. At night two ounces ointment, with four of calomel.

Medicines of the fame kind, as many as could be taken.

roth

Inceffant stools, with violent pain; at night with blood. Extreme debility.

Stools innumerable : extremities cold, pulse scarce to be felt.

Death at one in the morning.

From a confideration 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 fuch 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 faid that the poor man, whose case is above related, had a fingle drop of wine, or any thing elfe, except opium, to support him against the action of fuch 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 fay, p. 86, that "mercury acts by " fupporting 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 affimilate 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 medi-

cinally 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 affimilation 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 elestroyed their health.

4. As every medicine has one peculiar nature, and one mode of action in confequence 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 fent out of the body as fast

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 fuch tremendous practice as nobody of common fense 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 feems 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 fuch 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 abfolutely 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 fingle mouthful of meat, as well as by a glass of wine. This shows that both these are general flimulants to the fystem; but what medicine have we that will produce fimilar effects? Perhaps opium comes the nearest in the whole materia medica; but the uneafiness 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 fays 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 fuch fymptoms; 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 Himulant we are acquainted with which acts equally on the whole fystem, and which can be readily exhibited as a medicine, is that pure kind of air called by Dr. Prieftley dephlogisticated, by Scheele empyrean, and by the French chemists and their followers oxygen. The exciting powers of this air, when breathed instead of the ordinary atmosphere, are aftonishing. 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 exhibarates the spirits in an extraordinary manner, but beautifies the face. Did the cure of difeases therefore, or any set of them, depend on mere excitation, no other medicine but oxygen would be neceffary. 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 confumptions, 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 confumption, and was obliged to use much butter and fat meat in his diet, befides giving up the use of the air altogether, in order to get clear of its mischievous effects.

Another mode of flimulating or exciting the whole fystem is, by putting into it a larger quantity of blood than it naturally contains. This is entirely fimilar 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 difeases, 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 feveral instances of the blood of brute animals being infused into human veins, without any inconvenience. It feems, however, not only a bold but an unnatural attempt to use the blood of beafts for fuch 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 fickness; but indeed little can be faid about the practice; as, on account of fome bad confequences, or failures, it was forbidden by the king of France, and by the pope's mandate in Italy, and has now fallen into difuse. In a paragraph at the end of Heister's furgery (4to edition) it is afferted that the transfusion of blood was productive of madness. Dr. Darwin, however, in his Zoonomia, still proposes

the transfusion of blood as a remedy, and even describes a convenient apparatus for performing the operation. In one part of his work he fays, "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 fickness, die of hunger; and, to relieve them from this miserable situation, extraordinary attempts are not only allowable but laudable. The Doctor propofed to his patient, "to supply him daily with a few "ounces of blood taken from an afs, or from the hu-" man animal, who is still more patient and tractable, in " the following manner: To fix a filver pipe, about an "inch long, to each extremity of a chicken's gut, the " part between the two filver 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 filver 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, laftly, "to support the gut and filver ends on a water plate " filled with water of 98 degrees of heat; and, to mea-" fure how many ounces of blood were taken away, to " compress the gut from the receiving pipe to the deli-" vering pipe." The gentleman defired a day to confider of this proposal, and then another; after which he totally refused it, faying that he was now too old to have much enjoyment of life, and that, being fo far advanced in a journey which he must certainly accomplish fooner or later, be thought it better to proceed than return. The Doctor informs us that he died a few days afterwards, feemingly very eafy, and careless about the matter. One experiment of this kind I have been witness

to; not indeed on a human creature, but on a calf. This creature received into one of its jugular veins a confiderable quantity of blood from the carotid artery of another, nearly of the same age (about a month, or little more.) It was impossible to fay any thing about how much was transfused; only the bleeding was continued till the animal which loft the blood began to shew figns of faint-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 affumed 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 fuch 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 tak place in some degree by the use of ordinary medicines This path is not absolutely untrodden: the pneumat practitioners of the present day have tried oxygen confumptions, and found it pernicious; and D 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.

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Before we dismiss the consideration of medical theories, however, it will still be necessary to give some account of the new fystem 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 difease 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 difease of excitement. These two doctrines are, in every sense of the word, as distant from one another as east from west. Let us then confider both, if any confideration 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 cottion, or concottion; which, if we pleafe, we may express by the English word cooking. matter of the difease, called also morbific matter, thus cooked, was in a state proper for expulsion, and was therefore thrown out by fweat, vomit, stool, &c. or it might be expelled artificially, which could not have been attempted with fafety before. Modern systems deny the existence of morbific matter, and resolve all into an affection of the nerves, according to Dr. Cullen by certain fedative causes, but according to Dr. Brown by an accumulation in fome cases, and an exhaustion in others, of the excitability or excitement of the body. The Science of Life commences with stating what they fuppose to be an improvement of the Brunonian principles, and from which the following account of the ori-

gin of diseases is extracted. "Upon the different states of " excitability depend all the phenomena of health and dif-" ease. There are three states of the excitability. 1. The state of accumulation; when a portion of the usual "flimuli 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 " exhaufted, 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 "difeafes to which living bodies are fubject."

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 fmaller degree of health; which we know without any medical instructor. If, inflead 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 fingle 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 fenforial 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 fometimes they are fick!

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 (fays 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 fymptoms produced by things quite obvious to our fenses. 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 faid to be the proximate cause. It would certainly be better to throw away fuch words altogether, and fay that cold, heat, &c. cause fevers, without troubling ourselves farther about the matter.

It remains now to take into confideration the pneumatic theories, founded upon the discoveries made by Dr. Black, Dr. Prieftley, Lavoisier, and others, concerning various kinds of aerial fluids, or gafes,* as they are also called. Some of these, particularly that afterwards called fixed air, were discovered by Van Helmont. Confiderable advances were made by a German chemist, named Mayow, in the last century; but his book had fallen into fuch oblivion that his name was fcarce ever mentioned, until his discoveries were repeated, and still greater advances made by others. Dr. Hales obtained air from a great many different fubstances, but was unable to afcertain 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, fignifying 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 magnefia alba. Some of this he distilled with a heat sufficient to make the vessel red hot. Only a very fmall quantity of water came over, but the magnefia had loft 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 magnefia to another from which it had been previoully 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 potath. Hence if any of thefe fubstances 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 fubstance 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 fay that the air is absorbed, we must still remember that only one part of it is fo, and that by far the least confiderable 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 Webfter 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 alfo, otherwife we make no advance in folid 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 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 folution of phenomena which it could not folve. 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 fometimes prove fatal to travellers. The pernicious vapours called mofetes, which sometimes issue from the old lavas of Vesuvius in Italy, were likewise supposed to be the fame; but of this, particularly with regard to the famiel, there seems to be no sufficient evidence.

^{*} 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 flories 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 deferts of Arabia, but is met with in all hot countries which are destitute of water. In the African deferts therefore it is common; and Mr. Bruce describes it by the name of simoom. It was preceded by whirlwinds of a ve-Ty extraordinary kind. "In that vast expanse of defert (fays he) from W. " and to N. W. of us, we faw a number of prodigious pillars of fand at dif-56 ferent distances, at times moving with great celerity, at others walking on " with a majestic flowness. At intervals we thought they were coming in a so very few minutes to overwhelm us; and fmall quantities of fand did actu-" ally more than once reach us. Again they would retreat fo as to be almost out of fight; their tops reaching to the very clouds." There the tops often fe-" parated from the bodies; and thefe, once disjoined, difperfed in the air, and did not appear more. Sometimes they were broken near the middle, 44 as if fruck with a large cannon shot. About noon they began to advance so with confiderable swiftness upon us, the wind being very strong at north. " Eleven of them ranged along fide of us at about the distance of three if miles. The largest of them appeared to me at that distance to be about se ten feet diameter. It was in vain to think of flying; the swiftest so horse or the fasted failing ship, could be of no use to carry us out of this " danger; and the full pertuation of this rivetted me as if to the fpot where "I stood." At another time he saw them in much greater number, but of smaller size. They began immediately after funrise, like a thick wood, and almost darkened the fun. 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

N. B. In these fandy deferts, where it never rains, there are no clouds.

The industry of other experimenters did not long leave theorifts without abundance of materials upon which they might exercise their talents. It is impossible in this place to affign 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, infects 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 fome 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

fpangled 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 defert pants and heaves beneath; Ting'd by the crimfon fun, vast columns rise Of eddying fands, and war amid the skies, In red arcades the billowy plains furround, And whirling turrets stalk along the ground."

Whether the fimoom 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 fure prefage. His advice was, that all of them, upon the approach of the pernicious blaft, should fall upon their faces, with their mouths on the earth, and hold their breath as long as possible, fo that they might not inhale the deadly vapour. They foon had occasion to follow this advice; for next day Idris called out to them to fall upon their faces, for the fimoom was coming. " I faw (fays Mr. Bruce) from the S. E. a haze com-" ing, in colour like the purple part of the rainbow, but not fo 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 fearce turn to fall upon the ground, with as 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 faw, was indeed passed; but the light air that still blew was of heat sufficient to threaten " fuffocation. For my part, I felt diffinctly in my breaft that I had imbibed " a part of it; nor was I free of an afthmatic fenfation till I had been fome months in Italy, at the baths of Poretta, near two years afterwards." It continued to blow for fome time, and in fuch a manner as entirely to exhauft them, though fearcely fufficient to raife a leaf from the ground.

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

it consisted of two different kinds of sluids, 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 slame, the latter extinguish-

ing 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 fix, eight, or ten times, but feldom continues more than a few minutes at a time. It often passes with the apparent quickness of lightning. The fign of its approach is a thick haze, which appears like a cloud of duft rifing out of the horizon, on which they throw themselves with their faces on the ground, as already mentioned. Camels are faid, instinctively, to bury their nofes in the fand. As for the stories of its disfolving the cohesion of the body in fuch 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 fubstance, we cannot by any means give credit to them. From its extreme quickness, and luminous appearance, it would feem to be an electrical phenomenon immediately preceding those vehement hot winds which all travellers agree in likening to the vapour iffuing 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 fay it always leaves behind it a very fulphureous fmell. These particulars do not at all accord with the supposition of its confifting of fixed air. I have indeed been affured by a gentleman long in the fervice 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 fame 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 mofetes are invisible, and kill in an instant. They rife 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 sound 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 sound in most terrestrial substances, he and his sollowers 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. Prieftley and some others.

In the midst of so much theory, and so many new and furprifing 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 fo. In passing this censure upon the modern nomenclature, as it is called, I am fenfible that I must rank with the minority; nevertheless, I have the fatisfaction of finding that I am not altogether fingular. Dr. Ferriar, in the preface to his fecond volume, complains, "that, with every attempt towards the for-" mation of a system, new applications of words are in-"troduced, which, though defirable 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-" fland, but which his readers find it very difficult to " unriddle. Hence refults 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 presace to his first volume, he cites Quintilian. *" Some have fuch a multitude of vain words, that, while they are afraid of speaking like other people,

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

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

The pneumatic fystem 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 preferve life for fome time at leaft, and the other inftantly destroy it, it became natural to think that diseases might be produced by any confiderable variation in the proportion of these ingredients. An instrument was foon invented by which any confiderable 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, fome confiderable alteration might be produced. which could not but be perceptible in the human body; and this led to the application of aerial chemistry to diforders of the lungs. The mixture chosen for this purpole 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 fome 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 fervice in the fea-fourvy; 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 sire 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 fuch 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 difease could be cured by any addition of oxygen to the folid parts; because, though found flesh may have an inclination to abforb this kind of air, we do not know whether it would have fuch a property of absorption in a difeafed state. Indeed in the scurvy, which Dr. Beddoes chooses as an example, experiment feems to determine in favour of fixed air rather than any other. But let us hear Dr. Girtanner himself, who has at large discussed this fubject 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 thest; 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 excitabi-

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 fays, in a fibre "con-"fifts 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 furplus of this irritable prin-"ciple, which the lungs and the circulation of the "fluids are continually fupplying. For this a certain " equilibrium is necessary between the stimuli applied " and the irritability of the fibre, in fine that the fum 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 "fum 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 fum of the "fimuli 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 fpeaking, "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 sabric; 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

fomething

fomething more cognizable by our fenses. It is imposfible, however, to pass over in filence the amazing inattention of the author, in imagining that on fuch 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 fay, 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 infensibility, 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 fense and motion! Yet this is all that we are informed of with fo much parade and affumption of novelty. We know that when a person is in a faint he is infenfible to ordinary stimuli, though very ftrong 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 abforb-"ing any thing from the atmosphere. . . . After hav-"ing a long time attended the phenomena of respira-"tion, and made many experiments upon this fubject, "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 confists 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 exifted, but heat, greater or less according to circumstances. When the air is taken into the blood, one part of it undoubtedly combines with fomething thrown out by the lungs, and forms fixed air, of which our breath contains a confiderable 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

^{*} 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 feries 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 slesh emits in distillation can be derived from the air by respiration.

Another and more probable fource 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 bydrogen when mentioned by themselves are not under-Rood to figuify 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 suid 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 fussiciently 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 monofyllable, which may happen in numberless instances, totally perverts the meaning of the author, and may of courfe 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 confequence 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 fubftance, or only one of its component parts. Probably he means the condensable or folid part. If he does fo, there must be a very material difference between his theory and that laid down in the Encyclopædia, and which is supported throughout this treatife. 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 sluid, communicating to it not only the red colour, but heat, and the principles of life and fenfation, as will be more fully explained in the fequel.

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 paffage 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

exygenation 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 infenfible perspiration; but there can be no doubt that this receives its elafticity only at the furface 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 airpump, does not fwell in the least when the air is exhausted, which yet must be the case, did the smallest quantity of elastic air exist in it.*

^{*} Hydrogen air is the fame with that by Dr. Priestley called instammable 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 afferts 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 chemifts, who supposed that every thing which could be extracted from any substance by fire, existed previously in it, in that very form in which it is extracted by the fire; and in the fecond 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 elfe, give this dark colour to the venous blood. "A fmall glass tube (fays he) filled with arte-" rial blood, of a bright vermilion, was fealed hermeti-" cally, * and exposed to the light. The blood chan-" ged its colour by degrees, and in fix 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 preferve it? The case here is precifely fimilar to what happens with the calx of filver. When that metal is diffolved in aqua fortis, and again reduced to a folid form, it appears as a white powder, and will preferve its colour if carefully kept from the light; but if a vial be filled with it, and exposed to the fun, that fide 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 calk 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 phlogifton 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 confiderable loss to understand what the natural colour of it is; and indeed the question can only be determined by examining the blood of a feetus which has never breathed. If the arterial blood of fuch a feetus be of a dark colour, refembling 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 foon 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 fyrup of violets, or an alkali of a green colour in the fame. Experiments are yet wanting to determine this matter. Mr. Hunter has observed that "in such fee-"tufes as convert animal matter into nourishment, they " most probably have it (the colour of the blood) influ-" enced by the air, fuch 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 elaftic principle of the oxygen that it is rendered brighter; and that, this elaftic principle being expended in the course of circulation, the fluid reasfumes its original colour.

3. Though enough has already been faid 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 pheno-

mena not of the dead, but of the living body. 1. A gentleman in an apoplexy, who feemed to breathe with great difficulty, was bled in the temporal artery. The blood flowed very flowly, and for a long time. It was as dark as venous blood. He was relieved by the operation; but, on opening the fame orifice in two hours, the blood flowed of the usual florid colour. 2. A lady in an apoplexy was treated in the fame 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 procels fimilar 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 elaftic part is diffipated 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 condenfable part, uniting with certain particles to be thrown off from the body, passes away in fixed air. Thus the process of respiration does not refemble the calcination of a metal (at least according 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 fufficient to determine this point. It is true that many very able physiologists, as Borelli, Jurin, Sec.

&c. have been of opinion, that part of the air is abforbed in respiration; but when we come to particulars nothing can be determined. Dr. Hales by experiment found the quantity absorbed to be a fixty-eighth part of the whole quantity inspired; but, on account of supposed errors, he states it only at an hundred and thirty-fixth 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 fixty, 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 fo, may be obtained in their original form. This experiment is fo decifive, that nothing can be faid against it with any shadow of reason; but who hath made, or who can make, fimilar experiments with the blood of a living man? Such experiments indeed might be made, if infenfible perspiration did not stand in our way. Common atmospherical air is about eight hundred times lighter than water. A cubic inch of diffilled 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 fix hundred inches of it are equal to an inch of water. If then the blood abforb three hundred and fixty inches of air in one hour, it will in twenty-four hours have absorbed eight thousand fix 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 infenfibly perspired in that time is fo 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 fource 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 folution of which must be attended with the utmost difficulty. We must know, in the first place, how much oxygen was contained in the air infpired. 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 fuch 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, lepton, phlogisticated air is contained in the atmosphere inspired,

and likewise in that expired. In the fixth place, we must be affured 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 (fays he) is found "to confift of various vapours, of which air, or, as it " has been called, pure air, or respirable air, (oxygen air) " forms at prefent about a fourth. Gas (probably fixed " air) forms fome part; but the greatest part confists " 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 fuch, 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 fame; but even this cannot be accounted a decifive proof of the oxygen being totally exhaufted; for the moift vapour with which the breath abounds may extinguish the fire, even though fome small quantity of oxygen should remain in it. It is not, however, our business at present to enter minutely into fuch discussions. From what has been already faid,

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 Differtation, 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 ease, 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 abforbed 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 fo implicitly, and in a manner univerfally, 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; fo 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 demonftrate, that, though mercury abforbs oxygen during calcination, this is not the case with all metals; that in many cases the oxygen will unite with other fubstances 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 likewife shown that phlogisticated air (azote) is not a fimple fubstance, as has been taught by the new chemifts, but confifts, 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 converfions fo great, it is impossible to fay 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 abforbed, 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 sacts, 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 affertion which cannot be eafily 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 confiderable 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 feconds. With carbonic acid gas (fixed air) a third dog died in a quarter of an hour. A fourth was killed in fix 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 fafely admitted into the blood in its elaftic state. If any fuch 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 fo natural, that we might have thought he would have foreseen and provided against them. Instead of this he grounds the whole upon fuch flender evidence as could not be admitted in the most trifling matter.

^{*} Nitrous air is that fuffocating 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 immediately, and a separation of a great quantity of black is fin ferum took place. The day after, on opening the bottle, a very strong smell of nitrous ether (dulcissed fpirit of nitre) was perceived, the nitrous air having been changed in part into nitrous ether by the carbonic 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 intimately 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 folid reason, from what he says, for supposing any such thing. How can any man determine from the mere finell 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 airpump 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 affured 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 loft 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 faid, we may fairly conclude, that no proof can be brought fufficient to prove the exiftence 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 refumes its aerial nature by combining with the superfluous heat of the body, and is evaporated through the pores of the fkin by infenfible 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 fame; 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 condenfable part of the fixed air; and hence we may perhaps account for the very grateful and cooling fensation 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.*

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

When the blood therefore grows very black, when the teeth are covered with a black fordes, the hands become foul, &c. we may fay, indeed we too furely feel, that, in fuch 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 fuch 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 fystem, " 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 confider 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 feems to be almost entirely owing to Dr. Black, who hath discovered some very remarkable phenomena unknown to former philosophers. His difcovery 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.

ter, which we daily fee, is an undoubted proof that there cannot be any effectial 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, sless, horns, &c. Besides, Br. Priestley has shown that every particle of charcoal may be volatilized into instammable air, with as great accuracy as any human experiment can be made; so that in this safe 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; fo that a quantity of heat feemed to be totally loft and in a manner annihilated. His attention was engaged by this unexpected phenomenon, and, profecuting 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 fo 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 refult of his experiments in short was this: Water, when frozen, abforbs an hundred and thirty-five degrees of heat before its fluidity can be reftored: 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, fo 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 fubstance of the body, without being fensible to the touch, while in its other state it hath no effect upon the internal parts, but affects bodies on the outfide. The former state therefore the Doctor diffinguished by the name of latent, the latter by that of fenfible 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 profecuting the experiment he found the quantity of heat absorbed by the water, when raised into vapour, truly furprifing; no less than a thouland degrees; an heat more than fufficient 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 fuggested one, which, had it proved fuccessful, 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 faid that, in this experiment, Dr. Black was equally concerned with Mr. Watt; but, in a personal conversation with the Doctor himself, he affured me that he had no farther concern than foretelling that the experiment would not fucceed, which it feems 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 confequence was, that a confiderable quantity of water entered the veffel, and was eafily poured back into the retort, as a subject for distillation. A fire being now applied, the water was foon raifed into fleam, 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 foon as any of the steam was condensed, the space which it had occupied (according to Dr. Black one thousand and fixty-fix 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 suel therefore in the practice of distillation, which was Mr. Watt's object in making the experiment, was quite trissing, and not equal to the trouble of filling the retort with liquid.

The doctrine of latent heat thus established, furnished a folution of many phenomena which could not formerly be explained in a fatisfactory manner. Thus the melting of all kinds of fubstances 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 folid state, absorbs 135 degrees of heat before it becomes fluid. A thousand degrees more convert it into vapour, and at last, by pasfing 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 fimilar 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 treatife. 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 fource 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 confift in a comparatively fmaller degree of heat, some phenomena occurred which would not eafily admit of folution upon fuch an hypothefis. With these Dr. Black did not meddle much, but others were bolder. Dr. Irving, Professor of Chemiftry at Glasgow, undertook to explain the whole mystery of latent heat upon the fingle 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 feemed to repel each other, and a very remarkable instance of this was, that, in the morning, a little before funrife, when the rays of light pass through the atmolphere, a little above the furface of the earth, the air then becomes manifestly colder than even at midnight. Dr. Irving's explanation of this was, that that the fun's rays attracted heat from the atmosphere, and thus rendered it colder. Such at least was the explanation given in an inaugural differtation 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 subfifts, or is supposed to subfift, between heat and all other substances, it is plain that while this attraction

attraction subfifts, 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 fay 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 folid; and thus, from the change of capacity, in different fubftances, every phenomenon was folved.

This doctrine of capacities did not give general fatisfaction. 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, fo 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 fame opinion. The doctrine, however, had feveral 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 eafily 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 fenfi-" bly warmer than the ice before its liquefaction; which

^{*} 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 faid to be owing to the water having a greater case 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 affigned 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 fay, confonantly 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 furplus quantity must be introduced, that surplus, " remianing free and uncombined, must act and be sen-"fible 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 ftrong 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, feemingly by rote, from one author to another, without the least inquiry or investigation. Dr. Girtanner indeed fays 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 affigning a very doubtful cause for a very doubtful effect. 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 furrounding bodies than venous blood does;

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 denfity. The more fluid and the more eafily expansible into vapour that any substance is, the greater quantity of heat it is capable of containing, and vice verfa. This has been fully afcertained by Mr. William Jones, an English clergyman, whose observations on the generally received fystem 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-filver of the fame temperature with the water. As the quick-filver 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 fuch 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 diffant 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 consideration

^{*} Count Rumford was superintendant of boring the cannon in the work-shops 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 folid 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 fo redu-" ced to chips, ought not only to be changed, but the " change undergone by them be fufficiently great to ac-" count for all the heat produced. But no fuch 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 " faw, and putting them at the fame temperature, that " of boiling water, and putting them into equal quanti-" ties of cold water (that is to fay, at 59 to 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 flips were put."

From this experiment, feveral times repeated with the fame refult, 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 preffure 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 horf-" 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, fays the author, " Is it possible that "the very confiderable 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 61 lbs. of "ice, or making near five pounds of ice-cold water to

"boil) could have been furnished by so inconsiderable a " quantity of metallic dust, and this merely in confe-" 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 confequently it must have " given off more than fixty-fix thousand, three hundred and " fixty degrees of heat to have produced the effects which " were actually found to have been produced in this

" experiment.'

It was next confidered 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 fenfibly 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 fo much heat, that in one hour the temperature of the water furounding the cylinder was raifed 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 " fame time with a clear, bright flame." From all these experiments, however, our author does not draw any certain conclusion. "What is heat? (fays he.) Is there " any fuch 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 furfaces, was not furnished by fmall particles of metal, detached from the larger folid

^{*}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 furrounded the machinery, because this " water was continually receiving heat from the machi-" nery and could not at the fame 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 infulated body, " or lystem 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 infinuation, that the cylinder and borer were infulated, or cut off from all communication with any other material fubstance. 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 perfons have supposed, fire be an element universally prefent, and which becomes fenfible to the touch only in consequence of a particular mode of action, it will follow, that no substance in nature can be infulated 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 effentially material, though invisible to us.

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

fubjects,

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 confift in the vibratory motion of the paticles of folid bodies, feemed altogether untenable. It is impoffible 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 fuch bodies as are heated. But if from this fact we infer that the parts of elementary fire are repulfive of one another, our reasoning is certainly erroneous. In like manner, when we are not fenfible 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 indifcoverable either by

our fenses 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 hypothefis 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 feems 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 fuch a manner that the temperature of the water in the tub might communicate itself to that in the bason. This being afcertained 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 fhort time pervade the small bafon, and affect the thermometer there. The latter would therefore rife; but instead of this it fell several degrees

degrees before it began to rife; for which it doth not appear that any other reason can be affigned 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 fink previous to its rifing. To the same purpose we may urge the phenomenon already taken notice of, viz. that the fun's rays, when paffing at some distance above the surface of the earth, cool the lower part of the atmosphere. The natural folution is, that the heat of the fun 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 fuch 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 effential 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 immerfed in it will fink 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 digefter, formerly mentioned, it appears that the additional quantity of heat, which the water was made to receive, very quickly left it as foon 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 omniprefent in its nature, infinite in its quantity, and equable, uniform and inceffant in its action; as far as thefe 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 celeftial spaces; the other the electric fluid, which penetrates every terreftial substance. Both of these produce heat, unlimited in quantity, as well as in duration, provided their action be continually 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 intenfity or duration. With regard to the folar 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 fun fhines 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 fubtile fluid in motion. One demonstration of this is, that, on the tops of the highest mountains, a burning lens or mirror will fet fire to combustible bodies as readily as in the vallies at the foot of them. Neither has heat, properly fo 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 fimilar 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 fomething criminal in the supposition. The opposition, however, was founded upon the same error with that about the folar 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 fuch 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 fuch a degree as to fet 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 fun and the electric fluid are the fame 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 sluid sets in motion, attracts, repels, or acts otherwise upon this unknown something; just as it comes into our heads to sabricate 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 sluid can perform? If we do not know what they can do, neither do we know what they cannot; and the invention of other sluids must be accounted not only chimerical but useless.

But, to be more particular: on the subject of heat people have embarraffed themselves more with philosophical reveries than by any real difficulty, and rendered the matter more obscure than nature has made it. have already observed, that by the convergence of light, or of electricity, heat is always produced. Here we can fee the mode in which the fluid acts, viz. first by converging, and then diverging. When the light falls upon a folid 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 filver. But, when the light falls upon a body capable of allowing it to enter its fubstance, 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 fame 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 fenfible 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 fubtile fluid we speak of becomes greater than the external, the water is converted into vapour; and it is remarkable that the fame effect takes place on greatly augmenting the degree of cold; for the evaporation from ice, even in frosty weather, is found to be very confiderable.

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, fo that in fome 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 fubstances 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 fnow and warm water are mixed together the temperature of the mixture differs very confiderably

from the arithmetical mean between the temperatures of the two substances employed. Dr. Crawford prosecuted the experiment further, and found that there were sew 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 determining 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 consusion wherever it is introduced.

With regard to the power which fets 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 fo 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 eafily 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 sluid 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 preffure

pressure the parts of the two substances are forced into such close contact, that an agitation and emission of the sluid 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 fubtile 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 furrounding fluid. By mixture with different substances the temperatures of various bodies may be changed; by fome 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 confider another fluid which has very generally been accounted the fource and fountain of heat, viz. air. This is indeed fo much the fource 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 fun'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. Prieftley thinks water is an Gential in the composition of air.

bly conclude that heat, attached to fome other fubstance, 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 alfo, 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 elafticity 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 reafon why this must constantly take place is, that part of the heat evaporates from the furface 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 confequently 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 fomewhat more than it gives out by the breath. Thus, while the air we breathe continues the fame, 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 air in conjunction with certain effluvia from putrid vegetable or animal bodies. Thus, in feveral 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, affigned 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 in-"habitants, who for the most part live very poorly and " nastily; the streets are narrow and close; it is fituate "in a fandy 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 paffes 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. fo that " the stench which arises from this and the mud toge-" ther is infufferably 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 fet in " at the same time, lending their affistance by purifying "the air." He then proceeds to account for the plagues in Ethiopia in the manner above related, viz. by the prodigious fwarms 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, occafion a pestilence; the putrefaction being heightened by the intemperance of the climate, which here is fo 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 ufually invades it whenever rains fall during the fultry 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 treatife are fufficient to render it very doubtful,

doubtful, at least, whether the plague ever does originate in Cairo, or any other place in Egypt. Befides, 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 formething 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 fay that this unknown fomething 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 feason 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 feven 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 fitu-" 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 " ftructure, were not the effect destroyed by the excef-" five 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.

will

" one can account for this; though a year feldom paf-

" fed by before without a vifit from it."*

From this it plainly appears, that, however these putrid esthuvia 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 sever; 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 sever 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 sever, 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 severish patient was, and bringing with him the insection, which was communicated to others in the room to which he came. He owns, however, that by allowing the air to stagnate in which severish patients are, the insection

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

[†] At the time of writing his treatife 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 severs to other difference 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, capation ble of producing sever, on being applied to the body."

2. Effluvia from putrid animal or vegetable matters. Of this our author feems to be less fully ascertained than of the former, as he does not say that he has observed any instances of severs arising from this cause; and he concludes by observing that "either the cause of sever, "consisting of matter produced in the body of a person affected with this disease, seems probably different from that produced by putresaction, or might be generated

" without any putrefaction taking place."

3. Cold. Our author "is not disposed to allow that "sudden exposure to cold occasions sever to take place, unless some symptom of the disease follows immediately. If a man had been suddenly exposed to cold, and continued in persect health for twenty-four hours, the author would never allow that sever, or any other disease, was occasioned by it. In this case (exposure to cold) the evidence is much stronger than in that of infection; 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 sever, unless the air has particles of water floating in it; in which case sever 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 sever.

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 flowly, is more apt to produce fevers than what proceeds from the fea, lakes or rapid rivers. "This (fays the Doctor) " has given occasion to suppose that some other vapours " proceed from fuch marfnes befide water, and produce "the difease. 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 enfue, they " are certainly in confequence 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 arss my

"my encamped upon fandy 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 perfectly healthy before, and no more fevers were produced 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

" fitting in rooms, the floors of which had been just

" moistened with pure water."

5. Certain kinds of food. On this Dr. Fordyce obferves, that, though food of difficult digeftion 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 unwholfome 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. 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 faid, that bad food is very feldom the cause of fever; for among fo 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 fimuli is not the cause of sever.

6. Passions of the mind. These are looked upon by Dr. Fordyce to be among the less frequent causes of sever, 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 severs, and even in the plague itself. "Contagious severs (says he) afford strong instances of the influence

es of

" of mental affections, both as prophylactics and reme-"dies. The plague is a remarkable example, and the " fame reasoning extends to other disorders of a febrile, " contagious nature. Fear, it is well observed by Dr. "Cullen, by weakening the body, and thereby increaf-" 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-" ftroying 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, " paffing-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 " engroffing 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 fuch diforders. We "know that contagious fevers have a peculiar tendency " to diminish the energy of the brain, and of course to " debilitate the whole fystem; and that this is especially " the case with the plague, which produces the most con-" fiderable effects in weakening the nervous * fystem 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 thould 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 " fo effectually kept up as by inspiring a confidence of " recovery."

^{* &}quot; 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 paffions in producing diseases, or death itself; some of the most remarkable of which follow. " All the passions (says he) when carried "to excefs, bring on very formidable difeases. 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 confider 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 fense of stric-"ture in the breaft, and an hefitation to speak; the "tongue remaining as it were immoveably fixed on the " palate. Hysterical and hypocondriacal affections are " fometimes the effects of grief in the most healthy peo-" ple. Joy is much more dangerous to life than fudden 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-" fopher would hoard up treasure, died fuddenly on "finding under her uncle's bed a box containing fixty "thousand ducats. Violent anger has sometimes pro-"duced hæmorrhages and fubcutaneous extravalations: " 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 epilepfy, colic, or a violent degree of fever. Some-"times it has occasioned an increased flow of bile. In " fome this produces vomiting; in others it goes off " downwards, and causes diarrhoea; or being retained, " from a stricture of the gall-ducts, will perhaps be ab-" forbed, 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 "fimilar 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-

"ing persons. In some cases it has not only excited im-" mediate convulfions, but caused them to return peri-" odically. Fear has been faid to make the hair stand " upright, and to contract the pores from which the hairs " iffue in the same manner as cold does. There are in-" flances in authors even of the colour of the hair be-"ing changed by excessive fright. Philip V died " fuddenly 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 fick. A firmness of mind is one of the best " prefervations 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 " affures 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 " Leipfic wholly to fear. The French phyficians, who "wrote on the plague at Marfeilles, went so far as to "deny its being contagious, and afcribed 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

"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

"the difease, seems to have been a fever, * produced by

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, fent 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 folitary shepherd, having " no communication with any body, fell fick 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 fecluded "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-"ifts; or, finally, whether it fometimes 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, feems inclined to think that it may arise without any predispofing cause; and after having enumerated the various causes already mentioned, and fully confidered them, gives it as his opinion, that "there must undoubtedly be other causes than those which give occasion to the difease, but which are at present totally unknown." In like manner Dr. Moore, speaking of the nervous fever, fums 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 fickly " conftitutions, and those whose minds are saddened by " depressing passions, are greatly predisposed to this dif-"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 effential " part

" part of our knowledge respecting the cause of this "difease; and even this little is diffurbed with uncer-"tainty: for we fometimes 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 feveral miles round; and, in short, when we " cannot connect it with any of the causes supposed to " be the fources 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 predifposed "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 fuspected. 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 fome other fource."

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 feems not to depend on fensible alteration " or fuccession 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, " univerfally Aa

"univerfally prevalent, would be greatly diminished; more effectual means of preservation would be found out, and the application of them might safely be limited 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 fubfift without any material " consequence. The return of the plague at Aleppo " happens at irregular periods; the intervals are of con-" fiderable, 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 fe-" veral times in the places now mentioned, without affect-"ing Aleppo; and even in two or three years fubfe-" quent to 1762, though it was at Marash, as well as-"other places not far diftant, with which Aleppo has " continual intercourse, no instances were discovered of " communicated infection: if fuch 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 Marath when the plague " broke out there, returned to their families in the fum-" mer of 1763, but that caravans of various merchandile " arrived in the course of the same summer.

"I consider it therefore as an established fact in the Levant, that commerce and intercourse with insected towns is sometimes attended with no bad consequence. The same thing may perhaps by afferted, without restriction, of all countries; but till the signs indicating a pestilential constitution be ascertained, no particular year can be declared exempt from danger. Predictions 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 dissimitar; and the same visible concurrence, usually deemed pestilential, has often, in the revolution of years, been observed to return, in various countries, without producing the dreaded consequences. Upon the whole, from all I have been able to collect, the pestilential constitution seems bitherto to be known only from its effects; neither its approach nor its retreat can be predicted; and its nature remains wrapped up in MYSTERIOUS and its nature remains wrapped up in MYSTERIOUS."

Having thus feen, that, of the causes commonly asfigned 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 fuch a distinction: for, though we should prove, ever fo clearly, that a difease 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 fense in which it shall for the future be used in this treatife, 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 indiffinctly 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 arif-"ing from the body under disease, miasma, a matter " arifing from other substances. But, as the cause of " continued fevers may arise from other substances than "the human body, and may in fuch cases be called a " miasma, and, as other miasmata also may produce con-" tagious

"tagious disorders, it will be proper to distinguish the cause of severs by using the terms marsh, or human effluvia, 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 (fays he) is a contagious " disease; that is, an emanation from a body diseased, pas-"fing into one which is found, produces, in time, the " fame difease," &c.. There must, however, undoubtedly have been fomething originally distinct from the human body which gave rife at least to the first plague that was in the world; and some plagues recorded in history are faid to have arisen in this way. Thus, Ammianus Marcellinus fays 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 peftilence. 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 fufficient to show what were the received opinions at the time. In like manner every one has heard of peftilential effluvia breaking out from the earth, from graves, &c. fo 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 failors, 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 fo, but it shows the general opinion, that the original cause or contagion which produces a plague is diffinct 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 affured that people have been fuddenly killed by explosions, probably of the electrical kind, or by lightning iffuing 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 faid 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 fick, 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, foon after which he fell fick 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 fick. 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 decifive in favour of pestilential contagion being capable of taking up its refidence in the earth. As it stands at present, it can only draw our attention to what may happen in another case, should any fimilar one occur.*

With

^{*} Though the writer of this Treatife was not at that time on the fpot 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 sever in the neighbourhood from whom it might have been derived, or any thing which might have strongly predisposed 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

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 slash (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 towards 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 apartment, 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

arife 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 feveral people in the neighbourhood.

From M. Chaptal's observations it appears, that bodies do not foon dissolve in fuch a manner as to emit no difagreeable or noxious effluvia, when buried. M. Becher, he fays, " had the courage to make observations during the course 44 of a year upon the decomposition of a carcase in the open air. The first er vapour which rifes, he fays, is fubtle and naufeous : fome days after, it has a certain four and penetrating fmell. After the first weeks the skin becomes covered with a down, and appears yellowish; greenish spots are o formed in various places, which afterwards become livid and black; a thick er glosey or mouldy substance then covers the greatest part of the body: the stopots open and emit a sanies." In such as are buried the decomposicion is much more flow; our author thinks four times at leaft. 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 flow. This decomposition is favoured by the presence of water, and likewife by fome kinds of earth more than others. It has been proved by Lemery, Geottroy, and others, that argillaceous earths have very litthe effect in this way : porous and light earths much more : the roots of vegerables 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 cafe is vaftly different. " Here, fays our as authors

" the foot, where they found him extended on the floor, " and furrounded by a faint flame, which retired to a " greater diffance in proportion as it was approached. " and at length disappeared entirely. Having conveyed "him to bed, fuch affiftance as feemed 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 " fphacelous. On my third vifit, 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 diffressed by a continual " vomiting.

"author, is neither water nor vegetation; and confequently no cause which can carry away, distolve 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 infection.

"The decomposition of a body in the bowels of the earth can never be dangerous, 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
sufficient 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 decompofition, should not be capable of forcing the earth covering which detains
them. The nature of the earth in which the grave is dug, instructed all its
seffects. 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 sive 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 decomposition 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
see suppressed. It is likewise necessary, to prohibit burying in vaults, or
time prescribed. It is likewise necessary, to prohibit burying in vaults, or

" vomiting, accompanied with a violent fever and de-"lirium. At length the fourth day after a comatole " fleep of two hours, he expired. During my last visit, " while he was funk in the lethargic fleep of which I have " fpoken, I observed with aftonishment, that putrefac-"tion had already made fo great progress, that his "body exhaled an insupportable smell. I faw the "worms which iffued 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-" feetly entire, without the least appearance of burning, " his drawers were untouched, but his night-cap was de-" stroyed, though a fingle hair of his head was not hurt. "That this flame under the form of elementary fire, "burnt the fkin, reduced the shirt to ashes, and entirely " confumed the night-cap, without in the least touching "the hair, is a fact which I affirm to be true: besides, " every fymptom that appeared on the body of the de-" ceafed, announced fevere burning. The night was " calm, and the circumambient air very pure: no bitu-" minous fmell could be perceived in the chamber, nor " was there the least trace of fire or of smoke. " however, which had been full of oil, was found dry, " and the wick almost in ashes. We cannot reasonably " fuppose 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 fometimes 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 foldiers fuffered a great deal from "the ardour of the fun, fo 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 feemed to announce fome extraordinary " commotion, and inftantly fell down. Mr. Bianet, " furgeon major to the regiment, found the patient in " convulfions. 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 fcarifications, but without ef-" fect; it was impossible to make him swallow any "thing; and it was found necessary to abandon him to "his difmal fate. His body foon exhaled a putrid " fmell, 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 sound in the middle of the room reduced to ashes, all except her sace, legs, skull and three singers. The stockings and shoes she had on were not burnt in the least. The ashes were

light, and on preffing 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 fkin, 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 folids 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 sat, 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

"rifhed by their whole substance spontaneously taking " fire, the principal feat of which had been the entrails, or the epigaftric 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 folutions of this kind cannot by any means be admitted. We have not the smallest reason to think that either the solid or sluid 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. Befides, 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 fpontaneously. 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 inftance of fuch liquors taking fire of themselves; nay, they cannot even be fet 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 furrounding his body; fo that the fire did not feem to have been generated in his body, but in the atmosphere. There are instances of people being furrounded with these luminous appearances without being hurt; particularly of a woman at Milan, whose bed was furrounded 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. Prieftley makes mention of a gentleman, who, after having worked an electric machine for a long time in a fmall room, perceived, on leaving it, a luminous vapour following him. But the inflances most to our present purpose are some recorded in the Philosophical Transac-

tions, of luminous vapours coming from the fea, 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 fea, and fetting 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 fet fire to it as well as to the flack of corn or hay. Whether these accounts render the story of the Genoese failors 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 fometimes interfere with the human body in a very terrible manner, producing, where it does not kill inftantaneously, 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 otherwife vitiate the blood and other parts of the body, as we fee in the plague and other epidemic diforders. This hypothesis, so generally exploded, and so apparently improbable, feems to receive fome support from a discovery of an infect made by Mr. Henry Baker, F. R. S. and published in his work entitled "The Microscope made Eafy." He called it the infect with net-like arms. " lives (fays 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 them-" felves transparent cases, which were fastened either to "the fides of the glass, or to pieces of grass put into it, " feemed to be changed into a kind of chryfalis; but " before they affumed 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

"it would flink to a degree scarce conceivable, and that too at several yards distance, though, in proportion to the water, all the included infects 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 fmall, may yet emit fuch poisonous effluvia as will destroy much larger ones in their neighbourhood. It will by no means be incredible that, had one or two fuch 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 fends 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 feen it, or fomebody who has feen 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 infect just mentioned.

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

^{*} 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 difeafed person, as much must iffue from a single patient as is fufficient to bring the difease upon thousands, and with regard to the small-pox and some other distempers we certainly know that it is fo. This infection is diffipated 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 diffolved, 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 flightest additional cause will bring it on.

Something indeed of this kind would feem 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 pleurify. The plague manifests itself to be the same distemper in all its various degrees of malignity, though even this dreadful difease is sometimes so mild that it does not confine the patient to his bed. There must therefore be fome certain conflitution in the nature of the cause which produces fuch and fuch difeates, as certainly as in the feed of particular vegetables, which gives to each its proper appearance and shape. The cause of the dif-· ease 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 fuch a thing as contagion or infection can possibly exist. Dr. Mosely in his treatise on tropical difeases treats the whole doctrine of contagion with the utmost contempt; calling it " a field for " fpeculation, 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 fuch bad fuccess, that in the very first paragraph he is obliged to derive the cause of difeases from the stars! "There are some difeases we "know, (fays 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 affured that planetary influence does not produce diseases; for, if it did, they would in all times of peftilence 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. People under similar circumstances must be subject to fimilar diseases: and yet it often happens that dysentery 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 seather-bed, which had lain by seven years, raised a plague at Wratislau, which destroyed sive thousand persons in twelve weeks, as related by Alexander Bemedictus, &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 affertion. 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 cafe 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 fuch 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 particular 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 flightest deviation from regularity lose the power by which the body resists diseases, and they are also attacked. 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 affaults of foul and pestilential air. Such people seldom suffer even by the plague itself: while all around

" them perish."

The first sentence of the above paragraph is so obfcurely 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 feems, we are to infer that none but drunkards, cowards, and dirty, naked ragamuffins, are ever feized with epidemic difeafes. 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 confiderable 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 fufficient 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 contiguity to infected people, or substances, as the collegiers 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 affizes. "On the 4th, 5th and 6th days of July were the affizes held at Oxon, where was arraigned and condemned Rowland Jenkins, for a seditions tongue; at which time there arose amidst the people such a damp, that almost all were smothered. Very sew escaped that were not taken. Here died in Oxon three hundred persons; and sickened there, but died in other

a places, two hundred and odd. * The fessions 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 ** (fays 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 44 taken off one of the corners of the court, and left open at the top: in this, 44 closest confinement. The hall in the Old Bailey is a room of only 30 feet se square. Now whether the air was most tainted from the bar by some prisoners 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 eatily conceive how much it might have been vitiated by the foul at Reams of the bail-dock, and of the two rooms opening into the court in 46 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 aggraes vated by the heat and closeness of the court, and by the perspirable matter " of a number of people of all forts, penned up for the most part of the day. so without breathing the free air, or receiving any refreshment. The bench se confifted of fix persons, whereof four died, together with two or three of the counfel, one of the under theriffs, feveral of the Middlefex jury, and 51 others prefent to the amount of above forty; without making allowance for at these of a lower rank, whose death may not have been heard of; and with-44 out including any that did not ficken within a fortnight after the fessions." (Pringle's Observations p. 329 & leq.)

"Yet most of the Capuchins, the Jesuits, the Recollets, the Observantines, the Baresooted 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 feems to have defigned 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 fays about the plague at Marfeilles getting into the convents, of which he prefents us with fuch a catalogue, it is impossible to know what precautions were used, and we are affured 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 alfo. Cats particularly are dreaded fo much, that a general massacre of them commences among those who use precautions, the favourites of that species must be fent to a distance, and M. Volney mentions two merchants who had thut 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 fay 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 moif-"ture, they reach to a much greater diffance. Vapour " arifing from a field of beans, for instance, or a pu-"trid ditch, is sensible to the nostrils at a greater dif-"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 "difease, and capable of communicating that particular "difease, with or without contact, to another." would here be no improper question, by what means he comes to know that a contagious difease can affect a person only once. But even this question is unnecesfary. Dr. Guthrie gives an account of a gentleman who had the courage to inoculate himself for the plague, in confequence of which he had the difease with the concomitant fymptoms of buboes, &c. Here then we fee 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 feems to be decifive on the subject; but as he has at great length infifted upon the argument last quoted from Dr. Mosely, it seems necessary to follow him a little farther.

"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 (fays he) here and there is " exempted from fmall-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 fuch cases it would be ridiculous to suppose the subjects labouring under a difease 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 feized at an after period when no more exposed to contagion than they had been at first.

"Small-pox, measles, and other general diseases, which coccur 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 fome disease higher in degree, have received the infection. As these diseases are very mild, children sometimes result the power of contagion from the superior force of some other diseases, although they may be so

" flight as to escape common observation."

In this paragraph we have the favourite maxim of our author repeated, twice indeed, without a fingle fact to fupport 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 fo flight 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 fo 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 affizes (fays 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 diarrhoca were not likewise affected by fever? How many fevers are attended by diarrhoa, or how many cease when diarrhoa comes on! It would have been equally conclusive to fay that the matter was not contagious, because some died and some recovered.

I shall only take notice of one affertion more, it being both tedious and unnecessary to follow him through the whole. "From every record of epidemic and peftilential diseases, it would appear, that they have their stated " periods of recurrence; that these periods are such "months as are most remarkable for vicisfitudes of the " atmosphere; that they become general only in those " years in which these viciffitudes are extreme; that " they do not occur in feafons when the heats or colds, " however intense, are equable; nor in years when the " ftate 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. " Ruffel, the Europeans regularly thut themselves up in "their houses every year, at some period between April " and July; and the rich natives begin to adopt the " fame plan, &c. . . From this fact it appears, that

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"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 matter."

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 sollowing 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 faid 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, Tri-

poli and Damascus; next year it seized Aleppo.

Dr. Alexander goes on to inform us, that the difeafe never spreads much in winter. It advances with the fpring, comes to its height in June, declines in July, and terminates in August. "None (he says) are ever feized with in September and October, not even in the plague of 1742, which returned three years successively;" but Dr. Patrick fays that this was not confirmed by his experience in 1760, though he owns that the diffemper declines remarkably at that period; and the natives are greatly inclined to have it believed that the diftemper 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 thut up about the middle of March, and kept confined till the middle of July. In 1729 they did not thut up till the middle of May, and were not confined above a month, the number of fick being fmall. 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 fick being inconfiderable. In 1760 they thut 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

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 (fays Dr. Alexander) feems 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 excessive." 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 insected 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

D d conclusion

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 fix 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 fixth 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 " Afia 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 inhabitants. The farther east you go, the less frequent it "is-every 20th, 40th, and, even at Bafforah, 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 aftonishing that people will write in such a manner as to subject themselves to endless criticism on account of their inconfistency. The plague, this writer fays, vifits most parts of Afia 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-fix 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 the houses in Aleppo is not accurately related, forfrom the above abstract it is plain, that they are sometimes that 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 affertions, which, being backed by no evidence, fall to the ground of themselves. "I will venture to af-" fert (fays he) that no person in persect 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 affert, must we of necessity venture to believe? When he ascribes the origin of epidemics, and the plague itself, to the viciflitudes of the atmosphere, not a fingle 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 refided in tropical countries, that, in the month of July, several weeks before the yellow sever 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 fouthern 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 inftead of the states or viciffitudes 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 faying 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 flate of the atmosphere we must suppose to mean that it continues for some time either to be wet ordry; a vicistude, when it changes from one to the other. If an

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 differtation we have neither distinctness nor regularity, nor indeed any thing but affertion, supported only by an imaginary theory.

Difmissing at length therefore these conjectural theories, let us endeavour to deduce from certain and undoubted sacts 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 fenfes 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 af-

fecting all the reft.

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 sluid is similar to electricity, and it is certain that the electrical sluid 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 elettricity.

oxygen, or dephlogifticated air, the combination feems 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. Prieftley, who fays that the basis of dephlogisticated air seems to be dephlogisticated water. But, let the basis be what it will, the ethereal fluid which volatilifes it is the agent; the basis is entirely passive, and only modifies or restrains the action of the other fluid, fo 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 volatilifed by the ethereal fluid. Phlogisticated air, azote, or fepton, according to Dr. Prieftley, confifts 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.

ftances with which it is united: the air is then decomposed, the substance into which the other sluid 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 affertions 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 sluids. A certain quantity of latent heat must be contained in it, in order to give the degree of sluidity naturally belonging to it. If this quantity be augmented, the sluidity 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 sormer qualities.

7. By

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

7. By augmenting the fensible heat, the blood is affected in the same manner as any other sluid; 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 himfelf affected with pain and a fensation of fulness in his head; he becomes fleepy, and, if the quantity be fufficiently great, he falls into an apoplexy, and dies. From diffections it appears that fuch as die in this manner have the capillary veffels greatly diffended, and even ruptured; the heat of the body is vailly augmented, and even continues some time after death. Hence it is evident, that, by breathing this kind of air, too much fenfible heat is conveyed to the blood. In like manner when we breathe the fteam 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 mosture should always appear much hotter than a dry one, though the thermometer stand at an equal height in both. Oxygen air feems 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 fenfible heat, it feems most probable, that, by breathing a confiderable proportion of it, both thefe kinds of hear, as well as the vital spirit itself, will be augmented. In this case, wherever the air naturally contains a larger quantity of oxygen than ufual, the blood ought to be more fluid, as well as warmer, than

usual, provided there be no evident cause why it should be otherwife. 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 Curaffau, Europeans gradually lofe 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 fensible heat thrown into the body, either by the rays of the fun, 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 sever; 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 cafe with the atmosphere at Martinico is now determined by a letter from Dr. George Davidson to Dr. Mitchell of New-York, inferted in the Medical Repository, vol. it, 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 53 parts; with a mixture of iron filings and sulphur, upwards of sour 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 circumstances 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 sew 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, fuch 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 fo great to the oxygen that we could suppose the excess capable of producing a disorder of any consequence, much less a violent epide-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 thare 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 confiderable 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 slesh 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 fensible heat of the blood, and consequently of the whole body, may be occasionally augmented or diminished. Thus the body may be confiderably 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 fenses, continue to operate without intermission. Though the obvious qualities of air and climate therefore may predifpose to an epidemic, we cannot affirm any thing farther: the direct cause is always different, and hath hitherto so much eluded our refearches, 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 likewife certain, if it be the fluid which acts in the nerves, as most probably it is. But whatever preferves health will also bring on difease, if it be applied to that purpose; and we have already feen that this fluid is capable of bringing on the most dreadful symptoms, viz. mortification in its highest stage, fever, convulsions, bilious discharges, lethargy, &cc. If it be capable of producing all thefe, can we fay 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 faid that this difease was occafioned by a violent stroke of electricity, fimilar to lightning; but how many people have declared, that, in the beginning of some violent epidemics, they have felt a fudden 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-Ee tion.

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 faid fuch strokes were given by spirits in human shape, in which we know they must have been deceived; but, though they were mistaken in fuppofing that they had been ftruck by a spirit, it does not from thence follow that they felt no ftroke at all. The people mentioned by Dr. Hodges did not fay that they were flruck by a fpirit, 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 fay. Thus, the poor failor, fo much frightened at the fight of a large bat in New Holland, was certainly mistaken in faying 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 fay that he had feen nothing. In like manner, when numbers of people in Procopius's time faid that they were struck by spirits, when we find others in Dr. Hodges's time faying that they were ftruck 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 faid 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 shuid

^{*} In the account of this failor'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 fize 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 to have touched him." (See p. 105, n.)

will not only produce fickness, but very extraordinary and feemingly miraculous effects upon inanimate bodies. It has frequently been remarked that people are fick 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 thip produces fea-fickness. But Dr. Hillary mentions a flight earthquake in Barbadoes where people were affected with fickness 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 fame. A good number of years ago, a powder-mill near London was blown up. The explofion, 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 difcovered themselves by the rattling and breaking of china dishes though fitting 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 feemed to refide in their bodies, fo 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 Dodfley's Annual Register; and the fact feems to be established beyond controversy. It proves that what has been advanced by Dr. Prieftley concerning electrical operations, on a small scale, holds good also on a large one, viz. that the fluid, when once fet 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 confequence

quence of these agitations we cannot know. It may be faid, indeed, that in the operations of nature the electric matter is often violently moved without any fickness taking place; neither in fact did any enfue 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 thunderstorms; 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 fafety 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 fieges, &c. An inftance of this is faid to have happened at Valenciennes, when last befieged by the Duke of York. A difease prevailed chiefly among women, children, and persons of a weak conflitution; great numbers of whom died fo fuddenly that it was at first thought to be a plague, until it was found not to be infectious. The blood was found greatly diffolved, and the physicians ascribed it to the monstrous bombardment and cannonading which took place during the fiege. Such was the account published in some of the newspapers of the time, and from the subsequent confiderations it will not feem improbable that fuch things may take place.

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

disorder

it appears, that we can neither brush a piece of chalk, open or thut a book, or do feveral of the most triffing 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 devastations, 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 fome 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 sury, 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 russed 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 shuid, which runs along the nerves; but experience shows that each of these can act upon the other; a

disorder in the body, particularly in the nervous system; will fometimes diffurb the rational foul in fuch a manner as almost entirely to deprive it of all its faculties; while on the other hand a violent commotion in the rational foul may at once extinguish all the powers of life, as has already been shown from Zimmerman. Now, let any one confider 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 difmay 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 flaughtered or treated even worfe than if they were ; themselves driven from their peaceable abodes to wander like beafts, while their cruel enemies exult in the miferies 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 affigned him by his Maker into a kind of hell, and himself into a devil, can we wonder that, in fuch 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 affigning 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 be-

fal them, than we are perhaps willing to believe.

Most authors speak of some hidden, unknown and unfearchable power in the atmosphere as the occasion of plagues and other epidemics; and, from what has been already laid down, it feems by no means improbable that this hidden power refides in the electric part of it. But we know that electricity proceeds from the earth, as well as from the air; fo 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 fo, 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 fituation 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 faid, then, we may conclude, that none of the obvious properties of the atmofphere, 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 fecret cause, along with the other more obvious properties of the air, fuch 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 difease 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 difease was confined to a few, perhaps to a fingle 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 faid to come from fome other place. The inftance 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 fingle instance little can be inferred. In those terrible examples we have given of people being burned to death without any accident from terreftrial fuel, the agent feems almost certainly to have been electricity. In the plague of Procopius, faid not to have been infectious, the strokes complained of by many patients feem 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 fuch difeafes spread from place to place? for even this dreadful pestilence of Procopius did not overfpread the earth at once, but is faid to have begun at Pelufium in Egypt. To this no answer can be given. To suppose an omnipresent contagion in the atmosphere, proceeding either from contagion or any thing elfe, 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 fuccession will be found very difficult; and the fame difficulty will attend every other folution 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 fatisfactory manner, for the way in which it diffused itlel

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 confider, 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, feem to act by augmenting or diminishing the latent or the fenfible heat of the body. Such, when taken in moderate quantity, may produce flight 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 treatife has been called the vital [pirit, as well as the latent or fensible heat. The confequence 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 crass, or proper consistence of the blood and other fluids. Hence it is poffible that fuch an inftantaneous 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 fensation of burning, as in the case of the Italian priest and others, who perished in such a miferable manner.

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 afide, 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 feem, 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 arifing 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 faid to act immediately upon the nervous fystem 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 confequently 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 furrounding 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"fenic, is also capable of producing all the inserior 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 feems to me of the utmost " importance; and the Abbe Fontana, who made more "than fix hundred experiments to prove that ammoniac " is no remedy against the bite of a viper, would have " faved himself the trouble, had he known it. If, instead " of applying the venom of the viper to fo many animals," " and afterwards applying ammoniac to the wound, he " had made a fingle 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 "difease exactly analogous to that caused by the venom " of the viper; and, confequently, fo 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 fix 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-" cifive experiment, the experimentum crucis of Bacon? "It is well known that frogs, and many animals with so 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 66 kills

This is an affertion fo 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 difease, the plague, yellow sever, gout, stone, small-pox, &c. &c. or to what patients and in what difeases 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.

"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 fix thousand other experiments have apparently established. According to my experiments, poisons operate upon the blood just as they do upon the musticular 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 experiments 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 fix 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 let man at the head of the creation, if inferior animals must patiently refign 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 maffacres it feems must be made, and new tortures inflicted, because an experimentum crucis is still wanted! If knowledge is to be obtained only by fuch means as thefe, it certainly must be derived from a very polluted fource.

2. The experiment on which Dr. Girtanner builds fo 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 fuch as are warmer; the circulation is more languid than in fuch as have warm blood, and, of confequence, 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 fuspect 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 decifive experiment, or experimentum crucis, feems 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 infide of the vein, which is not accounted very irritable; and the quantity injected was fo 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 convultive agony, or other fign of fome little life remaining, generally observable for some time in animals killed by the common methods. On applying the same poifon 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 sluid, visible or invisible, may with propriety be called contagion; and if any such proceeds

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 fudden manner in which people are affected shows that poisons kill by suppressing in a very short time the principle of life. which feems 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 filent 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 poifon ferpent or ferpent poison, which seems to be as bad as the laharra mentioned by Bancroft. This too is but fmall, viz. two feet long, and very flender. Its fkin 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 faw feveral in-" stances of it; and, among others, one very fingular, "in the midst of a corps of troops, commanded " by M. de Buffy. An Indian Gentoo merchant per-"ceived a Mahometan foldier of his acquaintance " going to kill one of these reptiles, which he had found " fleeping 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 " fuddenly

"ineffectual; his blood was already coagulated.* About in 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 ferpent, 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 refembling thin broth, with-"out apparently having paffed 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 " perifhing."

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 sluid, we cannot positively say that it has

circulation was completely ftopped.

There must certainly be some error here; for as he mentions a disfolution 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

[†] The blood certainly does not coagulate in the veffels, in any cafe whatever, unless by injecting fomething 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 severs; but as the disease goes on, an alteration becomes very perceptible, which gives just ground for suspicion, that there had been some altera-

tion 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 elfe. Dr. Brown used the word excitability, Dr. Girtanner uses irritability, and the author of this treatife, 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 effentially inherent in living bodies, acted upon indeed by certain substances, but incapable of deriving any supply from without; the author of this treatife confiders 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 univerfally 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 preferve 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 fuch 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 fuch 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 fuch diseases may either

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 foft 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 confift of a basis united with the ethereal fluid and volatilised by it, there is reason to suppose that contagions themselves are formed in the fame manner. Some kinds of air also are very eafily 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 falt, 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

and fomething 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 fubstances, 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 refuming its aerial properties occasionally, from causes unknown to us, though we cannot suppose them to be any thing elfe than the invisible action of the ethereal fluid fo 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 affume 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 confift mostly of fixed air, do not always appear; neither do they gradually accumulate, but come fuddenly, fpreading unexpected destruction among those who unfortunately come in their way. The fame may take place with contagion. After remaining fome 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. Ruffel, 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

him also denying that putrid effluvia can produce epidemics; according to which doctrine, it feems, we may not only fafely vifit 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 exift, 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. Ruffel, &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 afide merely on the ftrength 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 fuggest, 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 perfisted in the opinion that "the difease was never communicated by contagion." Such, however, has been the cafe. In 1720 some French phyficians laboured exceedingly to prove that the plague which then raged at Marfeilles and throughout Provence arose from corrupt humours bred in the body in confequence of irregularity in the feafons, 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 diffeminated contagion. Dr. Ruffel mentions in a note. feemingly with furprise, that " fo 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 paffage 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 nume-" rous 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 fieges two " thousand years ago, as applied to the plague properly " fo called, a difease then confounded with various " others from which the accuracy of latter observa-" tions have fufficiently 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 pestiserous 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 confiderable 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 insected. 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 insectious quality of the humours to the bile; but the insculation 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 rife to much confusion. Some, taking advantage of the inaccurate mode of expression on this subject used by Dr. Mead, attacked him with fophistical nonsense. The following may ferve 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 " fpread contagion, not the plague; and therefore either " contagion and the plague are the fame, or elfe the " plague is not confidered; 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-

" ed with their effluvia, and in which substances these " effluvia are fometimes retained in an active state for a " very long time. The fubftances 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. Ruffel, 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 fort 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 fick."

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 authority." Setting aside therefore inquiries of this kind, he thinks it sufficient to inquire whether the insection 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 insectious essentially 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 beenembarrassed 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 rages with more than ordinary violence, and which occasions extraordinary mortality amongst mankind, may be, and is, properly termed a pestilence, or the plague." By not attending to the proper 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 little 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 historians 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 fystem 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 finister dealings of those who have written against contagion, "the question seems to have been properly refolved in the affirmative;" and he complains greatly of the conduct of the Montpelier physicians in this respect, infomuch that "their misstating of circumstances, and "the partiality fo 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,"

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 feason, has afterwards " received the infection upon repeating the operation " at a diffance of time when the difease 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 fick, ninety " should fall fick, 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 fame 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, fubstances tainted by the fick should be " conveyed into these secluded retreats, and persons " living temperately as before, ignorant of what had " happened, and confequently in the midst of imaginary " fecurity, happen to be feized 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 confonant to repeated experience in "Turky; to fay nothing at present of what has been ob-" ferved 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 ce the

" the ceffation of the plague, at a period when the fup-" posed contagious effluvia, preserved in apparel, furnif' ture, and other fomites, at the end of a pestilential " feafon, 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 diftemper feems 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 fomething may be ascribed to "the means employed for the cleanfing 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 fingularity of conflitution given the name of idiolyncrasy. It is, however laughed at by Mr. M'Lean. "As the fact (fays he) cannot be denied, that a great " majority have escaped after contact with persons ill of "difeases 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 ff have this happy peculiarity of constitution; or the few "who are feized that are fo unfortunate as to poffess it? "The former are evidently too numerous to admit fuch "an hypothesis. The property must therefore, I const 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 sact must be accounted for by the same or another peculiarity of constitution. Peculiarities of constitution, 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 le/s? This is precifely his argument, and there needs no other refutation than stating it in this manner. What he calls the states of excitability are as much idiofyncrasies at the time as any thing elfe. Mr. M'Lean will not deny that a person debilitated by certain causes is more liable to be feized with typhus fever than one who is not. What does this proceed from, but that the body of the one is prepared for the difease, is constitutionally disposed to receive it, or has an idiofyncrafy of habit disposing to it, which the other has not? It is true, that unless we point out the circumstances which constitute this idiofyncracy we do nothing; but Mr. M'Lean's scheme, of refolving every thing into excitability, would forever prevent us from doing fo. This is the great deficiency of the Brunonian system altogether; for, by attending only to the animal life of the body, he feems to have absolutely forgot that we had any thing in common with vegetables. The bones, for inftance, 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 therefore

fore we find that after the excitability is entirely gone, after death has taken place for a confiderable 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 idiolyncracy of habit, as well as among animals. Some, even of the same species, are much more vigorous than others, and, among fome, difeafes are much more common than others. In like manner among the human race fome are strong, others weak; in some the blood is much more confistent, 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 fcale) must be merely imaginary, because excitability is not the object of our fenses. The obvious properties of the body itself, independent of any excitement whatever, are principally to be confidered in medicine. These constitute the peculiar constitution, or the idiosyncracy of habit, belonging to each individual. Yet, in defiance of every confideration of these obvious properties, which all have access to observe, the new system leads us only to confider an invisible and unknown being called excitability. Hence diseases peculiar to certain constitutions more than others are faid to be occasioned only by certain degrees of excitability common to all, or perhaps to confift 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, faying that all difeases 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 elfe, 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 feen that a difbelief of the doctrine of contagion leads people into a practice accounted dangerous by many, and which cannot be proved to be fafe: 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 diffinct 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 feafon, and dying away in another; fometimes capable of being revived, and fometimes 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 After a city has been thoroughly infected in mines. 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 fome unknown cause, though it has been dormant ever fo long. In fuch cases, it may with propriety be faid 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. Ruffel next takes into confideration the plague at Marfeilles in 1720, of which he fays 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 feverely fcrutinized, and falsehoods detected: "but (fays he) if, instead of " fuch detection, the most material have been passed " over in filence, and little more than hypothetical rea-" foning opposed to others, the main facts may be con-" fidered 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 thip 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 failors 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 furgeon of the lazaretto; a conful-" tation was held with two other furgeons on the 28th; " the disease was unanimously declared to be the plague, " and the three patients died next day: the furgeon of "the lazaretto, with part of his family, and the prieft " who attended the fick, 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 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-sever; and about the 23d the council of health were informed of the death of sourteen 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; sour 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 (fays Dr. Ruffel) was the rife 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 furgeon and a prieft, who attended the fick, " were among the first infected; that the passengers " from the feveral 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 flowly, and sometimes seem-"ed to paule; that it attacked chiefly the poorer fort 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 insected; and lastly, that the disease, which began to rage violently in August, continued to do so through that and the sollowing month, but declined fast in the months of October and Novem-

" thigh ;

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 diffemper did not spread, and ceased entirely after

the fummer folftice of that year.

To all this, however, objections have been made. I. That the irregular feafons 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 fufficient to produce the plague without any imported infection. To this Dr. Ruffel 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 " faw 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 practifed in the plague, into fuch 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, fo far as " appears, of pestilential symptoms. The tumour had "appeared fix days before the woman's death, but how "long the had been fick remains unknown. The other "died the 16th or 17th day, a very unufual period in "the plague. She also had a parotis, which did not " make its appearance till the 10th or 11th day of the "difeafe. 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 fmall tumour on the

"thigh; and the third (which bears the nearest resemblance to a very slight infection) had also a bubo in
the thigh; but the tumours in neither of these patients 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 feen 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, however, 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. Ruffel 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 soul patents arrived at Marseilles a sew days after Chataud. "To this (says Dr. Russel) it may be surther added, that, notwith-standing

"Iterate will think it far from improbable, that the plague might actually have been in Sidon when he failed, 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 thirtyone days. The French consuls lying under an obligation to insert in their patents a detail of circumstances, 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. Ruffel 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 confuls 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 " feem to have been iffued in Turky, and the partial indulgence of the council to Chataud's ship, notwith-" flanding the very extraordinary mortality which had " avowedly happened on the voyage, together with their " eafy confidence afterwards in the reports of the furgeon " of the lazaretto, can only be accounted for from the " prevailing influence of private commercial interest over " a fense 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 fustained some "damage by bad weather, he put into Tripoli, where he "embarked fome merchandise; he took in also some "Turks, paffengers 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 failors " employed to throw the corpfe overboard defifted at the " defire of the pilot, and the rest of the ceremony was " performed by the other Mahommedan paffengers; " the ropes with which the body was lowered down, be-" ing by way of precaution thrown into the fea. With-" in a few days the two failors who had handled the " corpfe were taken fick and died. At Cyprus the ship " put her remaining paffengers on shore, and made a " very short stay. Soon after her departure from that " ifland, a third failor and the furgeon 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 " fea; and kept himfelf carefully separate from the " crew during the remainder of his voyage. Some time " after this three more failors fell fick, and, there being " no furgeon on board, the veffel put into Leghorn, " where the three fick men died, and the physician and " furgeon of the lazaretto declared the difease 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 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 fmoke 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 eafily destroyed; and consequently that all kinds of purification, even when used with the utmost care and diligence, are scarce fufficient 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 (fays Dr. Pye) feemed 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 perfons here in England fo "dull of understanding, or so much blinded with pre-"judice, as to ftand 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 fhip 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"fides, this must have been fourteen or fifteen days af"ter the goods had been carried out of the ship into
"the lazaretto. Further, fix 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, fuch 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; fo that the goods of that ship, in purifying " which the porter first mentioned was employed, had " been airing and purifying for twenty-fix or twenty-" eight days before this accident happened; and it can-" not be conceived that after fo 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 " fo 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 " fome 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 lefs.

"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 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. Ruffel 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 failor on the 27th of May, and afferted, in con-"tradiction to the journal, that the former fix failors "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 fick on board, remains at a distance from the ship, "in a boat, and the dead bodies are funk in the fea. " As to the circumstance of the goods of Chataud's vef-" fel 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 veffels beginning to unload, is "taken up in examination and other forms at Pomegue, " and the council of health. The loss of fix men on the "voyage was an extraordinary circumstance, that re-" quired deliberation; and it appears that on the 29th, " after the death of the failor on board Chataud's vef-" fel, 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 requifite 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-fix or twenty-eight days, has been shown above "to be an error. The Doctor also makes two other " fuppositions equally erroneous. The first, that the "whole of the cotton contained in a number of bales " is equally imbued with infectious aura; the fecond, "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 fleeving them; it may eafily 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 warmeft " 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 feveral 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 " fome 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 fet 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 fix days, by " way of trial, in order to fee if any figns 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: " fo that, according to the burden of the ship, there may " be several of these sereines, each of several days dura-"tion. In this manner, independent of accidental im-" pediments from wind and weather, in fending 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 fix porters, employed in pu-" rifying fuspected merchandise from the Levant, died " of the plague; and their death was followed by that " of the furgeon 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 feems needless to follow our author through his investigation of those facts which his adversaries have mifrepresented; 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 fet forth in no stronger language now than formerly. Even as long ago as 1665 Dr. Ruffel quotes one Gadbury an aftrologer stating the difficulty as strongly, and giving a folution of it as clearly, upon his principles, as the best modern theorifts can do upon theirs. "If the pestilence, " (fays 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 fome particular persons only. If it be " infectious to all persons, or catching to all alike, then " all persons, that come into the fight or within the scent " of it, must necessarily be subject unto it. If not in-" fectious unto all, but unto fome particular persons on-" ly, I fay then it ought not to be deemed or esteemed " infectious at all, at least not any more infectious than " are all other difeases, viz. small-pox, scurvy, pleurify, " ague, gout, &c. fince (though the notion of infection " be laid afide) 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

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 sire, or a ferment in liquors, it disfuses 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 fection.

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 fpreading than by communication from one to another; and, therefore, if fuch communication was cut off, we should naturally think that the disease would not fpread. But, in opposition to this, we have already quoted Dr. Moseley giving a long lift of convents infected, though they kept themselves strictly shut up. Dr. Rusfel 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 oppofition 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 fays, "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." Kk

To the former of these our author answers, that " from "the manner of flating the case, one would think that " all thefe 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 meritoriously 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 thut up, and in that flate in-" fected; it would by no means invalidate the inftances " 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 leifure or opportunity to examine minutely " into circumstances. It is in this light I am inclined. "to confider 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, renders 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 afferts,
that two monasteries (from their situation, one near a
"burial"

"burial ground, the other near a pest-house) very dangerously 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 Marfeilles, we fee 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 treatife 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 Treatife 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 Tidefwell "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 Marfeilles, at "its breaking out, refolved 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 fent away their children. Mr. Mompesson con-" ftantly employed himself, during the dreadful visita-"tion, in his pastoral office, and preached to his flock "in a field, where nature had formed a fort of alcove "in a rock, which place still retains the appellation of "a church. He furvived, 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
	Tarrott	Oct.	22		June	20
		Nov.	5		July	53
		Dec.	7		Aug.	78
	1666	Jan.	3		Sept.	14
		Feb.	5		Oct.	17
		March	2		Nov.	I
		April	12			

This plague is faid to have arisen from a box of clothes fent from London while the diftemper 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 infulated fpot to be so violently affected, except by contagion? No matter whether by clothes or any thing elfe. very particular manner in which the numbers who died are recorded, leaves no doubt as to the fact of the diftemper having been there; neither is it possible to account for its rife 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 sidelity 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 pro-

posed were as follow:

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

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 rife 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 touch-

ing 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 feafons in which the plague chiefly appears; and what is the interval between the infection

and the difease?

To this it was answered by Raymond, that the two solftices 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 "fometimes acts flowly, fometimes like a stroke of lightning." According to Verdoni, "the difease generally shows itself at the instant of touch, like an electrical shock." Sometimes the infection will be communicated from a fick person to a found one, who without any difease may communicate it to a fecond, and that fecond to a third, in whom alone it would become active.

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

laid down in different authors.

Though this diftemper has most frequently been accounted a fever in the highest degree, yet, as we have already noticed, it feems to be effentially 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 faid to have taken place in the days of Romulus, + Plutarch relates, that the people died without any fickness. To this very ancient testimony we shall add that of Dr. Patrick Ruffel, 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 fo 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 fuccefs."

The fymptoms 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 sever. In these, death ensued within twenty-four hours; some were said to have died within a sew 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, sound upon inquiry that matters had been inaccurately stated, and that the patients had really been ill

one or two days.

In others the diforder was more perceptible. In a few hours the eyes became muddy, the furface of the body cold, with drowfinefs, lethargy, and pain at the heart. In the progress of the distemper they frequently loft 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 " fome 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 furvived the third day. . . . The total absence " of buboes in fuch 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 fometimes have been concealed, where the dif-" ease ran out to the fourth or fifth day, and for the " fame reason that the reports concerning the state of "the corpse were sometimes not true. It was " very rare to find fuspicious marks of infection on the "bodies [of those who died within 24 hours] "Carbuncles were feldom visible till the month of May, "which was later than this form of the disease. It pre-" vailed chiefly at the rife of the plague in 1760, and

"its revival in the two fucceeding 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 feldom vi-

" fible till after death."

This account of the most malignant form of the pestilence differs confiderably from that of Dr. Hodges, who feems to think that the tokens, as he calls them, very generally were to be found on the bodies of those who died fuddenly. He mentions indeed a young man who was fuddenly feized 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. Ruffel has confidered the description of the tokens given by Dr. Hodges, and compared it with that of others called by Diemerbroeck macula 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 feen (p. 10) afferts, in his Lcimologia, that the tokens rife 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 rife 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: " 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 periofteum, broad at the base. " and tapering to their termination in the fkin, being of produced by the extinction and extravalation of the vi-" tal spirits. Now (says Dr. Ruffel) this answers exact-15 ly to one species of the tokens described by Hodges. "which therefore may be reckoned the fame 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 fays that by careful diffection the tokens may be traced half. way deep in the flesh, and some, in the muscles of the breaft, have been followed by the incision knife even to the bone. By the directions given by authority to the fearchers in 1665, they were ordered to look narrowly for thefe 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 fomething " various, fometimes more reddiff, fometimes inclining " a little towards a faint blue, and fometimes a brownish " mixed with blue; the red ones have often a brownish " circle about them, the brownish a reddish."

On the fabject of tokens Dr. Hodges further obferves, that they differed also in their degrees of hardnefs, fome being eafily penetrated with a needle or penknife, while others, more callous or horny, were penetrated with more difficulty. They fo ftrongly 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 feemed hard to the touch, not unlike kernels under the fkin, the superfices being smooth. "When I effayed 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 infenfible, and this diffinguished them from the carbuncle, which is always very painful. Hodges also remarks, that a quick fensibility in the skin was always a good fign, and those that went no farther than the skin would fometimes flough 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 diftemper, were dangerous, the latter always fatal, never appearing till the patient is within a few hours of death, fometimes indeed not till death has taken place. Of the petechiæ Dr. Ruffel fays, 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 fpot, fometimes few, but commonly very numerous; the colour fometimes red or purple, fometimes yellow, and fometimes livid or black. From Gotwald, Ruffel 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, fometimes intermixed with the lentil kind. 4. Not unlike the meafles, spreading all over the body, rifing afterwards in small blifters without any matter, vanishing about the fifth day. Ruffel also takes notice of a species of petechiæ which were very numerous, confluent, and of a dark red or dufky colour and irregular figure. These were sometimes remarked in the interflices of the former. Such inflances occurred but rarely.

The vibices were much larger than the petechiæ. Gotwald fays 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 yellow. Diemerbroeck describes them as oblong spots of a livid or black colour, like strokes drawn with a pen; fometimes they were larger, the biggest resembling the strokes of a whip. Ruffel 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 obfoure 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 pla-" ces was fometimes deformed by narrow ftreaks of red-"dish purple, or livid colour. When such took poffes-"fion of the face they gave a frightful appearance to the " countenance, and frequently made fuch an alteration " in the features, and fo completely difguifed 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 refembled 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, fometimes 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 sew 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 enseebled to a degree capable only for a short

" while to refift the violence of the difease; in the sub-" ordinate forms, the vital and animal functions, vari-"oully affected, are carried on in a defective, diforderly " manner, and denote more or less danger accordingly." It feems probable therefore that in those who are fuddenly 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 diffections have evinced that this was really the case; but besides these there was an appearance observed in the plague at Marfeilles 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 diffections, 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 " fwelling of its ventricles; full of thick, black blood. "The liver was also very large, and of a livid colour, with " a carbuncular puffule on the fide of the gall-bladder, " which was filled with very black bile." In others who had eruptions, and who of confequence 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 fcarce any blood in the ventricles, whose cavities were filled each with a large polypus, that on the right fide having dilated the auricle to the breadth of four inches. The liver also was larger than ordinary, and the gallbladder full of a black and green bile. The appearances were much the same in all the rest; but, as the time

^{*} The Mediastinum is a membrane by which the cavity of the breast is longitudinally divided. The tearing of it in any difease 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 yapour after death.

they fustained 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. Ruffel takes notice that fuch patients as he attended complained greatly of their heart. " A fepfe of oppression about the " præcordia (fays he) which the fick were at a loss to "describe, was, in one degree or other, a constant at-"tendant on the plague, except in very flight cases of "infection; and where it came on early, or perfifted in "a high degree, was always a dangerous fymptom. "The fick 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-" fwered 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 fick feemingly 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 feat 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 fhort time, we must be apt to consider this enlargement not as any primary and effential symptom of the difease, but as one which takes place when the vital powers are able to oppose for some considerable time the cause of the difease.

In his account of the origin of the plague, Dr. Ruffel takes notice of the opinion that, at the communication of the infection, the fick were sometimes sensible of having received it. This has been observed by Dr Lind in malignant fevers; it has also been observed in plagues. as we have feen from Dr. Hodges, Verdoni, and others; but Ruffel fays he never faw any instance of this. He owns, however, that he has feen instances of the disease quickly fucceeding 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 feveral persons who " had, till then, without the least suspicion, frequented "the fick, struck suddenly with a panic, and imagine "themselves ill. They selt shooting pains in their " groins, confusion in the head, and a loathing. Though " in some these complaints were merely imaginary, and " foon vanished, in others they proved real; the symp-" toms increasing, and being followed by eruptions. In " fuch 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 feizure by a stroke. His information was derived from the physician-general of the Russian army. This gentleman affured him, that "he had feen men, in appa-" rent good health, inftantaneously 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-" feetly 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 fyncope very common in the plague, which took place at the very first invasion. Russel informs us, that "the fudden lofs 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 apre pearance of faintness was very remarkable in the " plague," &c.

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

the folid parts of the body, the other, without any diforganization of the body, attacking the vital principle itself, or rather the blood, from which this principle is derived, fo that a temporary suspension of all the functions enfues. 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 differtation 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 (fays he) by diminishing the " quantity to an appropriate amount, these noxious sub-" flances (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 pefti-" lential diseases, and which, in common apprenension, " is constantly connected with them. Yet these disea-" fes are by no means univerfally accompanied with what " is strictly called fever. There is often a degree of " virulence in the Afiatic 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 fay in what this virulence con-

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 essicacy below the skin in the soft substance of the sless. Where the patient is suddenly seized in the manner described by Dr. Guthrie, the cause seems to be something foreign to the body fuddenly inhaled, the effects being fimilar to those of fixed air when drawn in by the breath, and of confequence easily expelled by a vigorous action of the powers of the system. Guthrie observes, that, in such cases, it feems "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 elfe but the emission of the latent heat of both the folids 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 fensible 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 faffafras, the mixture will burst out into a violent flame. Water poured upon quick-lime occasions great heat, and feems in great part to be converted into a folid fubstance; 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 feen, 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 folidity; and the heat of lime when flaking is to much superior to this, that ships have frequently been

fet 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 sluids 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 surnished 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 affigning 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 uneafiness till within a few moments of death. This can only be accounted for by the fudden and perfect destruction of the parts, which did not allow time for any fensation of pain to take place; and indeed in the application of caustic for an iffue, 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 afcertained beyond a doubt; but in those who were absolutely confumed to ashes, it feems 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 prieft alone excepted, it feems probable that the first attack had deprived them of all fensation, and that, notwithstanding Mm

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 folve 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 diffufion all over the body, but in a number of infulated spots, between which the connexion can by no means be traced. In all pestilential eruptions indeed the action of fire feems to be very perceptible. Gotwald mentions his having observed in two patients what he calls papulæ ardentes "burning pimples," which Dr. Ruffel supposes to be a modification of carbuncular puftules. Gotwald calls them also fire-bladders, and says that they were as broad as a shilling, of an irregular shape, and the skin feemed 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, diftinguishes 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 instantaneously the patient seeds 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 extraordi-

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 feem to act by diffolving the blood, or infecting it in fuch 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 feem to produce the petechiæ or purple spots which fometimes appear in the plague. In Dr. Miller's Treatife, already quoted, we find, among the fymptoms occafioned by arienic, " red or dark spots appearing on the " fkin, and rapid putrefaction, which renders speedy in-" terment necessary." Herein it differs from the plague, for the bodies of fuch as die of that diftemper are not more liable to speedy putrefaction than others. Of the vegetable poisons he also observes, that, " after death, " fometimes before, livid spots are observed on the body. " the appearance of the blood is dark and diffolved, and "putrefaction speedily takes place." Of animal poifons—" The bite of the poisonous serpents is generally " followed by tumour, and livid colour of the part bit-" ten, extravafation of dark coloured blood into the ad-" jacent cellular membrane, nausea and vomiting, sud-"den proftration of strength, paralysis of the limbs, con-"vulfions, yellowness of the skin, hæmorrhages, &c. "Livid appearances of the body, a dark coloured and "diffolved state of the blood, and a rapid putrefaction, " are observed after death."

From all these accounts, however, it is plain, that, whatever may be the analogy between the action of poifons 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 elfe; 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 conclufion feems therefore liable to exception; in which he fays, "that only the lighter cases of pestilence are unlike " the effects of poison, but that, in proportion to the de-" gree of malignity, the refemblance 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 instammations 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 effential 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.

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 convulfive 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 fame day the dog died. From the time of the injection he had neither eat nor drank. On diffection the fore part of the breaft under the teguments was found entirely gangrened. the inward parts and vifcera full of black clotted blood. the outward furface 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 fimilar fymptoms, only the latter eat a little boiled meat, which he vomited up again in two hours. He died the third day, with the fame symptoms of the plague as the others.

The bile of people who died of ordinary malignant feavers was much 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; notwithftanding which he was not feized with any diftemper, 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 fign of being affected, only that he feemed to be thirfty, and drank with greedinefs. 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 " veffels, appeared of a lively red, and very fluid, with-" out any of those concretions that we constantly ob-" ferved 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 eryfipelas, 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 peltilential poison itself, taken into the stomach of dogs, did not produce any deleterious essects. "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 foilt on the ground in the infirmary; and this he did for three months, being always gay, brisk, well, sull 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 pestiserous 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 pestiserous 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 figns of the diftemper 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 fyringe being " too large to enter the vein, the experiment did not fuc-" ceed. This made me resolve to try to lay some of the " fame infected blood upon the wound. This I accord-"ingly did, and covered it with a dreffing, which the "dog got off in the night. I found the next morning " that the dog had licked the wound, and that he refuf-"ed his food. Towards night he began to bemean "himfelf, and gave figns of an approaching death. " next morning I found him dead, the wound being con-" fiderably fivelled and gangrened, and the edges round "the fwelling were likewise gangrened.

"Upon opening the body, we found the liver fomething larger than usual, with spots of a livid purple, as
in the bodies of persons dead of the plague. In the
ftomach was found a quantity of black coagulated
blood, of the size of a hen's egg. This in all likelihood was what he had swallowed upon licking the
wound. The heart was very large, with a black grumous blood in the ventricles, and the auricles were

"turned blackish and gangrenous."

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 treatife entitled Medical Facts and Observations, we can have little doubt that his experiments fucceeded, however others may have failed. One thing, however, is very obvious, viz. that if we mean to communicate a difeafe 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 afcribe 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 confiderable quantity must have been used, as he fays that in the dog's ftomach it equalled the fize of an hen's egg. A much finaller 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 himfelf for the plague, and of which Dr. Guthrie gives the following account: "This was Mathias Degio, one of the " furgeons of the hospital at Bucharest, a building appro-"priated to the cure of the plague in the Ruffian army. "He, perceiving the gentlemen of his profession condemned " in a manner to death, if punEtual 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 difease by inserting, with the point of a " lancef, under the epidermis of his arm, matter from a " pestiferous abscess, and followed the cold regimen ob-

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

"ferved 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 imitated. 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 fufficiently prolonged to allow them to come out. Dr. Ruffel fays, 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 confiders as an inferior kind of plague. In the latter, however, the eruptions feem to refemble 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. fame 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 fimilar to the phenomena of rain, hail or fnow, which fall in diffinct 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 fay that the phenomenon is occasioned by electricity: we may fay the same, if we please, of the small-pox and plague, with equal emolument.

From the accounts we have just now quoted, it ap-

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 severs 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 confequence of bile injected into his veins from one who died of a malignant sever, the blood was sound extremely sluid. In some who died of the hospital sever, 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.

Laftly, that the plague proceeds from too great a quantity of heat, either emitted from the body itself, or fome how introduced into it, feems 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 Marfeilles, and indeed in many others. Ruffel quotes two remarkable paffages 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 fhrieks, the fighs " and the groans of the fick, what would you have " expected? That the people, struck with dread and "horror, remained fad, modest and quiet. You are " mistaken. They sung, played on instruments, danced, "intrigued, and Genoa never was feen fo shameless. " debauched, and disorderly. I have said before, that "God in this plague gathered in a harvest for heaven; " but it feemed to be also a vintage for the lascivious of " of the earth. If not fo, how came fo many marriages " to be celebrated in the Lazaretto of Confolation, 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 dreffing 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 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 propenfity 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 fubstance is exceedingly apt to take fire on the application of a small degree of heat, and even by flight 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 fet it on fire. The taking fuch a substance into the body therefore feems 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 fays had been recovered, by it, from a putrid fever, but died fuddenly from fome imprudence. this woman the whole substance of the body was found luminous upon diffection, 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 fee 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 feen

feen that heat confifts 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 sluid; 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 substitute substitute, 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 firong fimilarity 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 difease 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 accention 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 fingle 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 furrounds 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

If we consider the composition of the atmosphere which surrounds us, we must acknowledge that by far the greater part of it consists of sire and electric stud, the latter being properly the element in a comparatively quiescent state. In designating dephlogisticated and instammable 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 sire, 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 furrounding ethereal fluid. In a stage still lower, the body is partially confumed, 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 feem to have died by that very deadly kind of plague of which we have already faid fo 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 prophefied 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 feverely 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 "fupernatural beings, pestilence was supposed to be " immediately imported from heaven. This is the opinion 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 " ftriking. Such was the depth of their blind bigotry " in favour of the healthfulness of the globe they inha-" bited, that they would feem to have confidered it as " even superior to that of the celestial regions. Hence, "unwilling to believe that their favourite earth could " give origin to an evil fo dreadful as the pestilence, they " imported the feeds of this calamity from the more un-

In this extraordinary paragraph we find the matter fo 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 difbelieve, 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 fufficiently able to execute his purpofes. 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 confumed 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 confumed 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 faid 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 prefent 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 indifcriminately, and as the mechanism of their nature happens to be stimulated, they destroy every thing promifcoufly before them. In all this I cannot perceive

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the smallest absurdity, or any thing but what a reafonable man may indeed must believe, if he makes use of his reason. As to the causes which Dr. Caldwell so much infifts upon, viz. filth and corruption, it is extremely probable that (while the Ifraelites were in the wilderness) these had no existence. By their law they were enjoined fuch 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 facrifices 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 carcafes or putrefying matters that might be allowed to remain notwithstanding the injuctions to the contrary. Indeed if we confider 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 fituation upon earth more healthy than that of the Jews in the wilderness. If plagues therefore came upon them, it is difficult to fay 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 fevere 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 sever; 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 sever with giddiness, vomiting, head-ach, and sometimes looseness. In the night the sever increased, the thirst was excessive, and the patient, harassed by the vomiting, &c. passed a very unquiet night, frequently with delirium or coma.

Towards morning the fever abated, the fick 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 figns 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 refembled (fays he) " fomewhat 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 fenfible 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 difease was or was not "the plague, though not independently of other fymp-"toms. When this muddiness disappeared or abated, "it was constantly a favourable fign. After a critical " fign it often disappeared suddenly, but where there "was a succession of sweats, or where no visible criss " happened, its disappearance was flow and gradual."

Along with this muddiness the patient had a peculiar consussion of countenance; the pulse quick and equal, or low and flattering, but rarely intermittent; the external heat moderately severish, at other times intense, with irregular slushings, 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 saltering in the tongue, loss of speech, while the surface of the body became

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 exhaufted than from any change to the better. When the vomiting had ceased, however, there was frequently fuch 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, loofeness 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 acceletated nor retarded the termination of the difease, which happened fometimes on the third, but more frequently on the fifth or fixth day.

The third class of patients were equally unfortunate with the other two. "The difference between the "fecond 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 augment; 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 sebrile 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-

" fequent days. . . . Vomiting was a concomitant in "about one fourth of the fick. 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 unufual to fee a fucceffive 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 fweat on the third, nor a " fensible remission took place on that day, some degree " of danger was always to be apprehended. . . . After "the fweat on the fifth, the fubfequent exacerbations " proved flighter and flighter, 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 appeared only to have a flight attack, and yet at laft were feized with mortal fymptoms, while others who feemed to be much worse at first yet happily recovered and did well. In general the fevere pestilential symptoms did not come on till a confiderable time after the attack.

To the fifth class our author refers all cases of flight 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 diforder, that the eruptions gave the first alarm; " and the fever which came on afterwards was frequently " fo flight as not to confine the fick 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 difease did not always invade "thus infenfibly. The febrile symptoms, especially the " first three days, fometimes run pretty high; and the " fever afterward, in nocturnal exacerbations particularly, " run out to the end of the week or longer; but, as " there Interpol

"there was no concurrence of alarming symptoms, and "the exacerbations, terminating for the most part in

" fweats, 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 fame 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 fick "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 " fymptoms 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 fixth class must be omitted, as containing dubious, anomalous and extraordinary cases. We shall therefore proceed to confider the accounts of the plague given by other physicians, which, without questioning the accuracy of Dr. Patrick Ruffel in relating what he has feen, may ferve to throw fome light on the subject, by relating what others have feen. Dr. Alexander Ruffel, 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 " fome 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

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

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

" 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 "difease, 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 diftem-" 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 uneafiness 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 fenfible of a sharp shooting pain darting at inter-" vals into the parotid, axillary or inguinal glands. " these symptoms succeeded a violent sever; in which, "while the fick complained of extreme inward heat, "their fkin, 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 feldom continued long in the same de-" gree, having feveral 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 fuddenly changing, it would assume a ca-" daverous paleness. The eyes, soon losing their natural "luftre, acquired a kind of muddiness; and the coun-" tenance of most of the fick was ghastly and confused " beyond description. The pulse at the beginning was " fomewhat 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

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"Teldom 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 sebrile symptoms.

"In fuch as complained of pains darting either into the parotids, the arm-pits, or the groins, a small bard, 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 fick " always fuffered a fevere 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 " fenses 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 those fiery " eruptions. The morning remission was commonly of " very short duration; the rigours, anxiety and delirium " foon 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 thort but alarming intermissions; for each " exacerbation furpaffed 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 comatole, and the " respiration was quick, laborious, and interrupted. "The buboes which, fome hours before, feemed 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 caustic: and at this period also livid or black spots, of various dimensions, often were found scattered univer-

" fally 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 criss on that day, by a profuse sweat; some
"struggled to the sisth day, a sew 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 sever; which, in that case, was generally to"tally removed by a second, though less profuse sweat,
"on the sisth; 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 " fymptoms as others were who died in a few hours. "Sometimes the febrile paroxysm, which had set in "with fuch formidable violence, diffolved in a few " hours, and left the patient languid indeed, and weak "in an extreme degree, but free from other complaints " except the pain arifing from the bubo, which from "that period increasing in fize, 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 fuch as recovered, very often dif-" cuffed without any bad consequence. Carbuncles " often began to digest before the termination of the fe-" ver in a critical fweat.

All the infected had buboes, except fuch as expired fuddenly, or furvived the first attack a few hours only. "Instances of this dreadful kind were more particularly " observed in March 1743. The fick were seized in the " usual manner; but the head-ach, vomiting, and pain " about the præcordia, increasing every moment, proved " fuddenly mortal, or terminated within a few hours in fa-" tal convulfions." Dr. Patrick Ruffel 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 fpring. In fuch fudden deaths few had any appearance of buboes; but in general the armpits and groins, or the infide of the arms and thighs, became livid or black, and the rest of the body was covered with confluent petechiæ, livid puftules 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

feldom or never.

The tongue in some was quite moift, 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, fou! scurf or fur. 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 fo 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 feldom alike in any two patients in the same stage of the distemper, and varying in the same patient every day. The vomiting commonly ceafed after a few hours, excepting where the fick were induced by thirst to load their stomach, in which case it always

always returned. Sometimes the patients were costive, in others a diarrheea 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 hæmor-rhages 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 difficult 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 diffemper might be given, but the following, it is hoped, will be fufficient, 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 inflantly despaired of life; but more generally people were furprifed by the fudden coming on of a flight fever; fo flight that no danger was apprehended either from the state of the pulse or colour of the body. This, however, was quickly followed, fometimes even on the fame day, fometimes 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 fize of a lentil. If these fwellings suppurated kindly, the patient recovered, but if not, a mortification enfued, and death was the confequence, commonly on the fifth day. Black puftules or carbuncles, covering the body, were figns of immediate death, as was likewife 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 fecure from a relapfe.

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 frength, flight fever, fickness 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 feldom on the fourth. The buboes were feated 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 fize of walnuts; and this retroceffion was always fupposed to be a fign of approaching death. Sometimes they neither showed any fign of inflammation nor were painful, and in fuch 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 veficles, bordered with an inflammatory ring, and foon 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 difease was likewise attended with petechiæ fimilar to those in putrid fevers, but larger; also with vibices, which resembled the mark of a whip, and were confidered, as well as the petechiæ. as mortal figns. 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 fuffered 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.

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According to Sydenham, the plague begins with chilliness and shivering, like the fit of an intermittent, fucceeded in a little time by violent vomiting and oppression at the breast, accompanied with its common fymptoms. 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 confiderable fymptom; but he conceives that fome flight and obscure shivering always precedes the leizure.

Mariti, in his travels through Cyprus, &c. fays 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 sew lived beyond the thirteenth.

The Abbe's definition of what he calls the plague, and which feems to be the peftilential 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 sless 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,

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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 Marfeilles and the adjacent places in 1720, people on their first seizure seemed as if intoxicated with drink; they loft 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 fecond day, quantities of small worms like ascarides were thrown off. The more plentiful these evacuations were, the more falutary; for those who vomited and purged but little funk 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 abfceffes. When these appeared, the patients rofe, 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 fixth, feventh, or eighth day, if the suppuration flopped, and the humours went back, then came on oppreffion, difficulty of breathing, furious delirium and convulsions, which ended in death. When carbuncles, or biles, with mortified floughs, 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 refolution; in others they continued in a schirrous flate; but it was best when the tumours came to suppuration.

These are the most remarkable symptoms of this satal 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. The mand say

Only a very few, and fuch as died fuddenly, 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 diftemper, sometimes not till twelve hours after; in a few instances not till two or three days; but in 1744 they were fometimes the first symptoms of the disease. The buboes were generally folitary, the inguinal and axillary more frequent than the parotid. "The in-" guinal bubo for the most part was double; that is, "two diffinct glands swelled in the same groin. The su-" perior, which in shape somewhat resembled a small "cucumber, lay obliquely near the large veffels 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 fize 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 funk 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-" ceffion of the tumour; but this did not happen for " 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 fuch time as a critical " fweat had carried off the fever. In ten, twelve, or "fifteen days, from the first attack, they commonly " fuppurated; having been all along attended with the "usual symptoms of inflammatory tumours. But I " have known them fometimes, nay, frequently, disappear "foon after the critical fweat, and discuss completely "without any detriment to the patient. At other "times, though grown to a pretty large fize, the tumour, " about the height of the disease, would fink and morti-" fy, without any fatal consequences; for, as soon as "the crifis 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 Ruffel obferves, that " there are certainly varieties in them, but " perhaps these varieties have been unnecessarily multi-" plied, from the fame 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 Ruffel describes them as follows: "The carbun-" cles were commonly protruded the fecond day of the " disease; and though the muscular and tendinous parts "were more especially affected, no part whatever could " be faid to be free of them. The carbuncle at first re-" fembled an angry confluent pock in its inflammatory " stage, but was attended with intense, burning pain, " and furrounded by a circle of a deep scarlet hue, which "foon became livid. By a progress very rapid, it then " spread circularly, from the fize of a filver 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 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 firstelled and hard, without any savourable signs of separation or digestion."*

Dr. Alexander Ruffel 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 confiderable length, the fymptoms of the plague as mentioned by authors of great eminence. To give a detail of all that has been faid

upon

^{*&}quot; Dr. Gotwald, formerly quoted, describes four varieties of carbuncles, the "differences between which feem to be pretty diffinclly marked. "kind rifes pretty high, is of a dark brown colour, the cuticle appearing as 46 if it were burnt, and it is furrounded with a lead-coloured circle. In the " beginning it is no bigger than a pea, but, if not prevented, foon grows to " the fize of a crown piece; inwardly it is moister than the rest, and may be er more easily separated. Its seat is generally in the flethy parts, as on the thoulders, neck, hips, arms and legs. 2. The fecond lie a little deeper, " and do not rife fo high; the eschar in the middle is entirely dark and at ath-coloured, full of small chops, as if it would burft by too great dryness: it has a strong lead-coloured circle, behind which the found sich looks red and shining. It eats into the flesh round about it, and takes deep root: it er generally fixes in the most fleshy parts, as the buttocks, calves, &c. 3. The 44 third is not very large at first; it appears like a blood swelling, not so dark as the former, with a wrinkled ikin; as it increases, small blifters arise in if the middle, and form an efchar, 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 er ears, &c. 4. The fourth is the most curious, as Purman, in his treatife on the plague, has well observed. Sitonius calls them pale, livid, ulcerous papulae: they appear with a high, yellowish blister, which seems full of corruption: the circle round it is first red, then of an ash colour: the blifter foon falls, and, with the carbuncle, appears fcarce fo big as a pepper corn, continually eating deeper and wider. They are feated upon the cartilaginous or griftly parts. Gotwald found them near the pit of the stomach, upon the cartilago enfiformis 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 ca-

lamity.

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 disficult to say any thing upon the subject. If the theory hinted at in this section (that plagues arise from some commotion in the electric sluid) 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 infects has likewise been accounted a fign of approaching pestilence; but if we suppose their appearance to be a fign, we can scarce imagine their putrefaction to have been a cause, of pestilence. In the east we are informed by Dr. Ruffel 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 figns failed in 1760. Violent earthquakes and famines feem to be more certain figns, though even thefe are not always to be depended upon; it being evident from historical accounts that pestilence has sometimes preceded, and fometimes followed, earthquake and famine. Mr. Gibbon, however, ascribes to the abovementioned causes, viz. insects, earthquakes, and even reign of Justinian. At least, all these preceded it; but perhaps the infects were only meant to be accounted the cause of the plague. The cause of the infects must remain in obscurity. According to him, "In a damp but "stagnating air, this African sever 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 fun 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 fuch 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 fuch character, that Constantinople has " been shaken above forty days; of such extent, that "the thock has been communicated to the whole fur-" face of the globe, or at least of the Roman empire. " An impulfive or vibrating motion was felt; enormous " chasms were opened, huge and heavy bodies were dif-" charged into the air, the fea 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 enfuing fpring was entirely gone. Our author fays that the plague feldom rages violently in England but once in thirty or forty years; but fince 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 fay what that constitution is. But, besides this constitution, he is of opinion that there must be another circumstance, viz. the receiving the effluvia or feminium from an infected person. Thus he supposes that a single infected person is fufficient to poison a whole country; the general mass of atmosphere being infected by the breath of the diseafed and the effluvia of the dead bodies. "Thus (fays 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 " fufficient to infect him, provided his juices be disposed " to receive the infection. I much doubt, if the dispo-"fition 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 " fome 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 " fome 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 Tufcany." As to the nature of the difease, when once produced, Dr. Sydenham is of opinion that it is altogether inflammatory; for which he gives the following reasons: 1. The colour Q q

colour of blood taken away that refembles that in pleuritic and rheumatic diforders. 2. The carbuncles refemble 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, quin-

fies, &c. are common.

Before we put an end to this fection, it may now be proper to fay 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 fystems of medicine now prevalent, or the different doctrines they contain. It was impossible to write in an intelligible manner for fuch 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 fentiments, 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 fubject to experiment, than others. If therefore in this treatife 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 with-INO

from

out them, and that in short our life and health are in immediate dependence upon them; I fay, 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 fought for fome constitution in the air, inexplicable, and perpetually unknown, to which difeafes might be afcribed that could not be supposed to originate from any of its ordinary properties. To explore this constitution is as great a defideratum at the prefent moment as two thoufand years ago; and any attempt to investigate it, or a conjecture relating to it, cannot be supposed inconfistent with any thing already discovered and ascertained. There are many things which lead us to think that electricity is very much concerned in difeases, 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, feems now to be decifive in their favour; and, if they act at all, it is almost imposfible to fuggest 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 folid reafoning 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 faid, 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 affertion 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 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 inflammatible 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 sluids." (Monthly Pounds of these substances are elastic sluids."

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 faying, that, " from the zeal of " reforming language, fuch a number of reformers may "arise, that our ears will not be less stunned, nor our "understandings less perplexed, than if we were expo-" fed to the clamour of Babel, or the that of words of "Sir John Mandeville." To this Dr. Pearson replies, that there is no reason to sear any such bad consequences. "The diffinguished superiority of a system produced by " a De Guyton, a Lavoisier, or a Bergman, would furely " fupercede 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 himfelf one of them, we can have no objection. He certainly has diffented, in one article, from "the fystem 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 fatisfaction.

tion, for Dr. Mitchell has adopted the word fepton 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. Priestlev 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 fignifying strength; thus, instead of saving the acid of stuor, we are to fay 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 fuch 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

eafily may the words fulfate, fulfite, fulphuret and fulphure, be miltaken for one another, either in writing or conversation! Yet a miltake 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.

HESE 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 slying 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 flow return again.

This maxim hath been put in execution in all ages, but often with fo little regard to humanity that it can-

not by any means be recommended without very confiderable limitation. The separation of the fick 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 thips 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 utenfils were burned, and the houses where the fick 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-sever or finall-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, fet the whole mass of blood into fermentation, and fometimes 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 frent can lodge; as upon wool,

" cotton, &c. and in the fame 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 fo affured 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 diffemper 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 corpfe is cold of a per-" fon dead of the plague, it does not infect the air by "any noxious exhalations. This is fo much believed " in Turky, that the people there are not afraid to han-" dle fuch corpfes. The governor of the French hof-" pital at Smyrna told me, that, in the last dreadful " plague there, his house was rendered almost intolerable "by an offensive fcent; 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 diffrict. Dr. Canestrinus, in a treatise on this diffemper, published at Saltzburg, complains greatly of the diffensions among physicians concerning the nature of the diffemper, 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 fent to inquire into the nature of the malady. "He reported that the disease was of a suspicious na-"ture, having a great refemblance to the plague. His " report was received by the nobility and health-officers "with indignation, as if untrue. Another was fent, "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 difease now becoming apparent, "proper measures were taken, and the infected sepa-" rated from the found, by which means the difease 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-" fiderable 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 fick be strictly " prohibited: whence the following forms a fafe and " infallible prophylactic of the disease:

"Mox, longe, tarde, cede, recede, redi.
"Go quick, fly far, and flow 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 fubstance. In the east, on the contrary, this precaution is totally neglected; whence it is probable that the disease is not reproduced anew, but that it is pergetuated

" 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. " 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 fick and " fuspected 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-" fible; 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 affertion our author gives a remarkable, instance in his own practice about the time that the plague stopped at Bodrogh. Having been fent into Caffovia, along with two other physicians, they were informed by the furgeon of the lazaretto, that an unusual disease had broken out in the district of Zboina, which had fuddenly 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, flept 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 hefitate 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 found: 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 perversenss 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 ensorced 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 pre-

vent 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 fick from the found certainly were not attended with any good confequence. "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 feclusion 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 fick and well together, as fometimes "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 loft might have been alive, had not 66 the tragical mark upon their doors driven proper affifs tanco

"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 seelings 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 necesfary 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 refided there for any time. Accidents among them are very rare, though not altogether without example. Alexandria in Egypt, M. Volney tells us, that as foon 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 provifions 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 fuch 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 paffed 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 impresfion 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 fome years ago established at Tunis; but the Turkish police is every where fo wretched, that little can be hoped for from those establishments, notwithstanding their extreme importance to commerce and the fafety 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 veffels 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 fays, that in the island of Cyprus, and on the continent of Syria, every European, on the flightest 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 fuch affiftance to each other as may be necessary, and often fly to the relief of a Christian when deferted by his friends. This arises from their belief in predestination. The Mahometans of Syria, however, less familiarized with this scourge, make use of fome 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 thefe means, though abfolutely 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 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 musti, and sent a detachment of soldiers to impose on him a fine of two hundred and sifty 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 thut one's felf 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. kinds of pulse were soaked in water, and they abstained from peaches, apricots, and other fruits which are coverd with a downy rind. Fowls were cooked out of the house. for fear that some small feather might adhere to them. Flowers were altogether profcribed. 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 fet an example which the rest of the Mahometans did not neglect to follow. Besides this he caused the flreets to be cleanfed; 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 fubmit 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 seathers of the other, however, attract and communicate the insection. 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. 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 confequence 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 fix rowers. When I came near the land-"ing place the cord was loofed, 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 fub-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 vifiting other lazarettos and fome of the hospitals " in Turky. My guard fent a report of my health to "the office, and, on the representation of our conful, I " was removed to the old lazaretto. Having brought " a letter to the prior from the Venetian ambaffador at "Constantinople, I hoped now to have had a com-"fortable lodging. But I was not fo happy. The " apartment, confifting 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 fix "days, however, the prior removed me to an apartment "in some respects better, and confisting of four rooms. "Here I had a pleafant view; but the rooms were " without furniture, very dirty, and no less offensive than "the fick wards of the worst hospital. The walls of my " chamber, not having been cleaned perhaps for half a " century,

et century, were faturated 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 flow " hospital fever. I proposed whitewashing my room with " lime flaked in boiling water, but was opposed by "frong prejudices. I got this, however, done one " morning through the affiftance of the British conful, " who supplied me with a quarter of a bushel of fresh "lime for that purpose. The consequence was, that " my room was immediately rendered fo fweet 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 fweet, and in a few days I " recovered my appetite. This room was lime-whited in "November, and in a very rainy feafon. 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 fecuring 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, furrounded 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 grafs, which is not fuffered 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 funfet; he takes the keys into his poffession, and fuffers them not to be opened before funrise; and, in case of any suspicion of infection, the gates must be kept constantly locked, and opened only for necessary occurtences in presence of the prior. He must not suffer dogs,

dogs, cats, &c. to lodge in the lazaretto. He must neither buy nor sell, nor suffer others to do so, within the lazaretto. No sishing boats or other small crast 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 cistance; 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 surs especially, are accounted the most dangerous goods. Animals with long hair are subject to sulf-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 fick, 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 preferved fo long "in clothes among which it is once lodged, that as " much, nay, more of it, if fickness 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 fmall 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 infifts on the utility of destroying the clothes of

of the fick, because, says he, they harbour the very effence of the contagion. He quotes in favour of this opinion what Boccacio fays he faw 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 convulfions, 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 feems to be contradicted by M. Deidier's account of the dog at Marfeilles who swallowed with impunity the filthy pus and pestilential matter adhering to the dressings of plague fores: but, when a person of credit informs us that he fare any thing, we scarce know how to contradict him. The evidence of pestilential contagion adhering to clothes, does not depend on fuch 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 fays that the pestilential contagion resembles that of the fmall-pox, in being of a fixed nature; and that all who studiously avoided communication with the fick, or with whatever fomes might carry the contagion, escaped it altogether. "That the contagion of the plague (fays he) " may lie dormant for a confiderable 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 fimilar inftances are adduced." If this revival happened from infected clothes or foft goods, it shows them to be dangerous in the extreme; but of this we have not any direct proof, neither indeed is fuch a belief quite confiftent with what takes place in all plagues, viz. that the clothes of the infected are worn by the found, 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 fuch 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 feems to be very much haftened by exposure to the atmosphere. The doing of this, however, by obliging people to put their naked arms into bales of suspected goods, has fuch 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 forfaken by "the birds; and those kept in houses have many of "them died." But, though he fays this upon very great authority, no less than that of Diemerbroeck, yet we can by no means look upon the fact to be abfolutely determined. Dr. Ruffel indeed fays that the defertion of the birds is looked upon by the Turks to be the fight of an approaching plague; but this failed in 1760. Thucydides fays that birds of prey deferted the territory of Athens during the great plague in his time; and he fuppofes them to have been poisoned by feeding upon the bodies of fuch as died of the difeafe. It is possible that fuch 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 confiftency 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 inconfiftent with the life of any human creature, and we may well put down this, as that of pestilential infection

fection arising 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 fecond mode of prevention, viz. removing these local causes which, in the opinion of fome, 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 Differtation 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 ftorms are fo infrequent during the former part of the year, that the fun is never obscured for a whole day. Even in the month of January, however, the weather is warm, and as the feafon advances the heat becomes insupportable. In autumn it is rendered somewhat unpleafant 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 fummer, to poilon the atmo-" sphere: its effects on the countenances of the poor " people who live in its vicinity are evident; and a " ftranger who travels through the island in this season " ought to avoid ever passing a night near them." De Non fays, that " as foon as the fun enters the Lion, this se country becomes the house of death : fevers of the

^{*} About the mouth of the river Gambia in Africa, after the annual inundation of the river, the putteraction 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 putteractive 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 unfortunate wretch that spends a night near them (ponds
and marshes) and few escape with life when attacked

" by fo virulent a diforder."

To the poisonous effluvia of these marshes the Doctor attributes, in an especial manner, the plagues which took place in the armies. In the fecond year of the Peloponnesian war, the Athenian army was encamped, as we are told by Thucydides, "upon marshy and unwholefome ground;" and that fuch kind of encampments will produce diseases in an army is well known. In the time of Dionyfius, when the Carthaginian army under Imilco fuffered fo dreadfully, or rather was totally destroyed, his camp was fituated on an eminence between two moraffes, 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 fituation; but, in order to raife 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 diffurbing of " fo many dead bodies (fays our author) arose a terrible or pestilence, which carried off immense numbers of the "Carthaginians, and amongst the rest the general him-" felf." To the unhealthy fituation of the armies also the Doctor ascribes the plague which took place in the Roman and Carthaginian camps in the time of the fecond 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 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 fetide 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 cleanlines?"*

This certainly feems 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 feem 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 " (fays 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 of that fevers prevail most in houses exposed to the effluvia of dunghills in fuch fituations." In Spain the opinion feems to have been but lately eradicated; for fome years ago, an order having been iffued by government that the streets of Madrid should be kept somewhat cleaner, the people were fo much exasperated at being threatened with the loss of the savoury odour, that a rebellion had almost ensued, and the physicians declared the fmell of human excrements to be the most wholesome thing in the world.

That

^{*} Medical Review, vol, iil, p. 260.

[†] It feems, however, of late, that at least the city of Madrid is kept clean. Swinburne fays, 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, thudder at at the very recollection of its former filth. Some of the natives regret the dold stinks and nastiness; as they pretend that the air of Madrid is so sub-

^{*} 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 cafe the diffemper feems 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 refembling those of the true plague. In this case, however, the confinement was beyond example in any fituation 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 confequence 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 foil rich, the air pure, and the induf-"try of the inhabitants aftonishing. 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 feldom 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 refidence. "Their number of people lays them under the neces-

The former filthiness of Madrid, together with its being fituated 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 folid objection to the theory of the domestic origin of plague. To the same purpose

tee below the remarks on the climate of China.

[&]quot;til as to require a proper mixture of groffer effluvia, to prevent its pernicious effects upon the confliction. The extremes of cold and heat are aftonishing in this place, and the winds fo fearching, that all the Spaniards wear lead them under waiftcoats, to preferve their chefts; for they pervade every other kind of clothing."

hty of carrying industry to the greatest height; for otherwise their country; fertile as it naturally is, would be infufficient to maintain the inhabitants. Every " inch of land is cultivated; no forests not woods, nor "even a fingle 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 difeases to which they seem to be subject

" are the small-pox and leprofy.

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 fixteen miles below the city of Canton, on Canton river: "It is the usual station of all European " ships in this river. On one fide the land is low, " marshy, and covered with water, forming swamps fit " only for the cultivation of rice. The extent of these " fwamps is confiderable; the tide rifes high, and over-" flows great part of them; but the interfection of the " rivers renders them more pure than they would other-" wife be, and confequently the air is much healthier "than one could expect from the unfavourable aspect." In like manner Canton city he fays "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. " houses are built with bricks; the apartments are in "general small, and not very lofty, and the ground "ftories are very damp. When the business of the sea-" fon 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. Wampoa the marshes in the neighbourhood must, in the hot feafon, emit noxious effluvia as well as any where elfe, and there can be no certainty that the overflowing of the tide is fufficient 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 furface, were sufficient to produce fevers; yet here it is not 10. In this city also the inhabitants are numerous, and the apartments small; so that neither the perspiration of multitudes, nor the moift exhalations from water stagnating in the ftreets, nay, under the houses themselves, are able to produce the diseases in question. Again, at Macao the fultry heat of the air has as little effect as the reft.

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 searcely sufficient for so vast a population; but very little room is occupied by a Chinese samily, at least by the middling and lower classes of life. In their houses there are no supersuous apartments. A Chinese dwelling is generally suricularly 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 frequently

^{*} 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, sleeping 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 fuch causes of their power. People, however, feldom want a falvo for any thing. "The crowds of " people, at Pekin (fays 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 dif-"eafes; and exceffes productive of them are feldom " committed." But, if the dry air at Pekin contributes to the health of the people, why does not the moift 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 purpofes.* Sir George Staunton computes the number of inhabitants on a branch of a fingle 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 Ruffel 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 vicistitudes 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-

[&]quot; tacked

^{*} Authentic Account, &c. vol. i, p. 290.

" tacked by epidemics and pestilential disorders than " the young and middle aged, and women feldomer and " less severely than men. Now, if contagion was the " fource 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 vicifitudes of the " atmosphere, the principal fource of those diseases, they " are confequently 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 " viciffitudes 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 folution fails in a manner almost as evident as can be imagined. "The removal of the embaffy, " (fays Sir George Staunton) was a disappointment to " feveral 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 fnow, 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 confiderably below the freezing " point. The usual inhabitants were guarded against es cold, not only by habit, but by an increase of clothing " in proportion to its intenfenels, confifting of furs, wool-" len clothes and quilted cottons. They are not accuf-" tomed to the prefence 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 " ftoves

"the worst weather experienced in that capital might. The worst weather experienced in that capital might be considered as mild by the Tartars, coming from a climate still more rude; but other foreigners 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 feem 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 vicifitudes of the air, which Europeans cannot. The prevention of plagues or mortal diseases then must confift 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 ambaffador were feized could not be owing to any flovenliness 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 feen, in a former fection, that this was preceded by the most dreadful and violent wars throughout the whole Afiatic continent. Since the ceffation 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 fay, to its utmost perfection. This feems 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 differtation above mentioned obferves, 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 feems 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, inflead of allowing the greater part of the territories they poffess to lie waste, would in all probability gradually leffen both the frequency and violence of this terrible difease. Migrations of large bodies of people, especially for the purposes of war, are greatly to be dreaded. If a few Englishmen, poffessed 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 fickness continued afterwards to enjoy good health. He likewise observes that many who left Britain, after being feafoned to the countries to which they went, chofe 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 unbealthiness 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) fays 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 (fays he) I will begin with the most " common fevorous difease, 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 fuch as use that "diet; but of both these kinds of fevers the air is the " fole author and cause, for the common sever 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 confequence 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 arifing 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 differninated 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 enfuring fafety in fuch 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 fay how far the contagion might be carried.*

Another mode of purification is by exposing suspected goods to heat, to the vapour of vinegar, &c. sumigating with gun-powder, sulphur, &c. and on this principle various powders of sumigation 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 sumigation 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,

^{*} 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 sumigation.

"There is no better corrective (fays 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 fulphur and "gun-powder purify the air, and drive away its corrup-"tions; fo does the burning of amber, pitch, frankin-" cense, &c. so do the sumes 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 sumes 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 " fulphur."

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 an-

[&]quot; Med. Repos. vol. ii, p. 433. + Synopsis, vol. i, p. 80.

fwer as well! "Whilft 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 contagion? or did former noxious exhalations cease in
consequence of the convulsion of the earth?
Sorhait 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 declined; which may have been owing to the great

" quantity of fixed air in the atmosphere."

To this our author adds, that "places adjoining to "fpice-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 feen, might be accounted rather a fign of 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 sulgora, sine pluvies et tonitruis, colo 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 suppofitions, 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 proofs

and we cannot accelerate this ceffation. This is entirely conformable to the opinion of Dr. Patrick Ruffel. Speaking of the decline of the plague at Marfeilles, and the vigorous exertions of the magistrates to put a stop to it, he fays, "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 peftilence, 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 fuccess than that " peculiar state of the atmosphere which, in conjunction "with contagion, is absolutely necessary to render the

" plague epidemical."

Dr. Ruffel takes notice of the methods of extinguishing contagion already mentioned, by kindling fires, &cc. and disapproves of them. We shall not therefore spend more time in confidering 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 fo large a space, it seems that it certainly may be done in fmaller spaces, ships for inflance; 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 considence in their fuccess. He adopts the doctrine of contagion, of which he gives the fame definition that in this treatife is given of infection, viz. "Something propagated from difeafed "bodies, or from substances that have been in contact " with them, producing a fimilar difease in other per-"fons*—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.

^{*} Medicina Nautica, p. 173, et fig.]

" ver may be called malignant, when, with the symptoms " of debility, there is a cadaverous fmell arising from the " body, an unufual fector 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 si 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 flight 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 " fymptoms, whether they are mild or malignant. We es are affured 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 fubject, I would fay, that " the contagion is the offspring of the catarrh (the cough " and hoarfeness resembling a cold) which accompanies " the meafles.

"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 insection, 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 unburt, or one only, out of several, is insected. The escape of persons employed about the sick. proves a frequent sause of misseading 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 fick are the vehicles of contagion. It " is these which impregnate the atmosphere with nox-" jous 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 filk 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 Marfeilles, and affected "the people that opened them fo fuddenly, had their "virulence increased by not being duly ventilated. "When the jail-fever was brought into court by the " prisoners at Oxford affizes, 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 defign, many of them were feized "with the fickness. 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 thefe

"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 fide were fufferers.

"In the summer of 1793, while the Orestes brig, com-" manded by Lord Augustus Fitzroy, lay at Plymouth, " fhe was anchored very near and to leeward of an " army transport, which had on board a very malignant " fever among the foldiers. While the foldiers 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 "thefe troops, on bringing them from below, that " eighteen people belonging to the brig were quickly " feized with the fame 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 confiderable 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 washerwoman. The heat of his sumigating surnace 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 washed and dried immediately after. We had in that hospital 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,

familes, or clothes, bed-clothes, bale-goods, &cc. The most plausible reason, he says, that could for some time be aftigned for this, " was, the generation of animalcula; " the cotton or woollen clothing was faid to ferve 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 poifoned eleven hundred thousand times its bulk of water. but infected a much greater bulk of air, with its effluvia,* shows that fuch 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 fays of the variolous contagion emitted from the human body will apply equally to infects. "What has "been called the infenfible perspiration (fays he) which arises from the surface and the lungs, we have a right " to believe carries with it in folution 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 diftant from its fource." The smallness of fize of infects can be little objection here. A skunk is but a small animal, yet it spreads its odour farther than an hundred difeafed human bodies could propagate the plague.+ On

⁺ 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 fmell, yet people are by no means fafe in approaching patients about whom no fmell can be perceived. We have already feen, from Dr. Fordyce, that what may be called the pure infection of fevers is not perceptible by any of our fenses; and there are examples of very offensive smells iffuing from diseased bodies without any contagion ensuing. Dr. Trotter tells us, that " a patient in typhus was fent from the "Venerable to the hospital ship, with a feetor 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 confiderable diftance. He died in a few "days, yet nobody was infected from him, either in his "own ship, or in our hospital. There was probably " fome peculiarity of constitution here." In M. Deidier's experiments, above related, the dog which eat the dreffings of the plague fores, after being infected with the difease, 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 effential connexion between offenfive finells and contagion; yet, as they are fometimes 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.

minate in our minds. Birds are the natural enemies of that hateful class of beings we call infects, 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 sty 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 fimilar to that given in this treatife, viz. from the decomposition of some kind of "The fœtor of the breath (fays he) perspirable matter, &c. evidently demonstrate that they differ from "the healthy state. The smell, to our fenses, comes very " near what is called sulphurated-hydrogenous gas. Some " of the fluids within the body would feem 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 decomposition 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 gafes will be diffipated as quickly as they " are evolved; while, on the other hand, by laying the " clothes in a heap, packing them firm in a cheft, 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 fay, that thefe "gases are themselves what we call the matter of infec-"tion. I would only go fo far as to affert that they are "the vehicles of it, till more certain experience shall " determine farther."

With respect to sumigations 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 sumigation has no connexion with the true plague, nitrous acid having never been used as a preventive for it, we shall defer any

farther confideration of it to the second part of this treatife,

to which it naturally belongs.

We come now to the fourth and last mode of prevention, viz. a confideration of those means by which an individual, without separating himself from society, and who is daily obliged to have communication with the fick, may yet secure himself against insection. Here the means recommended are extremely various, and some of them fo opposite, that we can scarce avoid suspecting them all. The misfortune is, that though a person should go, without fear, among the fick, though he should constantly take a medicine, and should never have the diftemper, yet we cannot fay whether the medicine did preferve him or not. Were it possible to know the particular constitution of the body which disposed some to refift the attack of the difease, 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 "fuch as had "the good fortune to escape a fit of fickness or death, " foon after their arrival, enjoyed afterwards a pretty " good state of health, thence concluded, that the blood " of fuch persons had been entirely changed by the diet " of the country. Upon this erroneous principle they " adopted a most fatal method of feasoning people to "these unhealthy climates. They, by small quantities, " frequently repeated, took away as much blood as they " fupposed 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 mightily 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 " feized with the plague foon after bleeding, wherefore " we forbad it to all." This may feem furprifing, as we find bleeding fo much recommended by Sydenham as a remedy; but by others it is equally reprobated; nav. Dr. Hodges tells us that he never knew but one who recovered from the disease after the use of it. Issues feem more likely, if not to prevent, at least to render the disease more mild if it should attack. They are recommended by Diemerbroeck, and Ruffel speaks of them as, by fome authors, represented as almost infallible." He cannot, however, recommend them from his own experience, having never feen them opened for the purpole 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 fexes at Aleppo had iffues in their arms, it being "there a very common remedy in a variety of chronic "diforders: but, notwithstanding those outlets, numbers 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 prefervative, particularly by Diemerbroeck, who writes with a kind of enthufialm in its favour. "Being called " (faid he) to vifit a patient afflicted with the plague, as " foon as I entered his chamber I felt a most offensive " fmell of excrements (for he had a diarrhoea) with "which I was greatly affected. Leaving the house " after a very fhort visit, I instantly found myself seized " with giddiness, nausea, and uneafiness at the heart; so "that I had no doubt of my having caught the peftilential contagion. Laying afide all bufinefs, therefore, I " immediately returned home, and fmoked five or fix "pipes of the best tobacco; by the use of which all the " above-mentioned fymptoms fo totally vanished, that "I felt not the least uneafiness any more. Then, being " again defirous to go abroad and visit other sick peo-" ple, I took a drachm of theriaca, and from thence-" forward was in perfect health. The fame thing hap-" pened

"this peftilence; 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 sound 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 samily 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 persons, 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 (fays Dr. Canestrinus) that the cold of winter was destructive of contagious matter; but various instances 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, 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 descined 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. Ruffel justly observes, that the human frame, "could it support such an application of fire " and fmoke as is necessary to expel or destroy contagion " from infected fubstances, would probably receive little " benefit from it, if infected; nor could those in health " fustain, 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 faying, 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 Hof-" 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-feven 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, fugar 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 fu-"dorific drink, fuch 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 subfided. "The operation should be repeated once a day, until " evident fymptoms 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 " dreffed 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 diarrheea has commenced, " little hopes can be entertained of a cure; but still " the patient should not be despaired of, as, by an af-" fiduous application of the means proposed, some few " have recovered, even after diarrhœa had comstrang cross and and about to strang . " 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 " fays, an indigeftion 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 eafily digeftible 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." Lif-

bon, July, 1797. By Royal Permission.

With regard to diet, and the use of spiritous liquors, opinions, as may well be imagined, have been very difcordant. 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 diffurbed by thefe, he cheered his heart by three or four glaffes of wine: his common drink was beer, and also white wine, fmall, 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-" fions." Allen goes on to inform us from Diemerbroeck, that, "as to diet, it is adviseable in a pestilential dispo" fition to use temperance, which very much contributes " to the prefervation of health; but all fudden 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 fweet "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 veffel 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 tafte either spiritous or fermented liquors, and was the only European that entirely efcaped 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 fucceed any more than bleeding: There is a certain quantity, and a certain species, both of food and drink, different in different persons, necessary to preferve 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

^{*} The opinion of those physicians whom Mr. Howard consulted upon this subject are given at large in the APPENDIX.

in one equally fubtile. How far the skin may be able to inhale or rather imbibe furrounding 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 abforb 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 fuch 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 fick with an empty stomach in the forenoon. "In fuch circumstances (says he) after a long and " fatiguing morning, I have often found myself disagree-" ably affected in my latter vifits, and have been fenfi-" ble of flight 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 confequently much more alarmed. In " fuch 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, unufual 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

^{*} This doffrine of fancy, or imagination, ought undoubtedly, as Dr. Ruffel fays 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

"I shall not take upon me to determine; is is sufficient for the present purpose to indicate the means of refraining those alarming sensations which, when aggravated 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

"fusceptible 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 insected 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 discovers 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

take it into their heads that fuch a thing cannot be; which by the bye is as firong 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 centrary I may say that not one in sive 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, thow 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 sussicion to show them that they ought to bring a proof, and not those who say they saw or selt any thing. But, waving this, sinse is the highest faculty in our nature; imagination as well as reason are inserior 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 seed any thing, nobody can, with any shadow of reason, say that he neither saw nor selt 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 seels any slight pain or uneasines, 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 sew glasses of wine gave vigour to the system, and enabled it to repel the attack. Had he been much satingued with bodily labour, and sound himself greatly relieved by a few glasses of wine, surely he would not suppose that his former fatigue was m

to fumigate the clothes with nitre, fulphur, 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 afterwards aired. The mouth and hands ought once more to be well washed, and the hair might be sumigated with a little nitre and sulphur, by means of a

" pipe, fo 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 fafety of it. The only folid objection that can be made to it is, that those who have once had the plague are not fecure from having it a fecond time, or oftener. Yet, if we confider 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 confideration, and, unless some objection to it be discovered greater than any that has yet appeared, feems 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 fection 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 fuch eschars discover themselves in abundance on the external parts, it is likewise observed that the patient certainly dies; whether from the fame 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 furface, fo 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 feen that in Dr. Ruffel'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 fuccels. In this uncertainty, however, we must look upon those who have recently had an opportunity of feeing the difease 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 Ruffel at Aleppo, and the phyficians to the Russian army when the plague raged in it in 1770, &c.

Dr. Alexander Ruffel 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 difease wherein reason is often perplexed, and experience itself fallacious, it is greatly to be lamented that nature is not more, and opinion less, consulted.

" No traces of any fatisfactory 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 finful 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-" five 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 vifit the fick. " Hence the greatest part of the infected are either left "to struggle with the disease without any affistance " 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 confists in bleeding, let the stage of the distemper be what it will, and afterwards attempting to raise a sweat with the infignificant 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 fal vitrioli might be added. Violent cathartics were hurtful, but an emollient clyster or laxative of manna and cream of tartar were not only fafe but serviceable. "On the second day of the dif-" ease (says the Doctor) where the remissions of the "fymptoms were tolerably diffinct, I have frequently " and fuccessfully given an infusion of senna with manna " and cream of tartar; and it is a fact confirmed to ec 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 bubbes.

"The natural crifis of the difease was always by the " fkin. 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 fymptoms; " the second, that, though they produced the defired " effect, it was necessary to keep up the sweat a much " longer time than most people of that country could " be perfuaded to endure; and, if the fweat 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 " feem to relieve, yet generally proved fatal in the ec end."

Contrayerva and valerian, faffron, the compound powder of contraverva 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 fyrup of poppies was reckoned preferable to opium. In cases of diarrhoea, Venice treacle or diascordium were joined with the diaphoretics. Neither bark nor fnakeroot 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 confequence, they will often rather choose to " incur distant though great risks, than avoid them by " fubmitting to prefent inconveniences." Nitrous medicines were found ineligible on various accounts: 1. They did not, as in other diseases, allay heat. 2. The fick

fick could not bear them in ordinary doses without languor and dejection. 3. They were apt to bring on a diarrhæa.—The following is an epitome of our author's practice:

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.

of the room was warmed or corrected by a moderate fire. In fummer only the windows opposite to the patient's bed were ordered to be shut; but even this restriction was not universally complied with; many infisting upon setting all the windows open in the day

time, and fleeping 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 prefcription 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 is it happened on the second day, the patient was never freed from the sever, though greatly relieved. It was therefore necessary to continue the same medicines, in order, by a more plentiful sweat, to procure a persect criss. 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 sever 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 sew 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 asraid 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 mortisted, the treatment

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 Ruffel complains that, in Turky, phyficians are laid under fuch restraints, by popular prejudices, that they are fometimes obliged to remain almost passive spectators of the difease. 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 ftate, 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 fecond day; but fometimes not till the third. Where the operation was repeated, it was usually on the third, fometimes on the fifth, and even on the fixth; 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 fucceeding days it was regulated by the state of the pulse, and other fymptoms. Where the infection was flight, 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 feldom exceeded eight or ten ounces. Cupping was used by the natives, but never ordered by Dr. Russel. Children were scarified in the legs. He feldom had an opportunity of examining the blood drawn from a vein; but, in fuch cases as occurred, the general appearance was little different from that of healthy blood; the craffamentum Zz

was sometimes of a darkish colour, but never sizy 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-sive

were bled; forty died, and twenty-five recovered.

Of these bundred and twenty cases at large, fifty-seven recovered, as many died, and the event of fix was unknown. This would tend to give us some confiderable 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-feven took place mostly in the earlier part of the feafon, and were of confequence 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-fix died, and fifty-four recovered. Such an excessive disproportion cannot be ascribed to the medical treatment, but to the nature of the difease 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 suppoled 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 foft and loofe texture, somewhat blackish on the surface; but the quantity of ferum 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 finapifms to the feet. On the feventh day he sweated copioufly, and was much relieved, but foon relapfed. On the 10th he sweated early in the morning, and had a temporary relief, but foon became worfe than ever. 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 fætor; the others were "inconfiderably fmall." 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 fixth 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 fixth 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. the fourth he had a diaphoretic medicine, and his drinks were acidulated with spirit of vitriol. The symptoms increasing, finapisms were applied to the feet, but with-Cataplasms of garlic were applied next out effect. night; he had two copious black stools, not very feetid, and two bilious ones in the morning of the fixth. these stools he was greatly weakened, and was ordered a cordial with diafcordium. He had another flool, and became much worfe. Cataplains were applied without effect, and he died on the feventh day. This patient had a great number of eruptions; but, though fix 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 dissigned 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 fix in the same house escaping the disease. Three died.

no. An Armenian woman in the feventh 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.

the first day. A diarrhoza 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 or-

dered without fuccess. 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 sourth, 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-cupsuls 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 loofe stools, which funk him greatly. Next day he seemed past recovery; lying motionless, insensible, his breathing quick, laborious and interrupted; the fkin 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 fuch like means, by which they fometimes fucceeded; but, though he opened his eyes, and gave figns of fense, he could not be prevailed on to drink; and he remained filent. He would then, for fome 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 loofeness, with gripes, for which the white decoction was ordered; and he had tincture of bark thrice in twenty-four hours. On the fixteenth 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 himfelf fomewhat 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 sætid 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.

of the third day, was bled, and had a faline 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, flender 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 fixth 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 sact, 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, affisted 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 contraverva, but where it occasioned loose stools, was lest off. Spiritus mindereri and saline mixture were also given as sudorifics.

5. In case of diarrhoea, 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 sudorifies exhibited having but small power by themselves, it was found necessary to affift 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 (fays our author) to a cer-"tain 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, usual-" ly excited vomiting. I fometimes wished to give "wine, but a religious bar lay in the way of Mahomme-" dans, 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 difease access of cool air to the chamber was constantly allowed, and, where the chamber itself was not fufficiently 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 fkin, the fick 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 Ruffian army, the greatest confidence feems to have been put in vomits. The difease commonly began with a dull pain in the head, resembling that produced by the sumes of charcoal, accompanied with shivering, universal weakness, &cc.* On the first appearance of these a vomit was given, working it off with acid drinks. " If the nausea " and bitter tafte in the mouth was not removed by

[#] Duncan's Med. Comment. vol. viii, p. 352.

"the first, they gave a second, and sometimes a third or of fourth; nay, they fometimes, if the fymptoms were er very urgent, gave two or three in the space of twelve 65 hours, as there is no time to be loft in this difease; for "they did not find this species of evacuation subject to "the fame 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 cleanfed, they gave every " morning a powder composed of twenty grains of rhu-" barb, mixed with as much flower of brimftone, and three grains of ipecacuanha, exhibiting also, every " hour, five grains of pure nitre mixed with two grains so of camphor; and, if coffive, a laxative clyfter was " given every evening, composed of decoction of camomile, wine vinegar, with or without foap, according "to dircumstances." It nome stante

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 fixteen of powders, and taken in twenty-four hours. When de-"lirium came on, blifters were applied to the legs and " arms, and camphor given largely. Vegetable and " mineral acids were given indifcriminately; but they "found the vegetable kind fometimes remain on the of ftomach when the other was thrown up; and of the "latter they preferred the vitriolic. Acidulated drinks " were given in quantity through the whole difeafe, and "the food confifted 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 " tafte remained, there was little hope of the difeafe " abating. According

According to Baron Ash, "the plague does not deer pend upon any constitution of the air, but is com-" municated only by contact, and they had repeatedly " fucceeded in suppressing it in different divisions of the "army, by the immediate separation of the infected " with their attendants, and burning every thing be-"longing 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 preferved 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, ipeca-" cuanha, rhubarb and bark, to be the properest reme-"dies. That, to purify the air in hospitals appropriated "for their reception, gun-powder was found most effi-" cacious, probably from the commotion given to the " air in explosion, over and above its action in common . "with other fumes. To refift infection, courage and "fortitude of mind is necessary, as consternation and " terror feem to prepare the body for the reception of " the difeafe."

Dr. Sydenham feemed to have as great an opinion of bleeding, as the Ruffian physicians of vomits. Confidering 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 confiderable; 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 feveral places. Being accidentally brought to Dunstar castle in Somerfetshire, a surgeon, who had travelled much in foreign parts, applied for leave to give the garrison what affiftance he could. This being granted, he bled them, every man as he stood, without distinction, till ready to drop down; the blood was fuffered 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 phyfician was obliged to attempt the cure by sweating, which he says he preferred to bleeding on account of its not weakening the patient fo 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 fwelling had appeared, by which means a fweat would be more fafely and eafily raifed. 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 fays, contributes more to the raising of a sweat than one would imagine. If no vomiting enfued, he adminiftered sudorific medicines internally. But, if the stomach cannot retain any thing, he proposes to begin the • fweating merely by the weight of the clothes, and now and then throwing part of the sheet over the face. The fweat being thus begun, the vomiting, however violent, generally stops, and the medicines will be retained, fo that as plentiful a perspiration as we can defire 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 fweat being proposed, the apothecary told him that he had given him feveral 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 difeafe. He advises the sweat to be kept up without intermission for twenty-four hours; a smaller time being insufficient

^{*} Dr. Power, who wrote, in 1732, the Ancient Physician's Legacy, had lodged his foldiers in a church in which those who died of a plague had been buried. An hundred and eighty of the foldiers 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 sew ounces. (Sauvages.)

to remove the disease, and a stoppage of the perspiration certainly attended with a return of the bad fymptoms. 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 poffet drink is what he recommends. Next morning the cure was finished by a purge of fenna, tamarinds, &c. Where a swelling appears, he directs to forbear bleeding even in fuch as are not apt to fweat, least the patient should die suddenly from a return of the morbific matter into the veffels. 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 fafety than by waiting for its suppuration.

This may be accounted an epitome of the most approved modern practice in pestilential cases. The Rufhan physicians above quoted feem to speak with most confidence of their fuccess. They, however, "lay great " ftress upon diftinguishing the plague from the worst skind 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 66 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 difeafe, 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 faid of remedies in the plague. He divides the diffemper into two kinds. the nervous and putrid; the former "comprehending " merely that degree of confusion and disturbance given " to the nervous fystem on the first introduction of the " miasma, and the latter commencing at the time the " miafma begins to operate upon the blood and other "fluids by affimilating them to their own putrid na-"ture." In the nervous state the miasma has sometimes been carried off by sweat, gentle diaphoretics, camphorated emulfions, juleps of camphor and mufk. 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 ufeful; purgatives were hurtful, blood-letting inadvifable, and fcarifying 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, insected 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 sudorisic 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 sumigations, 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 fweats were promoted for two on 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 fand were applied to the feet, armpits and groin. If the fick were not eafed by the first fweat, it was repeated in a few hours; but if, after the fecond fweat, the fever and other symptoms still increased, it was the worst fign. 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.*

* As it might by fome be deemed an affront offered to the wifdom of antiquity, should we pass over in silence the opinions of the more ancient phyficians, I iball in this note give a thort account of fome of their most remarka-

ble modes of practice, as they are recorded in Burnet's Thefaurus.

r. Porestus, 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 peftle till united (which is not very easily done) into an uniform mass, adding as much syrup of citrons with vinegar as would render it fost, with a little powdered falt 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 bigues of a small nutmeg of this, made up into a confection with the ancient theriac, mithridate, Armenian bole, terrafigil-

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, lentil 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 peppercoorn; undoubtedly the rokens of Dr. Hodges.

2 Hildanus, also a respectable writer, has an high opinion of issues as a

preventive. He fays he never knew but one or two (and those of a very bad habit of body) who had iffues in their legs and arms that perithed in the plague, and fays that he has known its efficacy as a preventive not only in himself but many others. He says he kept two iffues in his own body, one in the left arm, the other in the right leg. (See above p 139) To the same purpose Mercurialis relates that he never knew but one, and he was a price. who died of the plague having an iffue. He fays 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 loofeness, and almost all who were bled, fell victims to the disease.

As preventives he advises amulets made up of arfenic, powder of toads, and other things. There are to be hanged round the neck in times of plague, and are undoubtedly of great virtue (maximam ad præservationem vim habere, non est qued dubites!) This remedy he says he had from his preceptor Cosmas

Slotanus, a very celebrated turgeon.

Brine of pork is another preventive, which he never tried himfelf, but afks 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.

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 sayourable alteration, danger is always to be apprehended. On the other hand, sweats, at certain "periods

zill it becomes clear, poured into earthen vessels, and kept thut up from the air for a twelvementh; after which it was fit for use. A draught of this was given to people infected with plague, and operated by sweat, stool or vemit, 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 fifter, 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. Braussel mentions one of his patients, who, he suspected, had got a dose of be-

20ar in urine.

4. Johannes Helmontius fays, that to his certain knowledge (me confcio) Hibernus Butlerus cured fome thousands of the plague, at London; though unhappily our author got only part of the secret, and which is to the following purpote. "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 insets (insectas ambulantes) viz. flies with thining wings of a greenith colour, as it 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 cursing farty thousand people insected with the plague, and promifed to show me the mystery of the matter (rei cardinem) but being suddenly fent into base nishment he departed." The best part of the secret being thus lost, it is needless to trouble the reader with any surther account of experiments made with other toads roasted alive, powdered and made up into troches, &c. prefuming 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 be goat; and Mercurialis says that in the house of a most reverend canon in Hungary, he saw a large he goat kept for this

purpote.

6. From fuch horribly difgusting 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 jacinet, 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 as 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 " fymptomatic exacerbations, feemingly dependent on "the eruptions." He adds, that he never observed blood exude through the pores; nor did he observe the fweat to be remarkably offensive; or in any degree so remarkable as in some eruptive fevers, particularly in the fmall-pox before eruption. Dr. Hodges, however, fays that in the plague of London sweats were sometimes extremely acrid and fœtid; and that they were met with of various colours, fuch as purple, green, black, or bloodcoloured. 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 dis-

temper.

Befides 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 confidered in the fecond part of the work. I now conclude this part with a short retrospect of the principal facts which to me feem to be the refult 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 fingle well attested instance to the contrary: 3. That the means by which the diffemper usually has been propagated are war and commerce. 4. That the difease differs from all others in having a more violent tendency to inflammation, infomuch that it approaches to actual accention; 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 fuch quantity as to deitroy Bbb

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 confifts.* 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; fo 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 fweat, and this perhaps is the only evacuation which ought to be kept in view, as having a salutary tendency, by those who attend the fick. I

END OF THE FIRST PART.

^{*} 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 fo much recommended by Mr. Baldwin is faid to be by producing fweat. (See above p. 341.)

TREATISE

ON THE

Plague and Yellow Fever.

PART SECOND.

Of the Yellow Fever.

WE now come to treat of a disease, less satal 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 fubdued fuch immense tracts on the Southern Continent. Soon after the fettlement 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 fays, that, "as we have no accounts of this difease in the ancients, nor even in the Arabian writers, who lived and practifed 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 "difeafe, it appears to be a difeafe that is indigenous * "to the West India islands and the continent of Ame-" rica which is fituated 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 fo to Barbadoes, about thirty-feven " years fince (1721 or 1722.) A better inquiry would

have informed him, that this fever had frequently appeared, 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, remember to have seen this sever 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 fays 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 "Marfeilles, on board which were feveral bales of Le-" vant goods which were taken in at Marfeilles 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 fome lingered longer; and the contagion, still " fpreading, made great havock at the beginning. He " fays he had this account from Mr. Nelson, an English "furgeon, who was feized with the difease at Marti-" nique, and died of it a few days after his arrival at Bar-"badoes. He fays, it is very probable that the fame " fever, or one of very near refemblance 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 foftered and " maintained it there ever fince."

Dr. Mosely at once concludes the whole of this account to be fabulous, but whether sabricated by Dr. Warren or the surgeon, he does not say. He then appeals 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 sever 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 dif"temper, and afterwards Kendal's fever, the pestilential se"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 rise and fatal in May, June, July and August, and then mostly among strangers; though a great many of the inhabitants, in the year 1696, died of it; and a great many

" at different periods fince."

As to the first appearance of the disease in the West India isands 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. " Mofely) 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, fays that this fever was fo 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-" viners, but calls it pestilential, and says that the Euro-" peans are almost the only victims to it.

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 failors were the only people attacked by it, whence it

" was called la fieure matelotte."

This account feems to carry no improbability in it; nevertheless Dr. Mosely rejects it upon grounds that are very far from being indisputable. "The French writ-" ers (fays he) have not been at the trouble to confider " 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 " fimilar to that in which the difease 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 fimilar to that in which the difease originated, furely 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 dif"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 affertions, 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 Nofology we find the plague diftinguished into a number of different species, among which there is one called the plague of Siam. This, he fays, was in the year 1685 brought from Siam to Martinico, in the ship called the Oriflame. This feems to have been the yellow fever, and the symptoms are considered in the following fection. This date agrees exactly with what Mr. Hughes fays 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 thefe names imply that the difease 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 diffimilar to their own, while some of them still continued to ramble from one country to another, occasionally visiting all, without taking up their refidence in any.

Martinique seems to have been the first place where this diftemper made its appearance; and from thence it feems 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 fuch exemption. Sebastian Cabot discovered the North American Continent for Henry VII of England, very foon after, if not before Columbus discovered the Southern Continent for the king of Spain. a very suspicious time; for Henry VII himself had introduced the sweating fickness into England only thirteen years before; * and in those days the plague seems never to have been eradicated; fo that it is by no means impossible that these first adventurers might have communicated to the Indians with whom they had any communication, the feeds of difeafes 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 feafon, in confequence of which they were obliged to feed upon unripe fquashes, fruits, &c. We know not the nature of the diftemper, 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 deferted, 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.

Anialia "

"This war and pestilence are frequently spoken of by the historians of Wew England, as remarkable events, in the course of Providence, which prepared

t In Belknap's Biography we have a more particular account of this pefilence, 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 sever. 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 samily 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 sounding of a colony. Two of the natives who had been brought to England were seat 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.

[&]quot;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 accomformally panied or succeeded it.

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 paffages: "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 cheft of wearing apparel which had be-" longed

64 prepared the way for the establishment of an European colony. Concerning
65 the war, we know nothing more than this, that it was begun by the Tar65 ratenes, a nation who resided eastward of Penobscot. These formidable
65 people surprised the bashaba, or chief fachem, at his head quarters, and de65 stroyed him with all his family; upon which all the other sachems whe
65 were subordinate to him quarrelled among themselves for the sovereignty;
66 and in these dissensions many of them as well as of their unhappy people
65 perished. Of what particular kind the pestilence was, we have no certain 66 information; but it seems to have been a disorder peculiar to the Indians,
66 for Mr. Vines and his companions, who were intimately conversant with 67 them, and frequently lodged in their wigwams, were not in the least de66 gree affected by it, though it swept off the Indians at such a prodigious rate 67 that the living were not able to bury the dead, and their bones were sound 68 several years after, lying about the villages where they had resided. The 68 extent of this pestilence was between Penobscot in the east, and Narraganset 68 in the west. These two tribes esoaped, whilst the intermediate people were 69 wasted and destroyed."

This diffemper 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 natives 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 fent from one tribe to another, as saves. 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.

^{* &}quot;The Pawkunnawkutts were a great people heretofore. They lived to the east and northeast of the Narragansitts, and their chief sachem held do-

" 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 fure if even this was its first appearance, still corresponds extremely well with the date of its introduction into Martinique mentioned by Sauvages. Dr. Lining fays 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 fettlement 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 sever) 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 fuccessively, 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 select in the woods, were missing, which they had stolen in the night."

"minion over divers other petty fagamores; as the fagamores upon the island of Nantuckett, and Nope, or Martha's Vineyard, of Nawsett, of Mannamoyk, of Sawkattukett, Nobsquasitt, Matakees, and several others, and fome of the Nipmucks. Their country, for the most part, falls within the jurisdiction of New Plymouth colony. This people were a potent nation in former times, and could raise, as the most credible and ancient Indians affirm, about three thousand men. They held war with the Narragansitts, 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, and 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 yellow (describing it by a yellow garment they showed me) both before they died, and afterward.

"The Massachusetts, being the next great people northward, inhabited to principally about that place in Massachusetts bay, where the body of the English now dwell. These were a numerous and great people. Their chief

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 otherwife. 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 " thips' companies at Santa Martha, that the furvivors "were ftruck with aftonishment and horror at the " havock made among their comrades. In 1730, when " the galleons under Don Manuel Lopez Pintado came " to Carthagena, the feamen were feized with the fame " dreadful mortality, and fo fudden were the attacks of

" fachem held dominion over many other petty governors; as those of Wee-"chagaskas, Neponsitt, Punkapaog, Nonantum, Washaway, some of the "Nipmuck people, as far as Pocomtacuke, as the old men of Maffachufetts 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 Narragansitts, but held amity for the most part with the Paw-" kunnawcutts, who lived on the fouth border, and with the Pawtucketts, who 44 inhabited on their north and northeast limits. In an. 1612 and 1613 thefe " people were also forely 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 Mailachusetts colony, which people this country, and the next called Pawtuckett. There are not of this people left at this day 44 above three hundred men, besides women and children.

Pawtuckett is the fifth and last great fachemship of Indians. Their coun-4x try lieth north and northeast from the Massachusetts, whose dominion reachat eth fo far as the English jurifdiction, or colony of the Massachusetts, doth so now extend, and had under them feveral other fmaller fagamores; as the 45 Pennakoaks, Agawomes, Naamkeeks, Pafcatawayes, Accomintas, and others-They were also a confiderable people heretofore, about three thousand men-"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 government of Massachusetts." (Gookin's Historical Collections of the Indians

in New England.)

The following was communicated to Benjamin Baffet, efq. of Chilmark, by Thomas Cooper, a half blooded Indian, of Gay Head, aged about fixty years; and which, he fays, 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 st they generally died, viz. the confumption and the yellow fever. The latter they could always lay in the following manner: After it had raged and fwept off a number, those who were well, met to lay it. The rich, that is, such as 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

"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 treating 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 fickness; and, having in his hand fomething in shape refem-" bling his canoe, ikin, 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. 46 to refemble became for ever transferred to him or her. After the rich had 66 thus given away all their moveable property to the poor, they looked out the " handfomest and most sprightly young man in the assembly, and put him 46 into an entire new wigwam, built of every thing new for that purpofe. 44 They then formed into two files at a fmall distance from each other; one 44 standing in the space at each end put fire to the bottom of the wigwam on 44 all parts, and fell to finging and dancing. Prefently the youth would leap " out of the flames, and fall down to appearance dead. Him they committed 44 to the care of five virgins, prepared for that purpose, to restore to life again. 44 The term required for this would be uncertain, from fix 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 44 hard to have the distemper laid, and generally, after much perfuasion, 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 fo 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 habitations 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 feems 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. 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.

F 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 kaufos 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 (fays he) fo " 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 " fymptomatical 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 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 sever; Warren, a putrid bilious sever; 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 sever, he thinks also improper, as a stranger would not know the disease until some of these symptoms appear; both of which are generally satal, 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 putresaction, and end in death with an extraordinary dissolution of the sluids. 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 severs, 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 neighbour-bood 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 seels 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 swelve 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. Thefe fymptoms are fucceeded by a high fever, great heat, and strong beatings of the arteries, particularly those of the temples and carotids; fluthings 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 fkin hot and dry, though fometimes it has a partial and momentary moifture. There is a fickness of stomach from the beginning; retchings succeed immediately after any liquid is fwallowed, which bring up bilious matter. There is an anxiety, with stricture, foreness, and intense heat about the præcordia; great restlessiness, heavy respiration, sighing, urine deep coloured and in fmall quantity.

Thus the fever goes on during its first stage, which constitutes the inflammatory period, and continues from twenty-four to fixty hours. The fecond, 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 vellow tinge in the eyes, neck and breaft; the heat subsides, fometimes accompanied with chillness, but never with that kind of rigor, which, when it happens, terminates the difease by sweat, or by copious bilious evacuations, upwards or downwards. The retchings increase and become porraceous: the pulse flags, but is sometimes high, ding relf in any, we may estrect a c

^{* &}quot;This (fays the Doctor) is the time to extinguish the disease; but Eurose peans 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 faffron colour, and in small quantity; the tongue in some cases is dry, hard, and discoloured, in others furred and moift; the head is confused, sometimes with delirium, with a gloffiness of the eyes. This stage of the disease continues sometimes only for a few hours, at others from twelve to forty-eight, feldom longer, and too frequently the difease hurries on rapidly from the first to the third stage, which is the gangrenous or fatal state. Now the pulse finks, intermits, and becomes unequal, fometimes 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 flate colour, and the ftomach can retain nothing: the breathing is difficult, the tongue black, the fweats cold and clammy, the eyes yellow and funk; there is a yellowness round the mouth and temples, and foon 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 fighing; the urine is quite black, and fometimes 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 fuccession.

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 sace was besmeared with blood, and D d d "with

"with the dullness of his eyes it presented a most distressing contrast to his natural visage. His abdomen was selected 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 sufficient strong to bring the sense of him and with the blood he was endeavouring to bring

" up, and expired."

The fymptoms 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 confiderably according to the conflitution 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 fultry weather, and damp fituations, where the inflammatory state has been only of a few hours duration, the metaptofis has been fo 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 fays that he never faw or heard of an inflance of what Lind fays, 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-diffolved blood followed, and a ghaftly 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 instanmatory stage; but being checked, though not extinguished, it has been lengthened out, and

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 sound mortissed, 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 fometimes does, though it is frequently carried off by an enormous fecretion of bile. "Diffections " (fays 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 found state of the " liver is never to be expected after death, whether the " difease has been acute or chronical. Of the latter class " of difeases it is almost always either the seat, or the " origin."

Dr. Lining, in a letter to Dr. Whytt at Edinburgh, published in the Phylical and Literary Essays, defines the disease, to be "that sever, which continues two or "three days, and terminates without any critical disurbance of the disease, with a small pulse, easily depressible 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 fkin; vomiting, hamorrhages, &c. and those without being accompanied 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 in-

fection. 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 laffitude; but some were taken ill fuddenly without any warning. The fymptoms were, shivering; frequent, full, hard and strong pulse; though fometimes fmall and hard, and in others foft and fmall; but towards the end of the fever it became fmaller, harder, and less frequent. Sometimes there was a remarkable throbbing in the hypochondria and carotids, the former caufing in some a tremulous motion of the whole abdomen. The heat was about 102 of Fahrenheit, and nearly equal over the whole body; fome had frequent returns of chilliness without any diminution of temperature of the body. "In a few there happened fo " great a remission of the heat for some hours, when at the " fame time the pulse was foft and less frequent, and the " skin moist, that one from these circumstances might " reasonably have hoped that the sever would only " prove a remittent or intermittent. About the end of "the second day the heat began to abate." Here Dr. Mofeley takes notice that when the fever abates, fome, who have mistaken the bilious remittent for the caufus, speak of remissions which do not happen in this fever. "This circumstance of the endemial causus (fays he) I believe, has never been mentioned before."

Dr. Lining goes on to inform us, that the skin was rarely dry in this disease, there being generally a propenfity to fweat. " On the first day the sweating was com-" monly profuse and general, on the second it was more "moderate; but on both those, there happened frequent " and thort 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 fo much abated that the skin was generally dry; on-" ly the forehead and backs of the hands continued moift." 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 fecond day the pains in the head, loins, &c. of which they had complained before the attack, and which were fometimes 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 loofe a texture.

This disease was not attended with any remarkable thirst; but, on the third day, as the sever began to lessen, or rather, says the Doctor, as the sulness 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 sew had a vomiting, either bilious or phlegmatic, on the first day. The whole sebrile state was attended with an obstinate costiveness.

These were the principal symptoms with which the sebrile state was attended, and which generally went off on the third day, or in seventy-two hours from the first attack, without any salutary criss, and was soon succeeded by the second stadium, as our author calls it; a state, though without a sever, much more terrible than the former. The symptoms now were,

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 fick 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 comit. But this, though its general appearance is black, appears not to be entirely fo, but owes its colour to a great number of black flakey 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 diffection, 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 difease, and likewise that the blood was very fluid, and the veffels of the viscera much diffended. 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 exceffive five 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, sace and expremities, 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.

In the third stage, which always terminated in death, the pulse was exceedingly small and unequal, though foft; 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 breaft and neck appeared livid; the heart palpitated firongly; the heat about the præcordia was greatly increafed, respiration became difficult, with frequent fighing; the patient became anxious and extremely reftlefs, the sweat flowed from the face, neck and breast, blood from the mouth or note or ears, and in fome from all together; the deglutition became difficult, hiccup and fubfultus 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 lo long speechless, and without any perceptible pulsation of the arteries and wrifts; whereas in all other acute difeases, death follows immediately after the pulse in the wrifts ceases. When the disease was very acute, violent convulsions feized 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 fymptoms 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 asraid 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; fometimes denoting, as in contagious " fevers, their malignant nature, at other times, as in " fome West Indian fevers, an universal diffolution of "the blood and humours; and frequently this fymptom " 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 diffolved mass of blood issues from every " pore. . . . On confidering the yellow fever particu-" larly he is of opinion that the remarkable diffolution " 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. " proceed, according to him, in fuch as are newly arrived, " fometimes from a gross habit of body, excessive drink-"ing of spiritous liquors, and from being afterwards " overheated in the fun; 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 fimilar difeases have made their appearance, not only " in the East Indies, but in some of the southern parts of "Europe, during a feafon when the air was intenfely "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 Eee

"hundred persons often died in a day. At this time " the winds blew mostly from the fouth, and after fun-" fet there fell an unufual and very heavy dew. The "difeafe began with alternate heats and chills, naufea, " pains of the head, back and loins, and at the pit of the " ftomach. These symptoms were often followed, in "less than 24 hours, with violent reachings, and a " vomiting of green and yellow bile, the fmell of which "was very offensive. Some threw up an humour as " black as ink, and died foon after, in violent convul-" fions and in a cold fweat. The pulse was fometimes " funk, fometimes 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, meien-"tery and intestines were found covered with gangre-" nous fpots. 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 flomach contained a quantity of an atrabilious iliquor, which, when poured on the ground, produced a fensible 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 flench was intolerable, and in some of them worms were already sound lodged in the stomach. His Maighty's ship the Tweed being at that time in Cadiz bay, feveral 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 sever 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 fign 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 sever 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 fubjects of the disease are the same with those already mentioned. He has feen it at all feafons of the year, but it is worst in a hot feason, 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 fiziness; and the crassamentum, when it has "flood till it is cold, will scarce cohere, but fluctuates; "the ferum is very yellow. . . . On the fecond or third "day the blood is much more diffolved, the ferum " more yellow, and the crassamentum loose, scarcely " cohering, but undulates like fizy 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 diffolved, that we frequently fee 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 " ftool, 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-" diffolved blood. . . . Soon after death the body apss pears

"pears much fuller of livid, large, blackish, mortified foots, particularly about the præcordia and hypoconders, 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 gangenes, in those, as also in several other parts of the body. And the whole corpse soon putreses after death, and can be kept but a sew hours above

" ground."

Dr. Jackson, in describing the yellow fever of Jamaica, acknowledges the difficulty of characterifing the difease, 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 obferves 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 confider 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. Mofe-" ley, who has endeavoured to perfuade us that it is no " other than the kaufos, 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. " kausos, we are informed, made its appearance in the "islands of the Archipelago, and on the coasts of the " contiguous continents, indifcriminately among men " and women, natives and foreigners: in fact it has not, " as far as I can perceive, any claim to be confidered 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 alimentary 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

"diathefis of the fystem for its existence."

The Doctor divides this disease into three species : 1. Where " figns of putrefaction are evident at a very " early stage, which is generally rapid in its course, and "which cafually 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 " figns of nervous affection are more obvious than fymp-"toms of putrescency; and in which yellowness and black " vomiting are rare occurrences. 3. Another form, in "which regular paroxysms and remissions cannot be traced; but in which there are marks of violent irritation, " and appearances of inflammatory diathefis in the ear-" lier stage, which give way, after a short continuance, " to figns 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 foon 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 " paroxyims and remiffions, but likewife 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 fymptoms enumerated by Dr. Jackson are in general the same with those already taken notice of.

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 fweat 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 forfook the furface and extremities; the tongue became moift, and at the fame 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 veffels became gradually more languid; the natural heat retired from the furface of the body, which was now dry and impervious; the pulse returned nearly to its ordinary state, or became flow, 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 ikin of an American favage; 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 foot, where the progress of the difease had been rapid; while it was not only less intenfely black, but often tinged with green, where the difease had been more flow and gradual. The number of villous or mucous flakes, in the matter discharged by yomit, 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 difease advanced, the vomiting became more frequent, but was feldom 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 foon as the matter discharged by vomit acquired this dark and footy colour, the belly generally became loofe, 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 fometimes observed in different parts of the body, while livid blotches made their appearance on the belly and infides 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; foon after which coma or convultions 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 intenfely black; the patient turned yellow almost in an instant, and died in a very short time. When any one recovered from this deplorable fituation, of which there were some few instances, the termination was not by any regular crisis. The black vomiting ceased, sometimes apparently in confequence of treatment, fometimes 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 unctuofity for feveral 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 diffections 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 putressed, and much distended with wind. The liver and spleen were generally enlarged in size; the former of

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 shuid, similar to that ejected by vomit, was found in the stomach, which shuid our author says positively derived its blackness from the bile, the slakes observed to sloat 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 confider 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 veffel called the Hankey. This veffel " failed 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 coaft " 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 confequently 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 fuch a manner as must be supposed capable of producing fevers of a bad kind, if they could be produced by fuch causes. Accordingly a malignant sever did break out; the veffel was not ventilated, nor were the bed-clothes, &c. of the fick deftroyed; from whence Dr. Chisholm concludes that the infection remained on board the veffel. The Doctor then proceeds to give the following account of the veffel after her departure from Boullam : " Capt. Coxe, finding the water at "Boullam unwholesome, proceeded with his ship to "Biffao, where there is a Portuguese settlement, for a " fupply. The ship was navigated by about twelve fea-" 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 feamen could be pro-" cured they put to fea, having on board the captain, fick, " 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 former, humanely rendered them every fervice 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 thips of war were feized with the fever, which " had carried off three fourths of those on board the " Hankey at Boullam; and, having no affiftance, two " of the four died: the remaining two were put on

^{*} Chisholm's Essay on the Malignant Pestilential Fever, p. \$6.
F f f

" 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 feveral of the Charon's and Scorpion's " people were fent 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 difease 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 furprifing manner. Dr. Trotter, in his Medicina Nautica, D. 328, gives the following account: "Dr. Chisholm " tells us, that the ships of war on the African station, " having fent men to affift 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 furgeon, is at prefent in the For-" midable, a fecond rate, also in the fleet; from them I " have copied the following narrative of their transac-" tions with the Hankey: " When

"When the fquadron under commodore Dodd " came to St. Jago in 1793, the Hankey lay there in " great diffress for want of hands; having buried above " one hundred perfons, men, women and children, from " the time she had been at Bulam. The fever was now " overcome : Mr. Smithers faw two men that had lately " recovered. He left a quantity of bark. The Charon "and Scorpion fent two men each to affift 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 se 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 sever, of " which one died: but it is remarkable that the Scor-" pion did not bury a fingle 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 fick."

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

To this is fubjoined the attestation of Mr. Smithers with respect to the Charon,

"hip, and said that he would not destroy them, unless he was indemnified for the loss he might sustain, for those for 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 fast feems 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 affign 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 fimilar disease, from the same cause, "though in a less degree, had existed in St. George's " fome 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,

wol. ii, p. 285. In this Dr. Chisholm retracts what he had faid concerning the mortality on board the Charon and Scorpion ships of war. "I have lately received " (fays 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 fick-" 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 ferious part of the charge, viz. that Dr. Chisholm had wilfully mifrepresented 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 sever, 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 fenior member of the council of Grenada. "Mr. Mitchill (fays 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 difinclined to fall in with the " univerfally received opinion, that that thip 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 sayour me with a written account; and in " order to direct that gentleman's attention to the points "I confidered 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 56 possession, and a slight attention will exhibit my view 55 III " in framing them, and show the doubts respecting the " nature of the epidemic which fuggested them. " though I repeatedly, through Mr. Mitchill and Mr. " Palmer, the gentlemen with whom Mr. Paiba refided " in the country, renewed my request to have this pro-" mife fulfilled, Mr. Paiba left the Mand 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, prefents 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 falsihes 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 failors, 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 "difingenuousness of this author is particularly evident "from this quotation, if the period of the commence-" ment of the difease be correctly affigned : 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 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.

rated, 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 fays, "Before the Hankey put to fea, all "the bedding of the fick was thrown overboard or de-" stroyed; the ship was washed from stem to stern, both " above and below, with falt 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 fand-bank, upon the " north fide 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; fo 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 fet off, in an " open boat, for Bissao, to obtain affistance from the " Portuguele 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 perfons 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 conftituted the feminium " of the infection. Capt. William Liddle, of the thip "General Mathew, faw them on board; and it was in " consequence of that gentleman's representation that "the lieutenant governor, Mr. Home, entered into a " ftrict 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 fecretary, is now " refident commiffary at Grenada; and these gentlemen " will readily testify to the truth of my statement. The es 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 misflated the case of a Capt. Remington, said to be the first who fuffered by the fever in Grenada. The words in Dr. Chisholm's Eslay are, " A Capt. Remington, an in-" timate acquaintance of Capt. Coxe's, was the first per-" fon who vifited the Hankey after her arrival in St. "George's bay. This person went on board of her in the " evening after the 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 fymptoms increased so rapidly, " as, on the third day, to put an end to his existence." In opposition to this Dr. Smith gives the follwing statement from Mr. Paiba: "He (Capt. Remington) had 60 been

"been all day and all night coming from Grenville bay. " and had been wet through. He flept on board in his " clothes; and went in an open boat the next day back " to his thip : 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 veffels, 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 " abfurd; 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 subverfive 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 treatife, into an endless dispute about which of the two parties had spoken the truth. Setting afide therefore the whole of the evidence on both fides as infufficient, we shall now proceed to give an account of the symptoms of the distemper as described by Dr. Chisholm, and to which descrip-

tion 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, fuddenly becomes giddy; he lofes his eye-fight; " every thing feems 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 paroxylm the body feels cold, and is over-" spread with cold sweat, which issues from every pore "in aftonishing 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 fide and at the præcordia. The lait, 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 feems to be confiderably affected by "the frequent retching and vomiting which then come "on. The patient foon 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-fix hours, "thefe fymptoms 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 " fixty 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 fuccession. "In general the patient expires in this fit; but fome " have recovered from it, and continued rational for a " few hours longer, when a fecond fit has carried them " off."

This, without much deviation, was the general progress of the worst kind of the sever. In some, however, a comatose disposition showed itself from the very first; in others the disease began with short convulsive sits in frequent succession, sollowed by constant delirium and cold clammy sweat, without any intervening heat. In a few cases the first symptoms were coldness and shivering, as in other severs.

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, slushing of the face, tendency to come, the pain generally confined to the forehead, and the peculiar cast of the delirium, during which the looks and actions of the pa-

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tient very much refembled 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 fetal profess.

pearance, 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 feveral inflances, the immenfity 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; " fometimes 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 fediment of a black " gritty substance, and has been so extremely offensive " as to oblige all the attendants to keep at a confiderable " diftance

"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, simall 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 satal, 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 sound in the brain; and, on narrowly inspecting the eyes of those who were afterwards seized with coma, the pupil was sound 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 " leffened in fize, are drawn up confiderably towards the "abdomen, and the scrotum appears at the same time " remarkably flaccid and empty. The furface of the " scrotum becomes soon after very painful, and an exco-" riation takes place, chiefly at the most descending " part, from which a confiderable quantity of very offen-" five purulent matter iffues: 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 infufferably 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 fepara-"ted, it much refembles moistened parchinent. " 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, foft and low found when compared with the natural tone, at the same time that the syllables are more diffinguished, 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 fign 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 feem 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 exquifite. 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 feemed ready to ftart from their orbits, with an inflammation externally, and a fensation of pain internally, rendering the admission of light intolerable. In the legs the pain had its feat at the top of the great tendon, immediately below the calf, and in the point where it was feated a gnawing fenfation was felt, occasioning exquifite torture, with an involuntary contraction of the limb; fo that, on the whole, our author concludes that this pain much refembles 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 fo flow as to

" beat,

"beat no more than thirty times in a minute. On the "whole, it has not been found quicker than 130, or "flower than 30, in a minute." In violent cases the pulse was hard, quick and small, but sometimes sull; 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, slushing 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 unaccompanied with thirst, or any other evident symptom of the existence of sever."

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 blifters, nor was he fenfible of the operation of laxative medicines. On being asked about his situation, he always answered that he was very well, and fensible of no pain, as in the yellow fever already described. It is observable, however, that the yellow colour, fo remarkable in the former, feldom 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 difease or the other; but Dr. Chisholm observes "that in some protracted cases on shore, and in " fome among the failors, which might have been a " combination of the pestilential and yellow fevers, this " fymptom appeared about the 5th, 7th or 9th day."

Besides the petechiæ and vibices, already mentioned, Dr. Chisholm takes notice of two other forts 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

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spots made by the fine black pencil of a painter, all round the mouth, but especially the upper lip, and cer-

tainly 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 fense of fulness, without any visible swelling, a contraction and distortion of the penis; the urine generally of a deep red, fometimes brownish, green, very often bloody, and in a few cases much inclining to black, and of an oily confiftence. Its fmell was generally very offensive. All the excretions were exceedingly offensive, but the fæces most remarkably so towards the latter end of the difease; for in the beginning they had no remarkable fœtor. The fick 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 enfued. 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 coffeegrounds. The matter discharged by vomit also varied from porraceous to black, and refembling 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 fucceeded by the fymptoms of peftilential fever. A remarkable instance of this is given in twentyfeven recruits, who had been feized with dyfentery, 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 feemed to be attended with furprifing effect; but in a thort time symptoms of pestilential fever came on, even in a few hours after those of dysentery had disappeared. In like manner catarrhal complaints foon 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, ee and

" and of course satal; 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 faid 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 fymptoms enumerated by Dr. Rush, who hath written a very lengthy differtation upon the difease, it was the fame 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 tafte, heat in the stomach, " giddiness or pain in the head, a dull, watery, brilliant, "yellow or red eye, dim and imperfect vision, hoarfe-" ness, or flight fore 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 fad, 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 dufky and clouded. After "the 10th of September, when the determination of " blood to the brain became univerfal, 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 st beginning of the attack was sometimes full, tense and " quick,

" quick, but frequently weak; sometimes so low that " it could not be perceived without preffing the wrifts; "and fometimes it had no preternatural quickness." " many it intermitted after the fourth or fifth, and fome-"times after the fourteenth stroke. In some it was ex-"tremely flow; even as low as thirty strokes in a mi-" nute. The pulse was also tense and chorded. The " flow 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 " affift 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 feldom afterwards faw an eye in " which it was wanting. In Dr. Say it was attended " with fquinting, a fymptom which marks a high de-" gree of a morbid affection of the brain. Had this "flowness or intermission of the pulse occurred only af-"ter figns 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 feveral 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 " affift 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 fulky " pulse became less observable, and, in proportion as "the weather cooled, it disappeared. It was gradually " fucceeded by a pulse full, tense, quick, and as frequent " as in pleurify or rheumatism. It differed, however, " from a pleuritic or rheumatic pulse, in imparting a Hhh

"very different sensation to the singers. No two strokes feemed to be exactly alike. Its action was of a hobbling nature. . . . It was an alarming symptom. . . .

The pulse most frequently lessened in its sulness, 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

"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, stomach, 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 orisices which had been made in performing venesection, several days after 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 furprifed to find fo few marks of hepatic af-" fection. I met with but two cases in which the pa-"tient could lie only on the right fide. Many com-" plained of a dull pain in the region of the liver, but " very few complained of that foreness to the touch, " about the pit of the stomach, which is taken notice of "by authors, and which was univerfal 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 fymptoms, and fome appeared to "die of sudden effusions of blood or ferum in the lungs. "... The difease 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 66 to reject drinks of every kind. Sometimes green or vellow bile was rejected on the first day of the disorder; " but I much oftener faw 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 toffing 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 convulfive motion which propelled " them in a stream to a great distance, and in some ca-" fes 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-" fembling 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 fwimming on the top of it."

A quantity of grumous blood, dark coloured on the outfide, 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 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 diarrhoea, 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 confistence 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 fometimes green, fometimes olive. Their feetor 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 fuch an excessively fœtid discharge, that the fmell produced fainting in an old woman who attended. Their acrimony was fo 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 sew 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 sensibility, 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 manifelted a confiderable 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 sever, but in some continuing without intermission to a sew hours before death. Some had maniacal symptoms, without any appearance of sever; 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 selt 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 often the feat 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 severs, and was excessively keen. Cossee 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 " fwellings on the limbs, with a black apex, which, upon " being opened, discharged a thin, dark-coloured, bloody "matter. From one of these malignant fores an "hæmorrhage took place, which precipitated the death " of an amiable lady. A large and painful anthrax on "the back succeeded a favourable iffue 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 diforder, it was remarkable that blifters were much es less disposed to mortify than in the common nervous " fever. Such was the infensibility of the skin in some people, that blifters made no impression upon it. . . . 66 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 sever."

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, fometimes a few minutes after death; fometimes 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 (fays the Doctor) as they appear by diffection after death, from the yellow fever, are different in different 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 flave 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 feemed to be mortified and corrupted. A viscid bile, like that just described, was found in the duodenum near the gallbladder. The villous coat being taken off, the other parts were found red and inflamed. The whole was lined with a thick fur or flime. The omentum was fo much wafted, that nothing but its blood-veffels 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 outfide and infide. The lungs were inflated and all full of black or livid spots; and on these fpots were small blifters like those of an erysipelas or gangrene, containing a yellow humour. The blood-veffels in general were empty; only the vena portarum feemed full and diftended as usual. On cutting the found part of the liver, the lungs or the fpleen, blood iffued 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 found.

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 feetly found; the blood in the heart and veins fluid, fimilar in its confistence 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 instaned; and this instammation extended through the pylorus into the duodenum some way. The instammation here was extremely similar to that induced in the stomach by acrid poisons, as by arselic, which we have once had an opportunity of seeing 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 fo. These diffections were made early in the feafon; 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 diffection at Bush-hill, in which the vessels of the brain were remarkably turgid. Dr. Rush, however, is likewife 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 veffels in the last moments of life. "It is no new thing for morbid affections " of the brain to leave either flender or no marks of dif-" eafe after death. Dr. Quin has given a diffection of " a child that died with all the fymptoms of hydrocepha-" lus internus, and yet nothing was distinguished in the " brain but a flight turgescence of the blood-vessels. 56 Dr. Girdlestone says, that no injury appeared in the " brains lii

"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 informs us that the brain was in a natural state in every case of death from puerperal sever, notwithstanding it seemed to be affected in many cases soon after the attack of the disorder."

With regard to the state of the blood in this diffemper, Dr. Rush says, that when drawn from a vein, it was, " 1. In the greatest number of cases, dense, and of a " fearlet colour, without any separation into crassamen-"tum and ferum. 2. In many cases it did separate in-" to craffamentum and yellow ferum. 3. In a few ca-" fes the ferum 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 fizy lymph, " while the part which lay in the bottom of the bowl "was diffolved. In two cases the lymph was mixed "with green streaks. 6. It was in a few instances of a "dark colour, and as Auid 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 diforder. 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 fay, hereafter, that the blood was feldom diffolved in this fever;" and p. 73, speaking particularly of the blood, he enters into an argumentation against the putrefcency of that fluid. "It" (the blood) fays 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 fkin, have been ascribed to this sup-" poled putrefaction of the blood. It would be easy to " multiply arguments to prove that no fuch thing as " putrefaction can take place in the blood; and that "the fymptoms 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-" fels; and hence the external and internal hæmorrha-" ges. The petechiæ on the furface of the skin depend "on the same cause. They are nothing but effusions " of ferum or red blood, from a rupture or preternatu-" ral dilatation of the capillary veffels. The finell 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 fweat, "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 fensation 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 fmell 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 fuddenly, and without lofs 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 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 folids, "which have been mentioned. It occurs in every cafe " 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 "fudden diforganization 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 fystem were not relieved by evacuations. "In those cases where purges and bleeding had been " used it was much flower. 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 "diffecting room that had petechiæ on them were "longer in putrefying than any others. The fevers of "which the poor (the common subjects of diffection) " die, are generally of the low-nervous kind. Great di-" rest debility is the characteristic of those fevers. " 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 flow progress of the body to putrefaction

^{*} See p. 126, n. where an account is given of the famiel, and another by-pothesis 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

"flowness 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 feems 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 valcular fystem, it was fizy 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 fizy, 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 veffels 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 veffels 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 veffels 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 veffels, 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 otherwife? This can be known only from confidering the fymptoms which take place in the last stage of the disorder, and from diffections. Now, from the concurrent testimonies of all the writers quoted in this treatise, it appears that towards the end of the difease there is fuch a tendency to diffolution, that the whole body feems ready to fall down into a putrid mass; or at least into what is commonly called fo, whether with strict propriety of language or not, fignifies little. In thort, the difference between the plague and yellow fever feems to be entirely of the fame kind with that taken notice of in this treatife, 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, befides what he discharged by vomit. Dr. Lining (p. 389) attefts a fimilar tendency to diffolution in the blood in a most remarkable manner. See alfo Dr. Lind's opinion to the fame purpofe, p. 303, Dr. Hillary's, p. 395, Dr. Jackfon's account, p. 399, Dr. Chifholm's, p. 411; and laftly, Dr. Rush's own testimony concerning the hæmorrhages from all parts, lately quoted.

As we have formerly feen, that in the plague there was no fuch tendency to diffolution, but rather to coagulation, in the blood, it was thence concluded that the immediate cause of the symptoms of plague is a tendener in the blood to throw out the latent heat it contains. by which means the parts on which thefe 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 feems to retire from the extremities towards the vital parts, and the veffels contracting and lofing their power by reason of the abstraction of sensible heat, the pulse ceases entirely some time before death. Dr. Huxham takes notice of this excessive coldness in the limbs taking place in a lady who died of a malignant sever, 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 sever 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 fimilar 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 veffels 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 veffels. In an healthy subject, hæmorrhages very frequently take place from the nose where the blood is of a very proper confiftence; and Dr. Ruffel fays 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 confiftence, the hæmorrhage was feldom 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 putresaction, as in the yellow sever, 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 attendants ants on the access of the pestilential sever. 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 sever, where the patient expired in a violent convulsive fit; or what Dr. Rush says of the sever 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 cafe 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 diffection, 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 breaft, fighing, anxiety, great proftration of strength, yellowness on some parts of the skin, and death on the fixth day. On diffection the stemach was found to be inflamed, the duodenum diffended 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-

ly checked by cold than the plague. It has already been remarked from Dr. Ruffel, that of two thousand sevent hundred patients, whose cases he noted, every one had bu-Thefe, 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 fixty-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 sever 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 fymptoms of the plague, the yellow fever, fever of Boullam, and fever of 1793, will perhaps fet this matter in a still clearer light.

From a mere inspection of the detail of symptoms in this table, the difference between the feveral diffempers 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 effentially different from the other three, which feem 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 fome 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 treatife, 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, to determine whether the disease has ever been ex-

cited by imported contagion or not:

"A very important question is whether this disease " is contagious. The greater part of the American phy-" ficians are of opinion that it is, and are perfuaded that "it is brought from the West Indies, by the ships which " arrive here in the beginning of every fummer. 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 fure prefervative, if almost all "the thips' 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 phyficians are fo " convinced that the yellow fever is contagious, that they "fcrupuloufly prohibit perfons 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 practifed with respect " to those who die with the plague. It must be confes-"fed that their precautions, in this respect, have in " fome fort been justified, on seeing all the individuals " of one family fuccessively 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,

Characters and most remarkable Symptoms

OF THE

Plague, Yellow Fever, Fever of Boullam, and of Philadelphia in 1793.

(In this table the mark Do. refers to the column immediately proceeding.)

General Characters. VELLOW TEVER. PEVER OF PHILADELPHIA SE STOP PLAGUE. FEVER OF BOULLAM. apposed by Dr. Chirholm to be a kind of new diffease, originating as faul velfels on the coast of Africa in 1785. Known and described by ancient historians. Not known to exist before the last sentury. Various opinions concerning it. Attacks indifcriminately people of all ma-Articles more generally than the common yellow farer. Brought on not only by Intemperance, but by flight errors in regimen. Sometimes fears to space the weakly and de-licate, and to attack the roboff. Attacks the robult much more violently than those of a contrary description. Attacks the intemperate and sobult-As in the yellow fever. People formetimes firmely dead as by a first of lightning. Sometimes fall down ful deally, but review, and by proper manage ment orgain their health in a doort time. Patient femetimes falls down in apoplexys fyncope or univerfal couralflors. Not observed. Death functiones taken place without any fe-ver or complaint; preceded only by sen-mentary fickacile, by eraptima of pusple fports, or the breaking out of hard citches in different parts of the body. Death fornetimes within twenty-four hourse but not without force previous complaints. Venerest appetite manifesufly increased on Not observed. No remifion, but a coffation of one fet of fymptoms to make way for another. Not observed. Remifficers and emserbations. Veneral appetite increafed, but lefs than in the plague. Symptoms of the Dijeaje in various parts of the Body, or over the whole System. PEVER OF PHILADELPHIA OR 1781-YELLOW FEVER. FEVER or BOULLAM. Infection fometimes begins with apparent in- Not commonly observed. Sometimes is felt like an eleftele ftrake. Not observed. Infedion felt at the commencement of the diffrafe, occasioning a nanina and rigor. Nainting very frequent. Da. Convultions care at the beginning. Comul-five motions of the limbs not unfrequent throughout the diffesie. Tremers of the limbs uncommon Not commonly observed. Convalifions formetimes very violent: the pa-tient often expiring in a fit. Do-Exceller flrength during the delirium-Hierap extremely common. Do. Sudden lods of Arength. Delicium at times Do. Sometimes conflant-Life of speech, feltering and trembling of Not observed, the torque. Da. Eyes watery, infigured, or like balls of fire, Counterance wild and fererisars. Muddineis of the eyes, frame to be deferibed-Grimmels of countenance. Byes red and heavy. Eyes inflamed, watery, chiling and protraded. A fellury inflance of the patient becoming green all over, A deep yellow colour all over the body for common that the diffuse has one of its names from it. Yellow colour very frequent-The yellow colour frarcely met with. Eruptions of the nature of afchars, formelings finally, and called tokens, proper-enters, its., fametimes larger, and called carbuscies, on many different parts of the body. Never obferval. The exchangles do not answer to any defining-tion of these in the player. Buboes in the inguinal, axislary and parolid Vety rarely observed, glands exceedingly exmunes. Sometimes objected, but only in fatal cafes. A very few inflances. Pulis femetimes Indiffinguishable from that of a healthy perion, even a floor time before death. Other wife of all possible varieties. Semetimes entirely gone a confiderable time before death. Pulfe difappeared as in the plague and Boul-lam fever a otherwise as in the yellow sense, Excellive uncafinely at the heart. One pro-fun died with violent polpination. Not observed. In the last stage the heart pulpitates strongly. Visiting pain at the pit of the floresch, which are if not bear the touch. Universal in the yellow fever of 1762. Very frequently observed. Difease forcesimes began with a pain in the florrach. A burning pain frequently accompanied the vomiting. Elemorrhages not very cammon, and saly Harmorrhages excellively common from every from the sufe and unesus. Veniting of matters of the fame kind; also of matter referabling codes grounds, with flaky fubflances flowing in it. Vamilting of yellow, green and black matter. Do. Do. Immeele quantities of excellively facial blood difcharged. Stools extremely fortid when firong evacuants had been used, otherwise the firster was leto. Stools excellinely fixeld, and in great quantity. Stools left fortid than in a common terrian. Dark coloured blood fometimes discharged. Yellow and fixed fweats. fiverate of various colours, and fortid. Not obferved. Not observed, No natural critis. Seldom terminated by fiend after the third Sweat the natural critis of the difference-Do. Appearances on Diffection. YELLOW FEVER. PLAGUE. FEVER OF BOULLAM. PEVER OF PHILADELPHIA 18 1791-Bills of a black and greenile calcur; turning quite black by the addition of fight of nitre; a litting graft green by adding figure of surios; and of a yellow by the addition of alkalies. Bile of a black colours and very vikids Bile very vifcid. Intellines mornifold Siomach affiched by gangenous fputs called eatherment by the Liming Black very fulds and the velfals of the vifcera much differed. Uffections of blend and forum in the brain. Liver forcetimes thrunk up into half its natural fice. Congestion of blood in the brain Liver forestimes of its natural appearance. Heart of an entraordinary bigness; in fever eates staffed with thick, black blood; in one, filled with a large petyper; in acother the contents and resentenced. Duodenson and other parts of the inteffices mortified. Worms from purrefaction found in the floreschin fix bours. Omentum and its appendages of a derk grey colour, and uncommonly dry. Liver and fploon calarged. Martifications in the brain, intellines, do-Abligides in two cafes; oor in the multiplier integraments of the thorax, the other in the sorts.

Fever of 1798.

Doffort RAND and WARREN'S Diffections.

Case I. Perion died on the 6th day. Lawry filled with dark bilend. Air wellels not dishaultd. Lawry experiences from a finally suggisted blood in the thereas. Fluid blood in the percentises. Commerce who sexupontly dishault laws technical so both filters and industrated as if bettee Call blooder contrasted, and outsetting only about a question of an essent of a furthernor entologies and should a question of an essent of a furthernor entologies of the contrast and dark coloured from the two filters and dark coloured from the two filters of the ventual and processing of the ventual of the contrast of

embed. An effection of ferrom between the dark and pin master. A hand of coagulated lymph printering so ading-time between the two coverings of the brain, under the feature former. Lungs address the other pleasures, and had feature incharations of the file of a pipone's ergo. Left to be extremely diffusion, and in a date of impopuration. Lives extremely diffusion, and in a date of impopuration. Lives extremely diffusion with its district of the highest printer before the printer and influenced, the indice of the printer before source don't his indice which the mixture of the highest verifications, and goal justification much influenced. Gain blacker fail of binn, and dutte previous. Disader commuted by the fixer of a public's eggs with a symmitty of blood effected in it.

Lots III. Death on the fourth day. Langu indumed of the fore gasts, and extendingly fluided with blood in the back putts. I have inflational, and of a very deeple conflictance Call blandar authory obligaterated; its coats forming a contilled membraness fabiliance by confidence with the neighbraning parts. Scannach crement in the infide with the black vomit. Called and part of the ownerson inflamed.

In the two cales, where the gain bladder had been differed, and the liver did not perform by fundious, the patients became yellow; but mut in the salars, where the bile was in due quantity. In the fiscond case the patient had previously had a pulmonary computation.

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" Nevertheless, if this diftemper 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 miasimata; 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 " fextons have enlarged the funeral lift more than any "other class of citizens. Some doubtless have fallen, and perhaps they owed their death to their frequent " communications with the fick; 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 feems hitherto to have spared the French-" men who have refided 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 fo fatal to the Americans. The refult 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 fo rapidly depopulates New York and Philadel-" phia. Every opinion, every fystem, presents palpable " contradictions, and is liable to objections which it is "difficult, not to fay impossible, to answer in a satisfac-"tory manner. If the disease be contagious, why are " not the physicians, the nurses, the servants of the hof-" pitals, taken fooner than perfons who have no fort of " communication with the fick?

"If it be not contagious, how happens it that the na-"tives of every age and fex, many of which, the women " and children especially, live in a pretty sober manner, " and feldom drink any of those liquors so liable to in-" flame the blood, are taken with it, and fall, in spite of

" 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 fo frequently fuccessful in the colonies have " no fort of success when administered to Americans, " and feldom with Europeans? Why is this fever at-"tended, in its very first stage, with vomitings of blood, " bile, black fpots, purples and other alarming fymptoms, "which they frequently have at Hispaniola? How "comes it that the West India planters, who, while "they refided in the colonies, had frequent attacks of " putrid and often inflammatory fevers, enjoy the most "blooming health ever fince 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 afylum are the "daily victims of it? Finally, if we must attribute the " epidemic to no other cause than the immoderate heat " of the fummer, which is really greater here for two or "three months than at Hispaniola, where a land and " fea breeze tempers its violence, why does it not ftop "its ravages when the heat moderates? We have ob-" ferved 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, especially on the 28th and 29th, when a violent north wind obliged many people to have a fire. The num-

" ber

se ber of deaths never were, however, fo numerous as they 46 have been fince the 20th of September. The funeral " lift, 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 October, fame hour, the number was 170; a number as or 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 af-" cribe it to celestial wrath, and to advise prayers, fast " and charity to appeale it. Those pious practices can-" not affuredly 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 feek for 55 more natural causes, and will examine whether they 56 (hould 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 55 localities of New York and Philadelphia fufficient 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 66 Philadelphia, more than any other cities, contain " causes of corruption or putridity, occasioned by their "fize and the extent of their commerce, which, added " to the high mode of life of the Americans, may be " the fource of the calamity which now affects them.

"In effect, we observe that in these two cities the epidemic has conftantly manifested itself in those parts " which are not only the most commercial, but also

"where the common finks of the city meet; where the houses, inhabited by the poorer class of people, being finaller, and more crowded together; where the stores contain most provisions liable to fermentation and putridity; 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 finks and docks, the rotten fish, and the pri-"vies, which in feveral houses, especially at New York, " are nothing but tubs, which are emptied weekly on "the fea shore, and we shall have less reason to won-" der at the putrid exhalations which iffue 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 fuch food as is generally known to be " unhealthy, is it to be wondered that, with fuch a " mode of life, their blood should be more disposed to "inflammation and to be diffolved and corrupted, in " the midst of an air already corrupted and loaded with " destructive miasmata?

"Now every man knows that those who live contiguous to the river at New York, and the Delaware at
Philadelphia, mostly sailors, shipwrights, truckmen,
labourers, tavernkeepers, &c. seldom trouble themselves 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 infects still " more difgusting, 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 fuffocating the most robust and vigorous men? "Shall we wonder that those who breathe this pestilen-"tial gaz are fuddenly feized with a fever? in itfelf perhaps " not very dangerous, if it were treated in a fuitable " 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 molaffes; " a fort of foup made with Madeira wine; fish; raw oyf-" ters, &c. these are their first medicines. If their wives or " friends go to confult the apothecary, he advises the " caftor-oil, or the famous calomel pills or powders, whose " virtues the quacks extol for every difeafe. 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, " feeing the case desperate, withdraws, saying that he " was called too late !*

In Dr. Rush's account of the sever 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 comparative 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 affisted by one of the physicians of the city. The kospital was in a pleasant and airy situation; it was provided with all the necessaries and comforts for sick people that humanity could invent, or liberality supply. The attendants were devoted to their duty, and cleanliness and order pervaded every room in the house. The reputation of this hospital, 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 fuch of the poor of the district of Southwark, as could not be taken care of in the patients who were sent to the hospital by the city committee (of which he patients who were sent to the hospital by the city committee (of which he

" 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 falt 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 feafon. Now, shall we not "concede that bodies thus predifposed ought to be " more susceptible than others of the impression of the " corrupted mia/mata which are conftantly exhaled from " every thing that furrounds them; from the common " fewers, the wharves or the docks; from the dirt and " litter of the alleys and lanes; from the fulphureous " bilge-water of ships; from the cellars and from the " ftores; 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 con-

tradiction

was a member) were in the first stage of the sever. With all these advances 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 patients 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 mose 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 sever 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, fays 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 vifited this veffel 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 fimilar fymptoms in seven days. Nothing can be more direct than this evidence, yet it did not give fatisfaction.

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 contradiction tracted a fever, such as prevailed in New York in "1795, from any sick or dead man, or any thing else

" connected with the veffel 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 thore, and came on board with the fame disease; and the captain himself had a dysen-

"etery 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 defired 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 affertion, 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 difeate 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 fo 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 faw feveral cases of it in St. Domingo. during the months of August and September, 1798, and " these were entirely confined to American Jeamen, while "the native inhabitants of the city were totally exempt "from it." 2. From this very fickly 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 veffel had loft feven persons with fever on board during her paffage, and one by accident; and that she had been employed as a transport in the British ser-TISCE

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 feemingly equally strong, was fet afide with the greatest facility by bringing counter-evidence, particularly that of Mrs. Philips, who denied that there were any fick people in the house; and by bringing instances of the fever existing in town before the veffel 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 Actius, lamented that the barbarians drove them to the fea, and the fea drove them back to the barbarians, fo may we lament, in the prefent 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. Monfon of that place informs us, that it appeared on the roth of June, when Mrs. Gorham, residing on the Long wharf, was visited by Dr. Hotchkiss, who found her atfected with fymptoms of the yellow fever. In three days her complaints fuddenly vanished, and she was supposed to be in a fair way of recovery, but the fame evening she vomited matter refembling coffee-grounds, and died next day. On the same day that Mrs. Gorham died, Dr. Monfon 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 faw

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 felect men, inquiry was made, when "it appeared, that, in the beginning of June, capt. "Truman arrived from Martinico, in a floop that was " infected with the contagion of the yellow fever; that "this veffel lay at the wharf, within a few rods of Mrs. "Gorhams refidence; that she had on board a cheft of " clothes which had belonged to a mariner who died " of the yellow fever in Martinico; and that his cheft "was carried into Mr. Auftin's store, and opened in " presence of Capt. Truman, Mr. Austin, Henry Hub-"bard, and Polly Gorham: the three last died in a " fhort time after their exposure to the contents of the "cheft. 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 fift 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 "roth. Jacob Thomson's negro woman, Solomon

"Mudge, John Storer, jun. and John Hide, had vi"fited Mr. Gorham's house a few days before their ill"ness; Polly Brown and Mrs. Thomson nursed in Mr.

"Gorliam'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

" nurfed 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 Georgeftreet. 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. Gorham's house. I could trace the disease throughout

the town. No person had the yellow sever unless in

consequence of attending the sick, or of being exposed

to yourses, infected houses, clothing, or furniture.

"I have inquired of several aged persons in this town relative to the yellow sever, 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 Indies, lodged at the house of Nathaniel Brown, an innikeeper in this city. The man was taken very sick in the night, and died shortly asterwards; and his body was very yellow after death. Mr. Brown's wife sickened

" was very yellow after death. Mr. Brown's wife fickened in a fhort time, and died of the same complaint, which was at that time supposed to be the yellow sever.

"I am credibly informed that several persons at Mill"river, in Fairfield county, and also at New London,
died with the yellow sever 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 objection to the idea of its being generated in this country is, that it was never known in the interior of this
ftate, or of the United States, so far as I can learn.
Had it ever appeared in Connecticut before the year
Had it ever appeared in Connecticut before the year
had it ever appeared in Connecticut before the year

"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 fore throat, small pox, measses, dysentery, &c. raging here with great mortality, but have no recollection of any yellow sever. 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 fpecific contagion, and no more diversified, in its operation on the human system, than that of the small pox and measses.

" 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 inflances it "would be extremely difficult to discover the origin. " But the mischief lies in this; that the inhabitants of " fuch cities, whenever a contagious difease 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 difease " spreads in every direction. Then, indeed, when it is "too late, they are folicitous in the use of means to ar-" rest its progress. As it extends itself slowly at first, " feafonable exertion might both detect its fource, and " prevent its increase; but when it is diffused through " a city, it spreads with rapidity, and it is no longer pof-" fible to discover where it began. But as, whenever "the yellow fever has appeared in the United States, "it has always been in fea-port towns, and originated " near wharves, docks, and warehouses, there seems to " be high probability that the difease is imported."

The evidence here feems fo ftrong, that no counterevidence that can be brought appears likely to invalidate

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 actempted 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 cafes be so; but they contend that if proper care be taken it will not spread. Dr. Smith in his letter to Dr. Buel fays, "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-" ift, however the person immediately affected, if it be " introduced by a fick person, may suffer, it is harmless " fo far as the general health of that place is concerned. "If the fubject were viewed in this light, as most af-" furedly it ought to be, the question of importation or " non-importation would fink into its merited infignifi-" cance." But, with due respect to the memory of Dr. Smith, this must furely 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 (lays he) as no other person is known to have been " infected by that veffel, 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 infignificant, 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 fame. As far therefore as the prevention of fuch accidents can be accounted a matter of importance, it is also of importance to believe the doctrine of imported contagion. It is true, Dr. Smith, in the paffage just quoted, adds immediately after, that " no fuch concession (with regard to Dr. Treat) is necessary;" but, in p. 104, he does make an ample conceffion, as we have feen, viz. that the contagion may not only be imported, but, under certain circumstances, be veryactive 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 fuch 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 fuch disease exists. Among the peafants of Poland, who likewife live in a very dirty manner, their mode of life is faid 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, fuch as rotten fish, fish-livers and roe, fat and train of whales and sea-dogs, congealed four 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 difease is not the yellow fever, though it is said to make the person afflicted with it more like "a putrefying corpfe than a living man." The cold feems to be affigned 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 fun has been faid to fet forests on fire. This is probably

bably a fable; but we are affured by Pontoppiddan, in his Natural Hiftory of Norway, a country to the full as cold as Sweden, that in fummer 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 difease is, that it is infectious. Supposing then that by any means it should be exalted into a fever, have we any reafon 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 fame reason to suppose that the latter is infectious, as that the former would be fo if it could lay afide its present form, and assume that of fever. Another proof that mere dirtiness cannot at all times produce a diffemper, or even propagate its infection, may be deduced from the fixth case quoted p. 355 from Dr. Ruffel, where he fays that a poor Jewish family lived in a place fuch as he had always confidered as one of the receptacles of contagion, yet only one in fix 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 fubject to an attack than the rich. This was fo remarkable in the plague of London in 1665 that Dr. Hodges fays it was called the poor's playue; 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 likewife that this cruel expedient was used at Marfeilles. The bad fuccess 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 affigued 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 M m m caules,

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 " flay in the city during the plague, and took upon him-" felf the humane office of vifiting the fick and dying who " had been deferted by better phyficians, averred, that, "being once called to a poor woman, who had buried " her children of the plague, he found the room where " fhe lay fo little, that it could fearce hold the bed on "which she was stretched. However, in this wretched " abode, befide her, in an open coffin, her husband lay, " who had fome time before died of the diftemper, and "whom she soon followed. What shewed the peculiar " malignity of the air, thus suffering from human miaf-" 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 fuch miserable apartments. The appearance on the walls brings to remembrance what is faid in the book of Leviticus concerning the appearance of the leprofy 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 boilterous weather at first fetting out, but croffed the equator on the 26th of May, where the weather was fultry, 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 fix or feven 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 feveral weeks the weather was hot and fultry; 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 fultry 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 veffel had been fix weeks at fea 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 windfails were attentive-" ly 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-" fphere, may have given rife to this calamity. But the " fame 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 furprifing.

It doth not therefore appear, that, without the intervention of some other cause, mere dirtiness can produce the vellow fever. Let us next fee what can be done by confinement, want of air, or, as it has been lately called. abstraction of oxygen. On this, however, we must obferve, 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 fmaller quantity of oxygen, it must contain a greater quantity of formething elfe. If a difease 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 fepton 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 feen, p. 90, contain a great quantity of fixed air. Others have shown that they contain also azote; and it may be fo; 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 flate, 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 record-

[&]quot;In the Medical Extracts we find it recorded, that a young gentleman having breathed pure oxygen for feveral minutes, his pulse, which was before 64, foon beat 120, in a minute.

ed; but we know that by breathing an atmosphere lowered by it the confumptive 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 fenfible 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 Ruffian 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 o of Reaumur, though affifted by 20 below o of natural cold, and the power of all the freezing mixtures he knew, " How much then " (fays he) was I furprised to hear Mr. Billings affert, "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.*

^{*} 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 association in 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 Fahren-peit'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 fevere cold (probably 42 below o of "Fahrenbeit) 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 fledges drawn by rein-deer, en-" camped every night on the frozen frow in low tents, " which they quickly formed with the skins of rein-deer. " foreading some of them on the surface of the snow, on " which they all flept; and he affured me, that, fo far " from fuffering from cold during the night, the heat " was so excessive in these fur tents, where from ten to " fifteen flept 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 feems 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 o, there must have been a generation of 120 degrees of heat; but the heat of the human body does not exceed 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 fleep in them. They could communicate to the air therefore

duced by a mixture of falt and fnow, 32 degrees below the freezing point of water. The freezing point of quickfilver has been fixed at 39, 39% or 40 degrees below the cold produced by falt and fnow. When the themometer therefore fell to 40 deg. below the freezing point of water, it was only eight degrees below the cold of falt and fnow, 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 quickfilver 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 hay, where, by means of vitriolic acid and snow, the thermometer was made to indicate a degree of cold an degrees below the freezing point of quickfilver. to indicate a degree of cold 40 degrees below the freezing point of quickfilver. 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 sact. If, in such a violently cold climate, the effluvia of sisteen 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 o 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 So, 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

Here no account is made of the heat that the very cold fnow 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 fucked his shirt sleeves, which were wet with sweat, and endeavoured as much as possible to catch all of it that he could. The tafte was foft 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 foon loft all fenfe. 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 fultry fun; yet, notwithstanding this ill treatment, they all recovered; having an eruption of large and painful boils all over the body. Mr. Holwell, however, faid that he never afterwards enjoyed good health.

Another melancholy proof of the bad confequences resulting from a want of fresh air we have in the evidence given by Dr. Trotter, when the question concerning the flave trade was agitated before the British House of Commons. He deposed that the flaves 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 fcuttles in the files 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 fays that he never could breathe in them, unless just under the hatchway. "I have often (fays he) observed the flaves draw-"ing 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 feen them, "when the tarpaulings have been inadvertently thrown " over the gratings, attempting to heave them up, cry-

" ing out, in their own language, 'We are suffocated!" " Many I have feen dead, who, the night before, had to shown no figns of indisposition; some also in a dying 16 state, and, if not brought up quickly on the deck, "irrecoverably loft. Hence, in one ship, before her ar-" rival in the West Indies, out of 650 slaves, more than " so had died, and about 300 were tainted with the

" fea fcurvy."

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 paffengers 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 feems to have been a kind of non-descript eruptive one, more refembling the small pox, or rather Job's difease, 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; fo 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 confidered 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 treatife 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 vellow 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 afcertain the purity of the air by Mr. Scheele's apparatus, and which was

N n n likewife

likewise used by Dr. Davidson, viz. filling gallipots with flowers of fulphur and iron filings well mixed and moiftened, and putting these upon a stand under a glass veffel, 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 veffel. 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 foon 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 fword-blades were turned black. This feems 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 furrounds us, even for a few miles extent, is fo great, that any confiderable 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 fulphur and iron filings is most liable to variation. It may vary, from the nature of the fulphur,* from the cleanness or the impu-

^{*} If fulphur be a fimple substance, as the new chemists pretend, there ought never to be any variation in its properties, except what arises from mere impurity;

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 asfigned for the production of fever, and that is the putrefaction of animal and vegetable substances. This hath been very much infifted 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 feveral weeks there were two fources 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 fallow colour on the " fkin. 2. Preternatural quickness in the pulse. 3. Fre-" quent and copious discharges by the skin of yellow " fweats. 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-66 fulness. 8. Head-Ach. 9. A preternatural dilata-

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 sact 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 feet but a few hours in the streets in the day, in attending 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 sever, 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 treatife would not allow (even were it but beginning) of a particular account of all that has been faid upon the subject; neither indeed is it needful. A fingle well attested instance would decide the matter; but we have already feen 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 confiderable 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 difease being imported. Several other cases of " vellow fever occurred in different parts of the coun-" try." This stands on the authority of Dr. Jeremiah Barker of Portland, fo 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 fame with marsh effluvia; for though we may, in the case of the village, suppose that the marshy ground on which it itands occasioned the disease there, yet what shall we affign as the cause of its being dispersed in disferent 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 more active in this way than the former. For this supposition he gives as a reason, that Dr. Rush has obferved, that butchers, and those who lived in the neighbourhood of shambles, scavengers, grave diggers, and others of fimilar 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 failors, 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 " feven men belonging to the alms-house of New "York were employed, during the whole of the fickly " feafon 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 corples, in different stages of putrefaction, and " though they were much incommoded with the pefti-" lential quality of the air in the rooms they entered, and frequently were obliged to vomit, not one of them was " fo much indisposed, during the whole season, as to " discontinue his employment." This is no doubt a very remarkable fact, but in the prefent 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 affures Dr. Currie, "that exhalations from corrupting beef and fifth " have excited fickness as malignant, and as deadly, as " any which has occurred." If exhalations from putrefying beef and fish have produced this fickness, why did not exhalations from putrefying human bodies do the same? and if we are affured that the latter did not, we have as little reason to suppose that the former did; unless we chablish a difference between the corrupting flesh of one animal

animal and of another, which no experience hath countenanced in the leaft.

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 bruife 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 fays also that scarce an instance was heard of those employed in digging cellars being attacked with the disease. "There " feems to be fomething (fays 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 nofes of in it, when bitten by poisonous snakes. The practice, "I am told, has been imitated with fuccess by the " fettlers upon new lands in feveral parts of the United se 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 sever bath 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 Feyer, p. 147.

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 fick people, there " was an effluvium that produced giddiness, sickness at "the stomach, a weakness of the limbs, faintness, and, " in some cases, a diarrhoea. The contagion adhered " to all kinds of clothing. It was in no instance commu-" nicated by paper." From fo great authority we may certainly conclude that, according to the best observation, there is an effential difference between the contagion of a difease 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 affimilated 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, fubjoin the testimony of Dr. Davidson, formerly quoted. "I must declare * (fays 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 sever 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-" fent, and, like the electrical jar charged, required " only the approach of a conductor." This shows an amazing fubtilty 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 Chefter 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 fmoke

fmoke proceeding from it were attacked with the fmale pox, and the disease spread. This is similar to an obfervation 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 furrounding 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 sire, 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 fuspicion of the small pox. He bled " her, and a Mrs. Brandon held the veffel 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 the was of course immediately separated " from Mrs. Brandon; notwithstanding, in twelve or "fourteen days, Mrs. Brandon was seized with the " fmall 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 fome 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 aforefaid;) he found the child bleed-"ing at the nofe 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 feized with the diforder, and not long " after

^{*} Haygarth's Sketch of a Plan to exterminate Cafual Small Pox, vol. ii, p. 27%

" 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 puftule, in the smoke of burning clothes or paper, or in the effluvia of blood, is invariably the fame, and never produces any other difeafe. It is the fame 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-" firous of inoculating his two boys; one nine, and the " other twelve years old. Not being able to employ a " furgeon, he collected the scabs of a child then fick of " the difeafe, powdered them, and sprinkled the powder "upon flices of bread and butter. The two fons ate "them, and gave a bit to the house-dog. They had a " mild fmall pox, and got well without any remarkable "accident. The dog remained fick 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 pultules were full ripe, and dried up and " fell off like those of the two children. An English " author fays he has feen 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 fame as in the human species."

This instance, partly quoted in the former part of this treatife, 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 fee 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 paffed from this fluid to all the other parts of the body; and, if difeafed blood is capable of communicating its difease to all the found 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 furface." If the difeafe originates in the blood, the latter should indeed feem more capable of communicating it at first than afterwards; because we must suppose that the diseased parts would be thrown off to the furface, and fo pals 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 fmall 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 confiderably advanced, yet there are " facts which make it probable that it is fometimes " 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 insected 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 overfeers 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 fat on his
horse, and talked to her through an open window;
and, at the common period (by which we usually understand about sourteen days) she took the disease
and died. Many such instances, adds the Doctor,
could I relate, where wigs have given the insection,
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 fenses. 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 55 1776 and 1778 my duty led me very much to refide " in New York; and during my refidence, particularly "in the fummer and autumn of 1778, which were re-" markably hot, and infufferably so in the lower streets " of New York, no difease 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 treatife on the fub-" ject) was in the highest degree offensive. The police " at that time was by no means frict : putrid substanse ces of every description were accumulated in the flips,

" 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 confider the inftantaneous and inexplicable action of the poison of serpents, and in how little time they produce a mortal disorder, or even death itself; when we confider 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 furprifed that a quantity of this volatile matter inconceivably less than that of animal poison should be capable of bringing on the diforder; for the length of time may be supposed to make up for the deficiency of quantity. Yet, if we confider 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 treatife 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 infrances 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 Ruffia is as mortal as that of the rattlefnake.* The effect of the furia infernalis of Linnaus is still more to our purpole. It is an infect 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 infect 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

death in a quarter of an hour.* Now, should we suppose the whole body of this insect to be posson, 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 evi-

The following account of the poisonous infects 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 feen (fays Dr. Guthrie) a woman " with her hand and arm in a most violent state of irritation, from the lodge-61 ment of the lumbricus melitenfis, a worm not much thicker than a horse-" hair, which had entered her thumb whilft at work in a marshy spot, and " was, when I faw 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 discase, if a sellow-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 as marshes in that district, about fixty versts to the fouthwest of Petersburgh-"I must farther acknowledge, that I was happy to hear the patient was to ** be inftantly transported to another village, where a famous operator lived, " well skilled in the art of extracting the venomous infect; as I should cerat tainly have gone very awkwardly to work if I had been obliged to operate: though the simple peafants perform it with success and fafety, gradually " winding the worm round a quill, till the whole animal be extracted; a work 54 of much patience and perfeverance. I was very forry that duty obliged me to be in town the fame evening, a drive of fixty verits. It was therefore 41 impossible for me to accompany the patient, though I was very desirous of 44 witnessing this village-operation.

"But Russia is pestered with a still more dangerous worm; the suria inforst nalis. It is still smaller than the former, not being thicker than a human thair. This infernal infect, 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 session an instant, and

#! foon 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 infect falling upon them. To prevent this accident from proving fatal, the part is instanly scarified, and rubbed with a mixture of snuff and fal ammoniac.

"This I am convinced must be the furia infernalis; more especially as he affured me, that the infect was so very minute, that none of the peasants had ever seen it when it soll upon them, and that they had no idea of its mature

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 testisses that it does adhere particularly to clothing. Dr. Lind thinks it may adhere to the timbers

"nature and form. But one circumstance of his, recited, almost staggered my helief; that the carcase of an animal killed by this infect is almost as dangerous as the infect 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 peafants 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 fweet curd. The intect possibly prefers this to fiesh,
and leaves the one for the other. I am, however, much asraid that this simple remedy will feldom be at hand in Russia, as the peasants are unacquaintded with the use of rennet, but prepare a four curd by means of heat, throughout the whole empire; evidently taking its origin in the Tartar Koumis,
and shewing them to be a people of Scythian extraction. They likewise
feparate butter from milk by heat, instead of the churn; a curious circumstance, probably unknown to you before.

There two dangerous infects are, however, not all which threaten the life of man in this empire: the fouthern provinces are infected with a third, the bite of which is as mortal as that of the deadly rattlefnake, if the para be not inftantly fearified, and rubbed with fresh butter. This is a species of erab-spider, the phalangium acaroides, resembling the tarantula, but rather thinner and smaller. It however kills and devours that formidable spider in a few minutes, which, when compared with it, is an innocent animal.

44 Your acquaintance, Mrs. Guthrie, lately returned from a tour on ascount 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 ansient Chersonesus Taurica, or Crimea, laid waste in the last Turkish war. It is a curious fact, that animal oil counteracts the venom of the spider tribes, as vegetable oils do the venom of serpents. I suspect, however, that either of them would counteract both poitons; 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 carecessly 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.

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 sever 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 insected, 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 seet of an insected person. 2. The nurses and attendants in some places were insected, but in others generally escaped. Neither did the disease spread into the country, as was reported; the Doctor having inquired into these reports, and sound 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 insection spread no surther, not even to one in the same house." 4

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 diffections have been made, and those who made them are still alive. 5. "Specific and acknowledged con-"tagions all seem to arise from themselves only: hence

[&]quot; it

^{*} See p. 387.

[†] The fame physician, in the very letter quoted by Dr. Seaman, fays that all the times this fever had appeared in Carolina, the origin of it was evidently traced to some vellel arrived from the West Indies.

" it would be almost as hard for me to believe that the " fiphylis, fmall 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 feed, or radical, " from one of the same nature." Contagions seem to " fix in the foil of our bodies, and there feed, 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 fome much more readily than others. 8. Contagious diseases generally have a determined time of invation 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 fixteenth 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 feed, 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 confideration of their origin is overlooked. In the yellow sever, 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 sever? 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, reters 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 gonorrhea will come on at any time between the first and spicenth day after the insection 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. Chitholm thinks that in the Bouliam sever 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, simply of themselves, without the aid of any particular
circumstance of air or climate; but the supporters of
the yellow sever 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 affished by the concurrence of a predisposing constitution of the air.
(Rush on yellow sever.) This sever 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 situations in thick-settled places; otherwise our almshouse
and the surrounding country would have sadly experienced its deleterious effects."

This argument merits a particular confideration, 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 faid in this treatife 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 infoluble let us fay what we will) stands thus: If the yellow fever is produced by the effluvia of marshes, by putrid steams, or by any thing elfe, how comes it to pass that it has been so frequent in the United States fince the year 1792 in comparison of what it was for 30 years before? Have the American cities all at once become finks of filth and naftiness? Have the feafons been changed, or have the inhabitants given themselves up at once to swinish intemperance and gluttony,

gluttony, devouring, like favages, their meat half-rotten, half-roafted or half-boiled? From fome declamatory publications indeed one might be apt to think that the authors certainly meant to bring fuch accufations 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 lefs 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 difease 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 difease, certainly the three last winters have been abundantly sufficient to do fo; yet it is certain that cases of the fever did appear in the end of December laft, when the cold must certainly have been deemed fufficiently 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 Chefter makes the following objections to the commonly received opinions concerning epidemic constitutions of the atmosphere:*

"I. Dr. Odier of Geneva, in a letter to Dr. Haygarth, writes thus: 'I believe it would not be difficult
to prove that the state of the atmosphere is in no refpect 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, although they are situated under the same heavens, and
exposed to the same vicissitudes of atmosphere.' 2. Sydenham 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

^{*} Sketch of a Plan to exterminate Cafual Small Pox.

"the earth must be capable of furnishing it; as no portion of the whole habitable globe has been discovered

" to be misled by this groundless hypothesis."

Objections of this kind do not folve the difficulty. The excessive disparity of seasons with respect to the fpreading of epidemic difeases, the long ceffation 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 eafily be known. As contagious matter feems to operate by being received with the air into the lungs, it would feem 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 diforder, is equally fo. It must, he fays, be diffused all over the earth. The electric fluid is fo; 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 sluid contained in it, yet we are certain that its constitution must be different in dif-

ferent

ferent parts of the world. Islands, from their being furrounded on all fides by the fea, 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 fituated 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 Afia, 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 " (fays he) operate differently in the two countries? It " has certainly had a different appearance, and required a " fomewhat 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-"fitution 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 confideration, and may throw fome 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, but on account of its fingularity. "Daniel Phœinix, city-treasurer of New York, is supposed without
doubt to have taken his complaints from contagion:
the corporation, some time past, having issued into circulation, for the accommodation of the inhabitants,
a great number of paper penny bills, it has been concluded 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 exchanged, 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, infifts 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 see 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 sact: "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 fickness 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 confider 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, sive 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 sirst colony having failed, another was sent; the Indians went to war among themselves, and the yellow sever is supposed to have made its appearance. Here a suspicion naturally arises, that a slight

pestilential

peftilential taint had been imported by some of these strangers, and that what would have been the true plague in Europe or Afia, by reason of the peculiar constitution of the atmosphere in the New World, there became the yellow fever. The fame may be faid of the original importation of it into Martinico. Sauvages expressly fays 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 differtation 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 fince that time ceased its ravages. Previous to its appearance at Philadelphia that year, Dr. Rush observes, that, "du-" ring the latter part of July, and the beginning of Au-"gust, a number of the distressed inhabitants of St. Do-" mingo, who had escaped the destruction of fire and " fword, arrived in the city. Soon after their arrival the "influenza made its appearance, and fpread 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 fick, 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 computed that eight hundred emigrants, including their fervants and flaves, were cut off by this fever; and about two hundred English, including new commercers, failors, foldiers and negroes, all fell victims to it in the fame space of time. Few new comerces 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 feem 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 affizes, and Old Bailey fession, 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 diffress fuffered by these people, the disease communicated by them will be malignant; nay, that new difeafes may fpring up, which cannot be treated with fuccess by any

^{*} 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 Nicaragua, were cut off by diseases; but these were fluxes and intermittents. He doth not mention the yellow sever among them. He tells us indeed that the troops under general Garth brought the jail sever along with them, and that those who returned to Jamaica were harasted with obstinate intermittents, with diarrhoea, dysenzery, 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 vellow 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 faid the evidence feems to prevail in favour of the opinion that the latter is fo. Should we then allow that two kinds of this fever might exist at the fame time, in one city, the difficulty would be at once removed. But this has been reckoned by many, particularly by Dr. Ruth, as totally inadmiffible; and indeed it is a maxim confonant 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 feem impossible that a fever may be fuperadded to fuch local difease. The following confiderations may perhaps throw some light on the subject:

It appears from the experiments of Dr. Adair Crawford, that, when animals are immerfed in hot water, the blood drawn from a vein is of a florid red colour. In fummer 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 likewife become acrimonious; though this acrimony is not necesfarily 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 fometimes, 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 Qqq

" endowed with a caustic quality, and affected a lancet " fo 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 vafcular debility, and he fays that it is attended with an aftonishing 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 moift, may confider 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 confequently is about to abforb, or rather may be confidered as in the act of absorbing, more, and confequently of changing from a thicker to a thinner or more fluid state; the latter being the natural fituation of the blood in warm countries. Dr. Rush, in his inquiry into the proximate cause of sever, has accounted for the diffolved appearance of the blood in malignant fevers to a tendency in the blood-veffels to paralytic affection. He fays that " it (the diffolution 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 diffolved " when drawn from the veins, which, when drawn from " the arteries of the fame perfons, exhibited no marks " of diffolution." 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 diffolution begins in the veins : and though it is likewife extremely probable that this diffolution is attended with a paralytic tendency, we cannot know whether the diffolution is the cause of the paralytic tendency, or the paralytic tendency the cause of the diffolution. 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 disfolution, 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 feems 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 fecond, that in the West India islands they have not accels 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 fervice on the Spanish main in 1780, " nothing was so grateful as Lon-" don bottled porter. Wine was neither fo much defired "by the fick, nor fo ferviceable in corroborating and " keeping up the powers of the stomach; which, like

^{*} Seep. 94. † Treatife on Tropical Difeases, 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 asfumed the state of fluidity proper to the climate in which they are, and the body has acquiefced in the change. They are then faid to be feafoned to the climate; and it is feldom that this feafoning takes place without a difease; indeed so seldom, that the first illness which happens to feize them after their arrival is called the feafoning. Dr. Trotter indeed gives a very different account of this feafoning. He confiders those who come from a cold to a warm climate as having a redundancy both of excitement and excitability, and fays that "to wear " out this accumulated excitability by flow and gentle gra-"dations is the grand explanation of the word feafoning: " it is the fecret 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 exci-" tability; 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 ex-

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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 thefe causes. The pure bilious fever, being of itself properly a local affection, may not be contagious; and we find it generally agreed among phyficians that the common vellow 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 Middlefex Indiaman, of which many died. It is not faid that the disease was contagious; but, on opening the bodies of fome 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 difeafe, might have been accounted little other than fymptomatic) would then have affumed very malignant fymptoms.

We might now fay that we have got to the end of our fubject. Having so amply discussed the question concerning contagion, and stated the principal part of the evidence against it, it seems proper to conclude the fection with a short history of the disease in the malignant form it has affumed in the United States fince the year 1792. Still, however, it is necessary to fay fomething further of one or two of the causes which have been commonly affigned as necessarily inducing this disease. These are, 1. Extreme heat, and, 2. Marsh effluvia. The effect of the former has already been partly confidered as a prediffonent cause of yellow fever: but it doth not appear that merely from this cause the difease 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 obli-

gingly

gingly informed me, that he has " in more than one instance been seized with that disease after riding in the fun;" 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 fickness and perpetual vomiting; which is the termination of the yellow fever. The above evidence is decifive with regard to heat being able to produce a remittent, but cannot exactly apply to the vellow fever, which has no remissions. Two failors indeed, lately brought from a coasting vessel to the Salem hospital, were attacked with violent symptoms of yellow fever without having been, as is faid, exposed to any infection. But evidence of this kind cannot be supposed to be incontrovertible. We have already feen the difficulty of afcertaining facts; and if it is difficult to prove that contagion has been received, it must be still more fo to prove that it has not. The persons in question had both worked during a very hot day in a veffel's hold, they afterwards fat exposed in the damp air of the evening on the deck until 10 o'clock at night, and then flept in the veffel'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 fince this vessel was at New York, and that a person on board had the yellow fever; it is also alleged that the veffel was not purified, and that the beds remained on board. It has therefore been by fome conjectured that the disease might have been derived from

Dr. Ramsay, in a letter to Dr. Currie of Philadelphia, censures Dr. Lining for saying that the yellow sever 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 severs of hot climates, or very hot seasons of any chmate." Our author also censures Dr. Lind of Hastar,* who, he says.

^{*} If physicians centure one another at this rate, how is it to be determined, who gives a true state of the matter?

fays, has been missed by the missepresentations 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 sever 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 sever, it can kill suddenly without any sever 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 selt 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 severs, but those severs 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 effentially

^{*}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 sever 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 sever is certainly not a remittent; if otherwise, it must be dissicult to establish any true distinction between them.

⁺ At Strafburg, in Germany, our author fays that he faw a man who had been an idiot for more than a year from a stroke of the sun. The 8th of July 2707 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, said on a cannon for twenty minutes, deprived of its juices, and overdone by the excessive force of the sun's rays.

effentially different from the fevers which fometimes 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 fingle circumstance: for Russel tells us that *sneezing* never occurred in the plague described by him, * while Thucydides fays that it was one of the common lymptoms 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 fo is the climate of China, yet no fuch diseases are there produced. The Doctor concludes that the diffemper originated from local causes; but the difficulty we find in proving fuch origin of difeafes in our own days, and in the country where we refide, must certainly make us look upon the proofs which can be brought for the local origin of a difease 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, fome new marth mud, from Octo-"ber to April annually, to increase the fertility of the " foil. 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 " marth 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 lefs. 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 feafons they were attacked with simple intermittent severs; but, after wet seasons, there prevailed among them massing lignant severs, and very obstinate remittents. Since the marshes have been drained, the inhabitants are no longer subject to severs, and are as healthy as those of others places. We know that there are local episodemics, which are produced by a low, wet and rich foil; such are, probably, those which prevail in the lower part of New York, which, according to the informations obtained by Mr. Perkins, is more unhealed thy towards the end of the summer than the other part of the city, and whose inhabitants are subject to diseases of a putrid caracters.

"It appears, from several observations, that the most mortal epidemic severs are not commonly produced by causes operating immediately; the cause often existing 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 confider 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, &cc. Some French ships were said to have brought the difease, but these arrived " so long before the disease appeared, that (the Doctors think) it would be abfurd to suppose even a possibility of its being derived from them." Mr. Webster adds, in a note, that the French corvettes, three of which fquadron 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." Rrr

"Halifax." This is certainly a suspicious circum-

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 feafon, which had been uncommonly warm.

These are the principal evidences that have been brought for and against the origin of the disease which fince 1792 has raged with fuch violence in the United States. Innumerable pieces have appeared in the Newspapers on both fides 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 fettled 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 satally 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 surnished 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 sury; the French royalists were every where driven out, and distressed in every possible way. Desolation and slaughter prevailed at St. Domingo, while an unbounded interprevaled at St. Domingo, while an unbounded inter-

courie

course took place between the United States and all those nations who were involved in the calamities refulting 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. have feen, that, according to Dr. Chifholm, this difease 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 " (fays 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 difease 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 perfons. From Grenada, the Doctor fays, the difease spread to the islands of Jamaica and St. Domingo, and from the latter to Philadelphia, "by veffels on which " the infection was retained by the clothes, more espe-" cially the woollen jackets, of the deceased failors."

This account of the origin of the fever at Philadelphia, as we have already feen, 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 furnish-

ed 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 unfortuante sugitives had arrived from Cape Francois; and we have already seen, from Dr. Clarke, that the arrival of some of their sellow-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, sacts being disputed, we can-

not enter into the controversy.

The difease 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 fo much aroused, 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 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 fmelling-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 to be feen 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 inftances are to be met with in Mr. Carey's account. It cannot, however, be doubted that the violence of the diftemper, 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 fuch persons as had arrived or should arrive from Philadelphia or other place, by land or water, that were or should be fick, should be reported to him, that those who were fick of infectious diseases might be removed out of the city. Next day the governor proclaimed that all veffels 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 infufficiency 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 meafures were taken as feemed most likely to proscribe the unhappy Philadelphians, and to prevent their having any place of refuge from the fickness they so much dreaded. On the 1st of October, however, the inhabitants of Springfield, in New Jerley, paffed a refolve, offering their town as an afylum for the people of Philadelphia, and directing an hospital to be provided for the reception of fuch as might fall fick. Similar resolutions were paffed 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 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 fuch 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 fervices as superintendants. By their exertions the credit of the hospital was foon retrieved, and fuch 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 fhort time the affairs of the city went on, in every respect, with as much regularity as could be expected; but the mortality increafed throughout the month of September, and the three first weeks of October. Great hopes were entertained from fome cold and rainy weather in the end September; but they proved illufive, and the difease became even more fatal than before, till the 26th of October, when it suddenly ceafed, as Mr. Carey fays, 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 dif-" 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 feventeen thousand left the city, and four thousand and thirtyone 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 sury 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 sled 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 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 satal 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 savour 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 savourably in preventing any very violent

attack for this year.

New York has also suffered very confiderably 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 confiderable 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 perfons fuffered 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 fun 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 45 all the full-marked and decided symptoms of an highly " malignant

[&]quot; Med. Repof. vol. i, p. 316. + Webster's Collection.

"malignant yellow fever." The difease 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 sever, 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 diffemper has prevailed. Bofton, Newburyport, Portsmouth, Portland, and even detached spots in the country, to which it is not possible to trace any infection, have selt 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 satal. 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. Cossin, the opinion would have been incontrovertible, had not a large quantity of sish-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

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 sever spread in the vicinity of the vessel, not of the almshouse, where the first patient was carried.

the veffel, or the fish, or both. It seems now unfortunately to be the case, that where this disease once gets footing it cannot eafily 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 fingle fact which cannot be controverted, renders every thing that can be faid upon the subject uncertain and precarious. In the case of New London particularly, where 81 perfons were destroyed by it last year, neither importation nor collections of filth could be affigned as the cause; nevertheless it began near a wharf; but Mr. Holt, in his account of the difease, thinks it was most probably owing to the mere heat and dryness of the season. On the other fide 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 sever 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 samily (sour
"or five in number.) This vessel, before she lest 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 veffel 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 sour or five years of age tase ken sick; the next day I visited it, and two days after 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 diffress. He was " blooded freely, took calomel, bark, &c. He died " five days after he fickened. Between the 8th and the " 20th of August, sour or five of the other children and " fervants were taken with the fame fymptoms, and re-" covered. On the fixteenth day, a daughter, feventeen " years of age, was taken down with the same disease : " the was treated in the fame 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 the "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 fame time. Many others "in that neighbourhood had the fever during this "time, about one half of whom died: out of forty-fix " patients I lost fifteen. If I could procure a foreness 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 fure 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 " fymptom, 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 " feized in the month of August, and lived in the streets " only which communicated with the wharf where the " veffel lay, and the beach where fhe was graved. Thefe " ftreets 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 dyfentery, and " fpread through almost every part of the town and its "environs. There has been no case of fever or dysen-" tery fince last fall : this place, during the winter, and

" fummer

to fummer thus far, has been uncommonly healthy; and " it appears likely to continue fo, 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 fent to two phyficians in Salem, gives an accurate account of the diftemper which prevailed in Bof-

ton 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 fubfided; and I was in ex-" pectation that fome regular returns would have been " made of the numbers who had paffed through the dif-" ease, and of those who had died with it, so that some " estimate might be formed of its malignity and morta-" lity; but fuch returns have not yet been made, and it " is therefore impossible to obtain any fatisfactory 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 confequential 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 unufual fymptoms, as early as the " middle of June; but, as no other instances occurred " for fo long a time, of an alarming nature, fome 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 "ftores 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, " whilft following their respective occupation in Mar-"ket square, on the east and south fides 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, whilft employed in stores and " counting houses there situated. The stores in Mer-"chant's row, extending from the Market to State-" ftreet, 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 fick. 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 fituation could not be washed off by "the waters contained in it. This spot is remarkable " for having been the refidence of most of the perfons "first attacked with the bilious remittent fever of 1796. "To the latter end of this month the number of fick " 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 Oliver's dock, leaping, as it were, over the fummit of the " hill, without lighting upon the inhabitants on the " north of that eminence. The fatality of the difease "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, feemed to have been arrefted " only by means of the evacuation of the buildings by

"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 fide of the town.

"Through the whole period of the fickness 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 besing 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 instances, where contagion might have been suspected, the subjects were so situated that they might have received it from the same source as those with whom they had communicated. I cannot learn that any evidence has been surnished of infection from the sick who had been removed into the country, though there were many instances of such removals, under the most malignant 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 affected, while the pains in the head, back, and legs, were intolerably severe. To these symptoms succeeded nausea, and vomiting sometimes of a highly bilious matter, seldom attended with diarrhoea, but often with a burning at the stomach, tenderness of the ab-

" domen,

"domen, parcity of urine; and, in one instance, a dy"furia, 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 fymptoms. The pulse funk " aftonishingly, 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 ferenity of mind, "which in no other difease, I believe, is so generally ob-" ferved to accompany its last stages, on or about the 4th "day from the accession of the fever, he fell into a state " of infenfibility, and thence funk gently into the arms " of death. In others this change was lefs rapid; the " pulse became gradually smaller, the distressing symp-"toms flowly 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 feldom became " much coated, to the last. Delirium was by no means " generally attendant; and a yellowness of the skin was " far from being universal; fometimes, however, this "appearance was observed within the three first days; " often on the fourth and fifth; and I was induced to " confider 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 severs, especially the
puerperal) was very frequently attendant on the last stages of the disorder; very sew recovered after this circumstance had taken place; in one person, however, who
had it in the most alarming form, together with an intermittent 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
set state of the series of the second colors.

"fkin in this instance became extremely yellow, and con"tinued so for many weeks after the sever had subsided;
"the biliary ducts having been completely obstructed, and
"consequently the alvine evacuations of a clayey colour,
"and with much difficulty procured. Frequent repetitions of rhubarb and calomel in large doses, the continuance 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 practifed 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 sever, together with those of several other celebrated writers on the fame subject, induced us to enter immediately on the use of calomel in small doses, as recommended in our

"In my own practice I now usually commenced the treatment by bleeding from ten to fixteen 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-

"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 upwards 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 advanced, the symptoms universally gave way; and in every patient, two only excepted, this effect of the remedy was a sure pledge of recovery. In this exception were comprehended two persons of the same samily, 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 many who recovered) and died in a state of apparent putresaction.

"The purgative medicines were generally repeated every fecond day; or an enema of water gruel was administered occasionally, if the bowels were constipated; but if otherwise, and the calomel passed off by those emunctories, opium was combined with it in fusficient quantities to restrain the discharge. The evacuations which took place from the intestines, during the use of the mercury, were almost universally of a remarkably dark colour, generally approaching to a deep green, but by no means remarkably section. 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 favourable 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,

" fnake-root, and the bark, were fometimes used with

" advantage.

"The diet was generally of the lightest and most cooling nature; barley-water, apple-water, and sprucebeer, 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 esfects; 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 extended ed, under no other method of treatment did so many recover; and there were but sew instances of a satal termination, when it had been administered from the

" commencement of the fever.

"Various have been the causes affigned to this disease. "That its origin was domestic, I have not a fingle doubt, " No instance of the arrival of any vessel from the warm-"er latitudes, with this fickness on board, has been dif-" covered; and it is believed that the local causes are " fufficiently 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 " fome time accumulating. The offals from the fifth "market, as well as damaged fresh and falted 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 fummer, to a degree scarce-" ly before known in this country, had rendered thele " articles highly putrid; and from the fame cause feveral articles of provision, such as barrelled beef, &c. 46 which Ttt

"which had been prepared for exportation, but, by rea"fon 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 removal fell a sacrifice to his folly.

"Two or three thousand of the inhabitants removed into the country, and began to return about the middle 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 pre-

pared for prefs:

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 difease 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 sever, and these were young persons from different parts of the town. As to the suppositions (says the gentleman) with respect to local causes originating 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 sever 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 sacts 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, manking have racked their invensions to have investigated other inducing causes? Surely not. . . . As to local putterlying substances, there was nothing but what has been common to the place, where the sever 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 importation 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-

et tions which I have heard of."

The following particulars relative to the difease at Portsmouth may like-wise be deemed authentic, as communicated by a respeciable gentleman (though not of the medical profession) in that place: "Most men of judgment and information on the subject suppose it was imported last year in
a thip of Mr. Shease, 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 sew days afterwards.
Mr. Shease lost three of his his own tamily. He lived within a stone's throw of the wharf where his ship lay, and the sever spread in the neighbourhood.

SECTION III.

Methods of Prevention and Cure.

In the yellow fever, as in the plague, where an attack is frequenly made with fuch 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. Shease's, died about the toth 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 sever. 2. From the soul air of ships. 3. From the common sewers. 4. From the gutters. 5. From dirty cellars and yards. 6. Privies. 7. Putresying masses of matter lying in the neighbouring part of the

city. 8. Impure pump water.

The difease is considered by the Doctor as an higher degree of bilions sever. He answers the objection by Dr. Chitholm (see p. 467) where he tpeaks of the sever not being produced in 1778, "when it was lest 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, satigue, or intemperance. The constitution of the atmosphere, however, he looks upon to be the principal cause : as without this conflitution mild difeafes 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 fince. . . . It has not been confined to the feaports. It has prevailed fince the year 1793 in many of the villages of New " England, and of the fouthern frates. On the Genefee river it has become fo prevalent as to acquire the name of the Genelee lever. The bilious fevers which prevailed in all the above places before the year 1793 were of a mild is nature, and feldom 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 restimony.

In answer to the question, "Can the yellow sever be imported?" Our author answers as follows: "I once thought it might; but the soregoing sacts authorise 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 soremer says it was imported into Charleston in 1732, 1739, 1745 and 1748. The latter says it was conveyed into Philadelphia, where it asserwards, 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 affertions to the entitle them to credit, and from the facility with which vague reports of

* Printed in 1799.

prevention than the efforts of the most skilful physician after the difease has once begun; for, in such violent attacks, medicines, though ever fo powerful, have not time to act. In countries therefore where this terrible difeafe exists, the first confideration 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 feen 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. Naffy 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 " fo, 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. Chifholm 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 " leaft accustomed to the climate; and those most given

the foreign origin of this disease have been admitted and propagated by phyficians in other countries, there is reason to believe the assertions of those
two physicians are altogether without foundation. The College of Physicians of Philadelphia, after two weeks investigation, were unable to discover
any thips, clothes, or sick person, that could have introduced the disease into Philadelphia in the year 1793. The Academy of Medicine have clearly
proved, by many documents, that the disease was not imported in the years
to Philadelphia in the year 1793. The Academy of Medicine have clearly
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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
to Philadelphia in the year 1793. The Academy of Medicine have clearly
for the College of Physicians, which have lately appeared in
the our city, has in vain been fought for from a prize sloop of the Ganges. Two
affidavits of Messeurs 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
ther 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 sever of last year. In Boston, Connecticut, New York, Baltimore, Norfolk and Charleston, both physicians and citizens have long ago rejected the
opinion of the importation of the sever. Some physicians suppose it possible
for the contagion of this fever to adhere to the timbers of ships that have
saided 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 resultation. Indeed
every thing that relates to the importation of t

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 fickness. " 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 failors and porters. 8. Ne-" gro women; more especially house wenches. o. Chil-"dren; more especially those of colour." It is certain, however, that, when the diffemper 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 fuch a manner as if they could not escape. With respect to the general modes of prevention, then, to which it is the bufiness of every individual to attend, the following things are to be taken into confideration :

1. Every one who comes from a cold to a warm climate may be affured 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 fituation he must consider himself as necesfarily about to undergo a change of constitution; and fuch change he may likewise be affured 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 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 confifts in one particular in having lived for fome weeks entirely upon falt provisions. To these he has been in some measure accustomed; and therefore it must be reckoned injudicious to give up the use of falted meat at once for fuch as is fresh. In fact, this mode of abandoning falt meat for fresh has been reckoned by the best physicians one of the causes by which the diseafe is brought on. Drs. Taylor and Hansforth express themselves in the following manner on this subject: " It " has been noticed by feveral medical writers, that fresh " meats, and particularly beef, in fouthern climates, ap-" parently generate fluxes and other malignant diseases." Dr. Ramfay, alfo, fays of those who were mostly affected with the yellow fever in Norfolk, that, "being foreign-" ers, they dealt lavilly 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 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

" 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 fix weeks, fell victims to this disease. The " natives live chiefly on falted meats and fowls, or other "kinds of poultry, which are killed but a little time " before dreffing." It is unfortunate that among the emigrants from cold countries there is a general prejudice against salt, as highly inflammatory; and many difeafes 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 fcurvy; and the Tchutski, who conducted capt. Billings through their frozen regions, informed him that falt was poifon in their climate; throwing away, with marks of abhorrence, a quantity he had brought with him from his frigate. We cannot indeed argue from falt 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 sever 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 hefitation in afferting, that to perfons who had " been accustomed to live freely, nothing could be more "dangerous than to become remarkably absternious " 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 " refift the attack. But, whilft I confider abstinence in " fuch a fituation as highly improper, a state of intem-" perance is certainly more so; for, were it necessary, I " could mention the names of feveral individuals, who " whilft in a state of intoxication were attacked with the " fever, and in two days after were tenants of the grave, "The fate of fuch people might be pronounced almost " with certainty: they were feized with fymptoms of a " peculiarly malignant nature, and their death feemed " 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 averfeness the Ame-" ricans feel for foup 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 feen on their tables; whilft 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 es eaten; hence bloody fluxes, dysenteries and bad " chyles, which unwholfome food must undoubtedly " produce. " The

The city of Naples contains about four hundred "thousand inhabitants; of whom thirty or forty thou-" fand are faid 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 fevere, and fcarcely allay-" ed in many years by a fingle 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 fame " 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 difease. And for "ten years no febrile disease, of any fort, was common "among them. They also pay great attention to per-" fonal cleanliness. Facts of this fort are very important, " and form the best comment on the discordant opinions " of our phyficians."

As a contrast to these the reader may take the follow-

ing quotation from the Medical Extracts:

"One gentleman excepted, fays Dr. Shebbeare, and I "-never faw 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 " diftinguished; 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 infipidi-"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.) Uuu

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 subasted 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, four milk, and other productions of their then " uncultivated foil. 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 fubfift 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 elfe, 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 fuch ridiculous exceffes must make any thing destructive to health; and accordingly this practice, being opposed by Boerhaave, foon fell into disuse. Coffee has the same exhilarating virtue as tea, but must be considerably different in its

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 fervants to be blooded once a month, and obliged each of them to swallow fifty dishes of tea every day." Tea is faid 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 fuch as come into a warm country feems to be improper. Chocolate differs confiderably from both, possessing no exhibitanting 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 fuch of thefe as the perfon 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 fea, 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 difuse, perhaps without sufficient reason. Dr. Rush attests the efficacy of these remedies as preventives when figns of the difease appeared. "During the existence of the " premonitory fymptoms (fays 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 fingle 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 quickfilver was carried off by the English. One ship

was loaded with it, and, the veffels 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 feem to be quite sufficient for any individual, and may be very eafily reduced to practice. His observations may be fummed up as follows: 1. To avoid going into infected houses. 2. If this cannot be done, to avoid going into the chamber of the fick. 3. If neither of these is practicable, to avoid a near approach to the fick person. 4. To avoid drawing in his breath, or that peculiar smell which issues from the bodies of the fick; and not to touch the bed-clothes. By neglecting this the person becomes affected with nausea: flight 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 fuffer the effluvia from either to be blown upon the body. The distance at which the contagion acts is by Dr Chifholm supposed not to exceed ten feet; but Dr. Lind thinks it may extend to fifty or fixty feet; but this must depend very much upon circumstances. The only thing that can be done in fuch cases is to keep at as great a diffance as possible. As to the preventives commonly recommended, fuch 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 fo.

To purify rooms or ships from the infection they have received, it has formerly been observed that sumigations with the acid of nitre have been recommended. According to the theory of Dr. Mitchill of New York,

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 forts 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 feems to confirm this opinion, viz. that, having injected fome 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 fign of the existence of nitrous acid, not of putridity; but, notwithstanding this, Dr. Girtanner might still have been in the right, as we cannot fay 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 treatife on the jail fever, confiders 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 fulphur prevented him from making any trials with that substance; but to nitre there was no fuch 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

^{*} If this be chiefly composed of fixed air and azote, as has been said in p. 246, 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 destagrated 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 sever.

A much more decifive experiment was afterwards made at Sheerness on board the Union hospital ship, where there were upwards of two hundred people fick of a very malignant fever. Previous to the fumigation all the ports and fcuttles 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 fick, 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 eafy to understand this. Nitre cannot defiagrate 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.

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 considence 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 sumigation effectually counteracted the influence of the contagion, though numbers of patients, labouring under the most malignant severs, were received from the

Ruffian ships of war.

The good effects of nitrous vapour used in this way is also confirmed by Mr. David Paterson, now surgeon in Montrofe in Scotland. The trial took place in the prifon wards at Forton. The operation was performed in the manner above related, and with fuch fuccess, 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 furnigated at night there was an agreeable fmell next morning; and by this fmell 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 cleanfing 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 Jerfey. The disease was a typhus fever, which had formerly proved very destructive; but, while the acid vapour was used, only one out of fixty-fix 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 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 hospi-

tals by a decree of the National Affembly.

This mode of prevention feems to be established on as fure a testimony as any thing can be; but what can be faid 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 (fays he) are comprised in "the immediate removal of the fick; cleanliness in per-" fon and in clothing; fires to keep the people warm in "the winter feafon; avoiding cold and moisture, fatigue " and intoxication; and keeping the ship dry and pro-" perly ventilated." To there 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 elfe, he thinks that " a phyfician 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 fo zealous against these noxious fumigations, that he wrote to Evan Nepean, efq. at the Admiralty upon the subject. His argument was, that every possible method was taken on board of veffels to expel azote or mephitic air, by opening ports, scuttles, &c. and putting down windfails, &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 dephlogifticated air : and in

^{*} 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 preserable.

of proportion to the quantity it attracts of this principle se 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 Majefty's " This letter was transmitted to the commissioners for the fick and wounded for their report. The anfwer of the commissioners was to the full as learned as the Doctor's letter; but they confidered the experiments of Dr. Smyth and others as quite decifive upon the fubject, fo that Dr. Trotter was obliged to submit. The matter therefore being determined by fuch high authority, we must take leave of the subject, and proceed to confider 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 fuccess 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 ferious 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 leprofy."+ 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 conge-

nial to it than the fouthern.

Dr. Chisholm informs us that the general plan of prevention made use of in Grenada confists in the destruction of all finall 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 poffible; stables, necessaries, &c. at a distance; and certain

⁺ Willich, p. 13. * Medicina Nautica, p. 229.

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 prevent-"ed in future, by conveying water into them by a paf-" fage 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 " thip that belongs to our port be compelled by law to " carry a ventilator. Let all fuch ships as are discovered " to contain foul air in their holds be compelled to dif-" 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 fewers be " washed frequently with streams of water from our "pumps. Perhaps an advantage would arife from "opening them, and removing fuch foul matters as "ftreams 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 leffened, and thereby one " of the predifpoling causes of the sever 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 " thould 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 frequently; and let them be constructed in such " a manner as to prevent their contents from oozing " through the earth fo 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 " fecret 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 leffened by their living sparingly upon fresh " animal food, and chiefly upon broths and fresh vegeta-" bles, rendered favoury by spices and a small quantity " of falted meat, during the fummer and autumnal "months. A constant attention should be paid at the " fame time to bodily cleanlinefs."

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 sallen 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,

Dr. Rush pathetically laments the loss of Dr. Nicholas Way, who had been his intimate friend. In a poem called the Political Greenbouse we find some account of the death of Drs. Smith, Cooper and Scandella, who also perished; and the sates 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 sever in 1798. Intending to seturn 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 sever, 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 scized with the sever, and was attended by Dr. Smith, until the latter also fell sick. A friend who lived in the house attended first Dr. Spandella, and then Dr. Smith, pastil 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 fuch 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 subfiftence. 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 fenses, 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 fum up the whole in the well known fentence, " 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 eschere 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 confiders 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 feems to have altered his fentiments in 1798. Dr. Brown, who would have confidered it as a difease of debility. would of course have prescribed opium and other stimulants; and lastly, on the theory of Dr. Mitchill, that the difease 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 confideration 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, 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 fays 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 alcerous fore throat treated of by Huxham. About 45 years ago it was commonly used in pleurifies and other inflammatory diforders; and, ever fince 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 fuch diforders, from a notion of its being inflammatory, or diffolving 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 feems to have invented, rather than to have been previously instructed in, the mercurial practice. His fuccess, 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 falivary 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 fingle 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. Naffy, formerly mentioned, again stands almost singular in condemning the medicine, because it disfolves 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 uneafiness he must apply a remedy, and not trust to nature in any case whatever. When the yellow sever prevails, every one who feels the flightest disorder may be affured that his diforder partakes of its nature, and ought immediately to have recourse to a mercurial purge, Dr. Ruth fays 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 fafely 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 fays 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 sever of 1793, 94 and 95. Dr. Moseley recommends it in the yellow sever of the West Indies, but only in the first stage, and says that the injudicious performance of this operation, when the fecond 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 fays 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 fays 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 fixth day of the disease, to the " great relief of the fick." Dr. Bruce recommends it in the island of Barbadoes in the robust and plethoric.* Dr. Hillary fays that in the same island it is always absolutely necessary, and that it may even be repeated once, but that a third bleeding was feldom 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 affures us " that there was not a fingle instance of an emi-" grant recovering who had been bled in this difease. In " the first 24 hours indeed it was admissible in the young " and athletic feized 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 treatife on bilious fe-

It is needless to take up time with a detail of more opinions. From those already recited it is natural to conclude that the sever 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 sever "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.

Moseley, Dr. Rush, and indeed almost all who have practifed 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 sever by vomits; but, as one half of those to whom they were exhibit-

ed died of the difease, 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

4. Purgatives are found extremely useful, both as preventives and medicines. There are innumerable inftances where an incipient attack of the difease has been carried off by a brisk purge. Dr. Chisholm was able to remove the flighter 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 falts, rendering the folution palatable by the addition of lime juice and fugar. But in all violent ca-

fes he would depend on nothing but mercury.

5. Stimulating medicines. The stimulants commonly used on the Brunonian plan, viz. opium, bark, &c. are univerfally owned to be pernicious. In a letter from Dr. Sayres to Dr. Currie,* the former fays, that "bark, " wine, and a number of the common stimulants, were " given on the first appearance of debility taking place; " but with little fuccels. 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 nofe, I for-" bid medicine, and directed very cold water and bran-"dy mixed strong, to be given as freely as possible. " 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, thefe 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 faw him, and having lost a very confider-" able quantity of blood from the mouth, nole, &c. he " died

"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 attefted by Dr. Jeremiah Barker of Portland, who fays 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 diffreffing " pain and anguish at the stomach, which would not " yield to opiates. The morbid excitement too was evi-" dently under the controll of alkalies; the febrile dif-" 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 fays that he used a mixture of a quarter of an ounce of salt of wormwood with a pound of lime water; the dofe 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

* Medical Repor. vol. ii, p. 149.

⁺ In this mixture the fixed air in the alkaline falt would instantly destroy the virtues of the lime water by precipitating the lime. What is fold for falt of wormwood is neither more nor less than common pearl ash.

neglected till of late. In the fever of Jamaica, after the fatal fymptoms were removed, Dr. Jackson fays, that the tone and vigour of the fystem was best restored by cold bathing, "which (fays he) I am induced to confider 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-" folutely 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 feems 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 foaked in water in which a large portion of falt had been diffolved, or which had been fleeped 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 fuperfede that of other remedies, especially mercury; and indeed this may be faid of every thing elle; for though by the use of the remedies already mentioned the disease has fometimes 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 sound 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 sever. Dr. Wright of Jamaica (who attests the efficacy

efficacy of the medicine in dysentery, belly-ach, remittent sever, 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 quantity 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 fix hours."

8. Medicines proper for relieving the most urgent symptoms of the difease. The most distressing symptoms attending the yellow fever are, head-ach, vomiting, pain in the stomach, and pains in the back, loins and limbs. Blifters were tried by Dr. Chifholm to mitigate the pain in the head. "I have (fays he) bliftered the whole head, " and the infide of each thigh, at once, in feveral cases, "without producing the least change in that or any " other fymptom. 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 blifter to the scrobiculus cordis completely removed the irritability; the other case is related in the next fection. Another practitioner found a blifter applied to the forehead of remarkable use in four cases; but Dr. Chilholm 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 feldom, the ftomach was thus enabled to bear the bark, but otherwife the æther was given every three hours. If the ftomach.

sthen given only once in five or fix 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 sted before it.

These are the remedies most approved, and which may with most reason be expected to succeed in the cure of the discase, 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 fuch 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 lystem by medicine, to that of attempting to revive a dead corpfe. "I have, however (fays he) " feen instances of such unexpected recoveries from the " most hopeless state in severs, 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 difease. 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 difease might be subdued at once, and the patient recover, as has been already mentioned of the plague, p. 363. But the idea of death feems to be fo 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 feems indeed owing to this invincible affociation of ideas that the enemies of Dr. Rush have found means to load him fo much and fo undefervedly with reproach. Another method, less exceptionable, though probably also less efficacious, is by injections into the veins. But what are we

to inject? Here, to the difgrace 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 thefe remedies were we know not. In the fame paragraph indeed it is faid that alarming fymptoms 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 diffolution of the blood, and yellowness of the Ikin, we may thence derive fome faint hope that fuch an injection might also be useful in desperate cases of the vellow fever; but, till further experiments are made, we

can fay nothing more on the subject.

Laftly, 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 sebrile 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 faving a person he loved from death, and in establishing a truth of such importance to the world in general.*

^{*} 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 Cafes.

O 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 fingularity, or to give instances of furprifing and unexpected recovery, but to elucidate fome points of doctrine hinted at before, and not fufficiently explained.

1. Spontaneous

delphia particularly there were many cases that sould not bear the froke of a lancet. In Boston it feems to have partaken more of the nature of the true plague than in other places and other years. The diffections of Drs. Rand and Warren manifest a difference between the effects of it on the body at that sime, and what they were in former years. Buboes, carbuncles, or what were shought to be fo, and petechiæ, were observed here, as well as in New York. One remarkable cafe, related in the next fection, shows a disposition to induration, very uncommon in the yellow fever, though to common in the true plague that in the former part of this treatife it is taken for the characteristic mark of the difeafe. 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 fa-livation could be raised. The warm bath was used in some cases with success-Large evacuations were useful, and some patients bore three or sour bleedings, with repeated doses of jalap and calomel. The distemper is by one gentleman Myled a novel difease, and differing effentially from other bilious complaints. In one case the patient died of apoplexy; and another would probably have shared the same sate, 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 ariting from a diffolution of the blood feems now to be univerfally abandoned, and the colour is supposed to arise from a suffusion of bile, owing either to the obstruction of the ducts, or too great fecretion.

The names of the gentlemen upon whole authority the above facts Rand cannot be mentioned, as permission for so doing has not been obtained. Their

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 Bolton 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 sever lay in the neighbourhood of the samily 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 lest their houses for months previous to the contagious period. This year (1799) there have been unquestionable proofs of the importation of the sever from the Havana. The quarantine, however, has kept the insection from spreading; though the state of the atmosphere has been much less savourable to the disease than last year, and has therefore no doubt contributed to preserve the heaith of the people. fore no doubt contributed to preferve the health of the people.

treatife 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 lift of those affected with the disease this year at Newburyport:

	When tak	en.	Remarks.
	Offytaway June	28.	A fearman on board the veffel.
	March	23.	do.
*		ly 3.	On board while her cargo was discharging, &c.
r	His nephew	4.	do. yelle betoelk to be a line of the line
	Duggins	5. }	Prefent when the ballast was thrown out; also
	WALL CONTRACTOR OF		on board.
	Tho's Norwood	6.7	Worked in a hatter's shop about 16 rods from the
	Tho's Nor'd jun		veffel when graving, the wind blowing all or
F	Robert Lord	6.)	most of the time from the vessel towards the shop. Worked on the wharf where the vessel was hauled in.
	Stephen Tilton	6.	Annual South College Whiteler Street College C
	Herbert	7.7	Loaded and stowed the vessel for another outward
	Walleigh	7.5	bound voyage. These men lived at Amesbury.
	Mifs Dole	9.	Worked in a tailor's shop, by Norwood's hatter's
	Sally Wood	10.	do. [shop.
			Along fide the veffel, and filled the old bread
	James Wood	11.	casks for her outward voyage. He also lived near
	And the party of	000 (the wharf.
	Widow Waite	23.5	Doubtful whether her diforder was the fever. Liv-
	Widow Walte	11. 3	ed at the bottom of the wharf.
	Wm. Thompson	11. 5	Lived at the bottom of the wharf, & was along
	THE AMERICAN	5	fide of the veffel.
	Jona. Pearfon	13. }	Kept a store near the wharf, & was along fide
	SACREMENT OF THE PERSON.	STATE OF THE PARTY OF	the veffel.
	Danl. Favour jun-		Worked near the bottom of the wharf.
	Goodhue Rev. Mr. Milton	15.	On board the schooner, and trimmed the sugar casks. Visited the sick at Norwood's.
	Mary Dunn		Lived at Norwood's.
		15.	Handled the bags of money that came in the
	Giles Parfons	16. 3	veffel, and counted it. Was along fide of the veffel.
	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 veffel 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 ROLL OF THE	. 3. 5	the fickness.
		Those	marked with afterisks recovered.
	Millson to all the said	BEAT TO SERVICE STATE OF THE PARTY OF THE PA	THE RESIDENCE OF THE PARTY OF T

"The fever unequivecally the fame 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 Saily, Joseph Gunnison master, which arrived at Bartlett's wharf on the morning of the 29th of June last, after a passage of 13 days, from St. Thomas's, where the yellow sever prevailed and was very mortal, with 17 turces 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 singers, and was very offensive to the peo-

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 indispofition, and went to bed. In the night time, or early in the morning, his wife awaked and found him dead by her fide. His body was so hot that it could not be touched, and he continued burning internally for three days. No flame appeared on the outfide, only an hot steam iffued from his body; and we are not told what was the ultimate effect of the fire, or whether his body was confumed 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 confumed 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 feems decifive 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 start of July.

"It is still questioned whether this sever 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 eisterns are replete with putrid exhalations. I do not know that this fact has been verified. It is also faid 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 sever 2 days before the vessel arrived. In my mind the weight of evidence in favour of the importation greatly preponderates. In

"Just before the vessel arrived we had some very warm weather, and the heat was oppressive to the seelings. The thermometer two asternoons was at 90 deg. Perhaps it may not be unuseful to mention that calomel was given liberally. All who recovered were falivated. All who could not be falivated 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 sever; then it assumed the symptoms of the yellow sever. She was taken on the 11th July.

2. M. D'Obsonville's case of the plague. In the former part of this treatife it has been faid 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 " defert; and at night, when going to rest, complained " of a general uneafiness 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 fleep. "The third, the fever and head-ach became more vio-" lent, two buboes began to rife on my left fide, my "tongue was swelled, and of a brown violet colour. The " fourth and fifth days, fores 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 rife, like other paffengers, 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 fit " 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 fixth day the fymptoms all "appeared aggravated; at one moment my pulse beat " with an aftonishing quickness, and fire seemed to run " through Zzz

"through my veins; and the next, my blood was in-"tercepted in its course, a moisture covered my fore-

" head, and I felt myfelf fainting, though without being

" delirious, or lofing my fenfes."

The caravan having arrived at a small ruined village named Soccun, in the defert, it was refolved to leave M. D'Obsonville to his fate, his case being considered as desperate; and indeed he fays he was left alone at his own request. A small horde of Arabs resided in that village. though ruined, and our patient was configned 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 piaftres in filver, befides fome 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 defert, where they left him to shift for himself. Happily, however, either through accident or defign, these religious devils had deposited their prey near some water, which undoubtedly, as he still retained his fenses, was the means of preserving his life. " It was there (says he) that, ex-"tended upon the earth, with no other fuccour than a " little water, nature laboured to expel the poison by "which I was oppressed. One of the buboes burst of "itself; the pestilential fores, which appeared first of a " red purple, became yellowish, then brown, and laftly "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 66 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 fores 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 fores. At last, having learnt a few Arabic words, he prevailed upon two of the hufbands to conduct him to Aleppo, about seven days journey distant. He was now mounted aftride on a camel (a very hard trotting animal) and by forced marches accomplished the journey in fix days, when he appeared before the conful, 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 feem that in some cases the human body, as well as mind, rifes 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 selt excessive heat (says he) which made my blood boil; the disease seized my head, and I perceived that I had only a few moments 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

[&]quot; 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 fixteen feet from the fire place where the girl " flood. Mrs. Morton found fault with the man for " not coming fooner to finish fome work, and he ex-" cufed himself by saying his apprentice was ill of the " finall 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 " paffed 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 affured her she did not need to be in "the leaft alarmed, as the could not possibly have " caught the disease. She seemed to be convinced that "her fears were groundless; but next day, the twenty-" fecond, a violent rash appeared; on the twenty-third "the fmall pox came out, of the worst kind I had ever " feen, and she died on the ninth day from the eruption."

5. Inefficacy of FEAR to render the contagion of YEL-LOW 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 Jeven perfons 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 pled in such cases is, "I cannot understand how fuch a thing could have happened, therefore it has not been fo."

6. Boullam fever cured by a blister.* The patient was a tradesman in St. George's, Grenada, and had "all the supplied between the shoulders, without administering any medicine previously except the solution (mentioned p. 530) which operated very mode-trately. The effect was wonderful; the discharge was uncommonly large, black, and setted 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 lever of spiritous liquors, he had been drunk three days and nights fucceffively, and in that condition had run races with the failors on the shore, in the heat of the mid day fun. The last night be flept in the open air under a tamarind tree, and in the morning was feized 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 diffolved. He was directed then to drink warm water to cleanle his ftomach. 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 flept 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 fome elixir of vitriol, mint and inakeroot tea, he recovered in a short time.

Dr. Rush, in a letter published in the newspapers last year, after regretting the inessicacy 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 Eslay, p. 169.

emetics and purgatives, so as to occasion an artificial cholera morbus; and he greatly commends this mode of practice. "Vomits (fays 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 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 bliftering point in all " fevers, fo there appears to be an emetic point in the or yellow fever. It may occur on the fecond, and it " may be protracted to the fixth or feventh 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 " diffections 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

"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 fuccessive 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 fame season. The sever of 1797 differed in several particulars from the sever of 1793; and the present epidemic differs materially from both. In many of the cases I have seen it exceeds the sever of last year in

" its malignity. These variations in diseases call for

" corresponding changes in our practice."

8. Extraordinary case of yellow sever 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 fome days before, and foon extended " to the lips and neighbouring parts. The centre of the "tumour refembled that of the incision of an arm "about the time of the eruption of the small pox " after inoculation, exhibiting a hard, florid, flining "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-" fit 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 preffure 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 faturnine preparations, which were re-" peated till about 10 o'clock of the following morning, when the was taken in travail, and foon delivered of " a healthy male child. For a few hours after her de-" livery the appeared fomething better, but in the night " she grew worse, and about 12 o'clock I was called to " her, when the 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 however in agony till 3 o'clock of the day, and then " expired."

9. Two cases of spontaneous origin of yellow sever: from the Medical Repository, vol. ii, p. 333. "At Salem "(Massachusetts) there was a general prevalence of

[.] The attending physician's name is not mentioned, having no permission to do fo.

"health at that season; though several cases of yellow fever, and some of them satal 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 sever 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 samilies; these unclean foots forming exceptions to to the generally purified fatal of the town."

10. Case of fever produced by the effluvia of putrid beef. This took place in the federal garrifon on Governor's Mand.* The subject was a foldier, who had been excused from duty on account of a violent and obstinate gonorrhæa. On removing him into a lodging without the garrison he was seized with symptoms of fever, and on the commencement of these the gonorrhæa 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 affured that this was not owing to want of cleanlinefs, he caused search to be made under it, and in the cellars found three barrels of beef fo 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 worfe.

* Medical Repository, vol. i, p. 210.

END OF THE SECOND PART.

APPENDIX.

Nº I.

Account of the Plague at Athens, in the time of the Peloponnesian War:—From THUCYDIDES.—--SMITH'S Translation.

Attica, with two thirds of their forces, had not been many days there before a fickness 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 snemory 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 fick; 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 faid, in that part of Ethiopia which borders upon Egypt; it afterwards spread into Egypt and Libya; and at length, on a sudden, sell on the city of the Athenians. The contagion shewed itself first in Piræus; which occasioned a report, that the Peloponnesians had caused posson 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 myteis, and seen many others afflicted with it.

This very year, (430 B. C.) as is univerfally allowed, had been, more than any other, remarkably free from common diforders; or, whatever difeafes had already feized the body, they ended at length in this. But those who enjoyed the most perfect health were fuddenly, without any apparent cause, seized at first with head-achs extremely violent, with inflammations and fiery rednefs in the eyes. Within, the throat and tongue began instantly to be red as blood; the breath was drawn with difficulty, and had a noifome fmell. The fymptoms that fucceeded thefe were, focezing and hoarfenefs; and, not long after, the malady descended to the breast, with a violent cough; but, when once fettled in the ftomach, 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 thort, to others of a very long continuance. The bedy, to the outward touch, was neither very hot nor of a pallid hue, but reddish, livid, marked all over with little puffules and fores; yet, inwardly, it was fcorched with fuch 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 fills continued the fame. 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 exhaulted; or, if they continued longer, the diftemper fell into the belly. caufing violent ulcerations of the bowels, accompanied with an inceffant flux, by which many, reduced to an excessive weakness, were carried off. For the malady, beginning in the head, and fettling first there, funk afterwards gradually down through the whole body. And whoever got fafe 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 loft all memory, and quite forgot not only their most intimate friends, but even their own felves. For, as this diftemper was in general virulent beyoud expression, and its every part more grievous than had yet fallen to the lot of human nature ; fo, in one particular inftance, it appeared to be none of the natural infirmities of man, fince the birds and beafts that prey on human flesh cither never approached the dead bodies, of which many lay about uninterred, or certainly perithed if they tafted. One proof of this is then the total difappearance of fush birds; for not one was to be feen, either in any other places or about any of the carcafes. But the dogs, because of their constant familiarity with man, afforded a more netorious proof of this event.

The nature of this peftilential diforder was in general (for I have purpofely omitted many of its varied appearances, or the circumstances particular to fome of the infected in contradiffunction to others) fuch as hath been described. None of the common maladies incident to human nature prevailed at that time; or, whatever diforder any where appeared, it ended in this. Some died merely for want of care; and fome with all the care that could possibly be taken; nor was any one medicine discovered from whence could be promifed any certain relief; fince that which gave eafe to one was prejudicial to another. Whatever difference there was in bodies in point of firength, 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 finking at once into despair, they soon gave themfeives up without a ftruggle; and that mutual tenderness in taking care of one another, which communicated the infection, and made them drop like theep. 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; fo that many houses became defolate for want of needful attendance; and if they ventured, they were gone. This was most frequently the case of the kind and compasfionate. Such persons were ashamed, out of a felfish concern for themselves, entirely to abandon their friends, when their menial fervants, no longer able to endure the groans and lamentations of the dying, had been compelled to fly from fuch a weight of calamity. But those, especially, who had fafely gone through it, took pity on the dying and the fick, because they knew by themfelves what it really was, and were now fecure in themfelves; for it never feized one a fecond time fo 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 diftemper would prove fatal to them. Belides this reigning calamity, the general removal from the country into the city was a heavy grievance, more particularly to those who had been necessistated to come thather. For, as they had no houses, but dwelled all the summer time in booths, where there was fcarce room to breathe, the peffilence destroyed them with the utmost diforder, 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 affuage their extraordinary thirst. The temples,

in which they had creded tents for their reception, were full of the bodies which had expired there. For, in a calamity fo outrageously violent, and universal despair, things facted and holy had quite lost their distinction. Nay, all regulations observed before in matters of tepulture 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.

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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 essect 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.

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Account of the Great Plague in the time of Justinian:— By Procopius.

THIS was a plague which almost confumed 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 assisted the whole world, and all conditions of men, though of never so contrary a nature and disposition; sparing no constitution nor age. The difscrence 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 feafons. It began among the Egyptians in Pelufium, and fpread 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 sellows. It began still at the sea coast, and thence went to the inland parts. In the fecond year of its progress it arrived at Constantinople, about the middle of the spring, where it was the fortune of Procopius then to relide. Apparitions of spirits, in all shapes human, were feen by many, who thought the man they met ftruck them in fome part of the body; and fo foon as they faw the spirit they were seized with the difeafe. At first when they met them they repeated divine names, and fled into churches, to no purpofe. Afterwards they were afraid to hear their friends call them, locking themselves up in their chambers, and stopping their ears. Some dreamed they faw fuch fights; 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.

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There were others different; whether made fo by the diverfity of bodies, or by the will and pleasure of him that fent the diffemper, our author cannot or by the will and pleasure of him that sent the distemper, our author cannot fay. Some were seized with drowfiness 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 said buried insected 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 be in those plague fores, opened the dead bodies, and, searching the fores, found an huge carbuncie 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 phydied vomiting blood. Some that were given over by the most eminent phydied vomiting blood. died vomiting blood. Some that were given over by the most eminent phy-ficians unexpectedly recovered; others, of whose recovery they thought them-felves 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 prefervation, either by preventing the sickness, or of mastering the disease, no cause appearing either of their talling 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 fafely brought to bed and recovered, their children dy-ing; and one died whose child had the hap to live. Such as had their fores great, and running plentifully, escaped; the violence of the carbuncles being thereby assuged; and this was the most certain fign of health. Such whose fores staid as they first arose, underwent the miserable accident formerly mentioned. Some had their thighs withered, when the fores role upon them and did not run. Some escaped with diminished tongues, and lived stammering, or uttering founds 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 ufual. 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; fervants were without masters; rich men had none to attend them. In the afflicted city little was to be feen but empty houses, no trade going, or shops open.

Nº 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 diffemper

diftemper being in Holland, feveral councils were held by government with a view of concerting means for preventing its introduction into Britain. were held privately, and it does not appear that any thing was politively determined upon; but thus the knowledge that fuch a diftemper existed in Holland was suppressed, and the public fears distipated until the beginning of December; when two, supposed to be Frenchmen, in Long-acre, or rather the upper end of Drury lane, died with fuch fuspicious symptoms that the people of the house endeavoured to conceal the diffemper 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 This produced a general alarm; Dr. Hodges fays, that "hereupon fome timorous neighbours, under apprehensions of a contagion, removed in-** to the city of London; who unfortunately carried along with them the pesti-41 lential taint; whereby that difeafe, which was before in its infancy, in a family or two, fuddenly got ftrength, and spread abroad its fatal poison; and, " merely for want of confining the persons first seized with it, the whole city was irrecoverably insected." The author of the Journal, however, says that the public fear again subfided, 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 fix 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 lift of burials at St. Giles's parish, which augmented the general alarm fo much that few cared to pass through Drury lane or the suspected streets, unless upon very urgent bufinefs. In a thort time a like augmentation was perceived in the bills of the adjoining parithes, and indeed all over the town. The Journal informs us that the ufual 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 29t to 474. This seems inconsistent with what he had be-fore 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 44 the preceding vilitation 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 fill the burials in St. Giles's continued high. From the beginning of April espesially, 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 " fame thing; likewife the number that died of the spotted fewer on the " whole increased; being eight the week before, and twelve the week above

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 sew were set down in the lists as having died of the plague; the semainder 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 sever, 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 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 fa-

as ver, or other diffempers, befides 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 feemed greatly to diminish the contagion, and very " few died during that feafon; though even then it was not totally extinguishet ed." The journalist fays 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 fays (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 er of any person dying of the plague, or the distemper being in that place, till 64 the 9th of February, which was about feven weeks after; and then one more 64 was buried out of the fame house; then it was huthed, and we were perof feetly easy as to the public for a great while, for there were no more enteret ed in the weekly bill to be dead of the plague, till the 22d of April. Now the question feems to be thus: Where lay the feeds of the infection all "this while? How came it to stop so long, and not to stop any longer? Either the diffemper did not immediately come by contagion from body to body, or, if it did, then a body may continue to be infected without the difease diffeovering itself many days, nay, weeks together. It is true there was a very cold winter, and long frost, which continued three months; and of this, the Doctors fay, might check the infection; but then the learned mult at allow me to fay that if, according to their netion, the difease was, as & may fay, only frozen up, it would, like a frozen river, have returned to its ufu-" al force and current when it thawed; whereas the principal recess of the inof fection, which was from February to April, was after the frost was broken, at and the weather mild and warm. But there is another way of folving all 44 this difficulty, which I think my own remembrance of the thing will fup-" ply; and that is, the fact is not granted, namely, that there died none in at 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 evidence on the other fide, 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, fearchers, er and perfons appointed to give account of the dead, and what difeafes they diet 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 proet cured, the dead perfons to be returned as dying of other diftempers; and this, 4. I know, was practifed afterwards in many places; I believe I might fay in all places where the diftemper came; as might be feen by the vaft increase of the numbers placed in the weekly bills under other articles of difeafes, during the time of the infection. For example, in the months of July and 44 August, when the plague was coming on to its highest pitch, it was very ordinary to have from 1000 to 1200, may to almost 1500, a week, of other " diftempers : not that the numbers of those diftempers were really increased to fuch 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 " diftempers, to prevent the flutting 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 sity 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; of 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; of there was hardly a horse to be bought or hired in the whole city for some weeks." Many sed on soot, carrying with them soldiers' tents, in which they stept 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

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 diftemper.

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 menth of July, though in fmaller 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 fervants 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; fo 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 thoufand 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 fied 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 intested from the healthy; but unhappily their mode of procedure was such as inspired both the insected and uninfected with the utmost terror. The houses were marked with a red cross, subscribed with the words "Load, have meast uron 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 sull height until the months of August and September. Before this time it seemed to sty from place to place; to that great hopes were entertained, though always without soundation, 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 ex-

tremity of diffrefs.

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 folitary walks to she house of his brother, who had removed into the country, in order to preferve 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 curiofity; and, though he generally came home frighted and terrified, he could not reftrain himfelf. " In those walks (fays he) I had many difmal 41 scenes beforé my eyes; as particularly of persons falling dead in the streets. st terrible thricks, and fereamings of women, who, in their agonies, would 44 throw open their chamber windows, and cry out in a difinal, suprifing manner. " It is fearce credible what dreadful cafes happened in particular families " every day; people in the rage of the diftemper, or in the torment of their 44 fwellings, which was indeed intolerable, running about raving and diffracted ; 44 and oftentimes laying violent hands upon themfelves, throwing themfelves so out at their windows, shooting themselves, &c. mothers murdering their 44 own children, in their lunacy; fome dying of mere grief as a paffion; fome of " fright and furprile, without any infection at all; others frighted into idio-44 tifm and foolish diffractions, fome into defpair and lunacy; others into me-" lancholy madnefs."

The distemper was found to rage so violently among the poorer fort, 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 attist them, nor nurse to attend

so them: many of those died calling for help, and even for fustenance, out of " their windows, in a most miserable and deplorable manner; but it must be 44 added, that, whenever the cases of such persons or families were represented 44 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 outcomes and lamentations when taken, but madly careless of themselves, tool-hardy and obstinate when well: where they could get employment, they pushed into any kind of business, the most dan-44 gerous, and the most liable to intection; and, if they were spoken to, their 44 answer would be, I must trust to Gon for that; if I am taken, then I am 44 provided for, and there is an end of me, or the like; or thus: Why, what " muft I do? I cannot Rarve; I had as good have the plague, as periff 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 diffress of their circumstances, when taken (with the diffem-" 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 labourse ing poor, while they were well and getting money, than there was before; 46 but as lavish, as extravagant, and as thoughtless of to morrow, as ever; fo 44 that, when they came to be taken fick, they were immediately in the utas most diffress, as well for want as for fickness, as well for lack of food as ** lack of health."

In the time of fo 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 toyal 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 fome who were employed in this laudable undertaking; particularly Dr. Gliffon, 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 tell in the work, who were too much loaded with the spoils of the enemy; among whom was Dr. Conyers, &c. Alter, 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 lays, that many died while preferibing 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 engines were broken, the buckets thrown away, and the power of man was bassied and brought to an end; so the plague defied all medicine; the very physicians were seized with it, with their preservatives in their mouths;

as and men went about prefcribing to others, and telling them what to do. as 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 se phyficians, even fome of the most eminent, and of several of the most skiiful in furgeons; abundance of quacks too died, who had the folly to truft to their " own medicines," &c.

Thus, in defiance of every effort of human skill, the calamity continued ** The contagion (fays Dr. Hodges) spread its cruelties into the neighbouring es countries; for the citizens, who crowded in multitudes into the adjacent towns, carried the infection along with them, where it raged with equal fury; fo that the plague, which at first crept from one street to another, now ** reigned over whole counties, leaving hardly any place free from its infult, and the towns upon the Thames were more feverely handled; not, perhaps, " from a greater moisture in the air from thence, but from the tainted goods se 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 rife, and fuch the progress, of this cruel defroyer, 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 it the worst part of the year war over, and the height of the disease, the plague by leisurely degrees declined, and before the number insected decreased, its malignity began to relax, infomuch that few died, and those chiefly fuch as were ill managed; hereupon that dread which had been upon the minds of the es people wore off; and the fick cheerfully used all the means directed for their is recovery; and even the nurses grew either more cautious, or more faithful; infomuch that after some time a dawn of health appeared; as sudden, and as "unexpected, as the cellation of the following conflagration; wherein, after blowing up of houses, and using all means for its extinction to little purposes the flames stopped as it were of themselves for want of fuel, or, out of shame, se for having done fo much mischief. The pestilence, however, did not stop for want of subjects to act upon, (as then commonly rumoured) but from the a 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 faid concerning it. Dr. Morton fays 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 ftrong reasons for believing that all the accounts of the numbers who perithed were much below the truth. He thinks that an hundred thousand at least must have fallen victims to it; and if his own affertion 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 twelvementh that the disease lasted : which would fix the calculation at 120,000. This great mortality however was foon forgot; as foon as the danger was over, the ravages it had committed were no longer an object of terror. The difease had its usual effect, viz. increafing the defire of the fexes for each other. " They had the courage (fays 46 Dr. Hodges) now to marry again, and betake to the means of repairing the 44 paft mortality; and even women before deemed barren were faid to prove so prolific; fo that, although the contagion had carried off, as some computed, se about one hundred thousand, after a few months their loss was hardly dif-

" Hodges, p. 25.

Nº IV.

Account of the Plague at Marseilles in 1720:—From the Periodical Publications of the time.

So much hath been faid 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, sew outlived the third day; and so insectious was its nature, that one person in a family was seldom attacked without its successively attacking all the rest. The bodies were said to putresy 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,

44 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,
- 48 Rais'd the weak head and flay'd the parting figh,
- 44 Or with new life relum'd the fwimming 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 insection, 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 perith, 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 imported 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 Betanic Garden, Loves of the Planic, canto ii, p. 61.)

Nº V.

Account of the Plague in Syria, Cyprus &c .- From Dr. PATRICK RUSSEL's Treatife.

THIS plague was preceded by violent cold, famine, and earthquakes. In 1759 it began in Egypt, having been imported in a veffel from Conftantinople. From Alexandria in Egypt it was brought by fome Jews to Saffat, a village in Syria, near Aleppo, which had suffered much by the earthquake; which last was for fome 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 diftemper had been introduced into Cyprus as early as April 1759, by a veifel from Conftantinople, wrecked on the coaft; and, having thus got a footing in Egypt, Syria and Cyprus, its progrefs was marked with the

ufual

ufual mortality. In Egypt the Europeans in Cairo remained in confinement till the middle of July; a space considerably longer than usual. Next year they that up on the 9th of March, but were released on the 24th of June. The diffemper raged in the city with fuch 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 1726, when the diffemper raged with fuch 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 Limfol, 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 Nicofia, 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 diffemper 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, infomuch that few of those recovered that were intected 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 fick, and affift at the burials; the other, a Greek woman, who, having with great affection nurfed her hufband and two daughters who died of the plague, continued with admivable courage to expose herself in assisting the fick 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 releafed from their confinement till towards the end of August. One half of those infected are faid to have recovered; but five thousand perished. The city remained free from any attack during the whole of 1761; but early in 1761 the distemper again made its appearance in the neighbouring villages, and again began its devouring ravages; but, though a free accefs was granted to infected persons in the city, it does not appear that any general insection took place.

In Latarkea the diftemper appeared in March, 1760, made confiderable 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 sunerals falling from 20 to 9. On the 4th and 5th of July they again role to more than 20, but prefently fell below fix. Four thousand were supposed to have died, though it was thought that as many recovered as perished. At Jerusalem the contagion discovered refelf 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.

Nº 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 sever 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:

About 2 o'clock after dinner I was fuddenly attacked with a violent glowing heat all over my body, uneafinefs, 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 sit continued about two hours; a slight perspiration succeeded, which removed the sever, 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 selt 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 persect intermission of the sever; at night became very refiles and uneasy, could not fleep, 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 fome 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 fevere. 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 case. Lest off the bark, as it seemed to increase the sebrile 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 nauseous faline mixture, which vomited and purged me severely. The quantity of bile which came off my stomach was incredible, yet I selt no relief, and the agony of the hot fit continued till 4 o'clock in the asternoon, 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, sleeples night.

I now began to experience fome of the dreadful fymptoms which are, I believe, peculiar to fevers in Turky and Arabia; a fenfation of dread and horror, totally unconnected with the fear of death; for, while the patient is most afgicted with this fymptom, 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 hide:

oully under the violence of the pain.

oth Till noon tolerably well. About r o'clock the hot fit attacked me, and was full as fevere 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, sonfusion, anxiety and incessant thirst; a sleepless night, startings, anxieties, and a constant wish to terminate my sufferings by death.

noth. Forenoon, pretty free from fever. Attacked at the fame hour as yesterday. The fit more violent—delirium. The agony of the heat not to be expressed; the whole body as it on fire; unremitting thirst, profuse per-Spiration, yet no relief till late in the evening; no fleep, a dreadful night, &c.

Pulfe about 120, unequal and fluttering.

A mere relation of facts can give but a faint idea of the wretched fituation to which the factory was now reduced: by this time eleven twelfths of the inhabi-tants of Bufforah 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 counte-nance 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 fufferings 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 fnatch 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 obsect I faw was quite yellow. This effect was most perceptible at night, in looking at the moon and ftars. In the evenings we were fometimes carried in our cots upon the terrace of the factory for air; but the wind was to heated by the burning fands of the defert, that we felt it more intolerable than even the lower apartments. We all remarked that the foemaal, or north winds, which blew without intermission at that time, greatly increased our heat and thirk.

The daily very evident increase of my fever, and its effects upon others becoming more fatal and alarming, determined me, while any ftrength remained, to embrace the conful's offer of flying from the feat of infection to Buthire,

in the Ranger cruifer.

11th. After an exceeding bad night I was carried early in the morning on board the Ranger, and was not very ill until about o o'clock, when I felt the fever coming on, with new and more alarming symptoms-violent head-ach. giddiness, dimness of fight, 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 flomach and bowels, I took a pretty large dofe of nitre. The oppression and pain increafed; in my confusion I took a paper of tartar emetic, which immediately be-From that time, about ten o'clock, till half past two in the gan to operate 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 cruifer, who supported me in his arms, and administered such cordials as I, in the thort moments of recollection, could call for, I have not a doubt but I must have funk under this attack. He counted eight times that I fainted, and fometimes an interval of ten minutes before he could perceive any lymptoms of returning life. I was chiefly supported by wine, hartthorn, 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 thort time, perfectly well. A little strength returned, every symptom of fever vanished, and my feelings were almost the same as if in perfeet 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 faczory 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 Gept pretty well, and awoke refreshed in the morning. I, however, foon became ill, and at noon I had a fevere 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-conful. who for forme days past had been ill of the same fever, had determined to embark in the Eagle cruifer next morning for Bushire, as the only chance of fave ing 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 sly 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 previous 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 flairs from whence the boat was to put off, I was feized 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 thore—I could not make myfelf 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 lide of the river. Humanity pleaded for me, and I was taken into the boat, in a fluation 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 Busiorah.

reth. 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 flight and of thort duration. This day, however, I supported the sever rather better than usual, and in the evening had a thort intermission, and slept a little during the night. The air on the river was this day cooler and more

refreihing than on thore.

13th. About eleven o'clock had a regular cold shivering fit, succeeded by a very severe hot sever, 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

might.

tath. By Mr. ——'s advice I took a dofe of tartar emetic, which not working, he gave me some ipecacuanha. I brought up a great deal of bile, but the sever increasing, my sufferings under it were greatly increased by the operation of the emetic, which worked powerfully both upward, 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 sever began to abate a little, and and at fix Mr. —— gave me a small dose of decoction of bark, which seemed instantly to cause a return of the sever, heat, thirst, anxiety and pain

My fellow-futlerer, Mr. Abraham, was in violent agony this day; he eried out repeatedly that a fire was confuming his bowels, and that he was in exquisite torture. The captain of the cruifer had been complaining; he, Mr. Abraham and myself lay in the same cabin. About 4 o'clock in the aftermoon, when my pain was excessive, I crawled from my cot, with an intension 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 Buthire. On our coming to an anchor Mr. Abraham was immediately carried athore; but I was too ill to be moved, and accordingly followed in the morning with Capt. Sheriff, after a very

fevere, fleeplefs night.

The heat was so excessive this day that even the natives we had on board funk under it, and many of them were struck down with the sun. By noon nobody

could keep the deck; and about this time the veffel 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 failing down the river, we faw them throwing many dead bodies from the veffels which were at anchor below Bufforah, and many boats crowded with people from the Arabian shore. passing over to Persia.

The Perfians at first opposed the landing of our fick, 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 athore.

15th. I was fo 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 stater 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 sever 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 Buthire is a miferable, wretched mud building, bearing more refemblance to a Rable than a human abode: the few rooms, or rather cells, are infufferably hot, even to those in health, and the rest of the building has no cover from the fun. In one of the best of these recesses in the wall Mr. Abraham and I were placed, and on the fame 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 affiftance 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 fome 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 fo highly offensive as to be smelt at some distance from the factory. Past snidnight we were both removed to the terrace, but, unfortunately for me, there was only one fpot where we could lie, and the fmell of the dead body became intolerable; I was, however, cleaned and put into another bed by the humane affiftance of Mr. Beaumont, who fat by me, and treated me with uncommon tendernefs. I recovered a little, but paffed a dreadful night indeed. I shuddered at the agony which I was to feel on the return of the fun, 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 fpeak. I told Mr. Beaumont that I thought a gentle dofe of physic, if it could be got down, might alleviate the racking pain in my breaft, Romach, bowels and loins; he accordingly prepared fome falts, 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, fwooned, and the fymptoms 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, sufficating heat. My stomach and bowels seemed all on fire, my lungs played with the utmost difficulty, and I selt a pain and sensation about my heart which I cannot describe. I was unable to move; my servant listed me; I sell into a swoon for a few minutes, and, when I came to myself, a great quantity of black putrid bile slowed from me. Relief was instantaneous, and I slept or swooned till about 5 o'clock, when I found myself free from sever, 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 sustenance; I had a little fleep; but about midnight I fell into a fituze

tion whigh 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 secollection 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 affeep, and heard me; I then got out the word toine; on which he brought me a glass of clarets which, with much difficulty, I got down; I felt myfelf much revived; I resected on my fituation; and, although I had not the most remote idea of furviving 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 preferve my life, it would be that medicine taken in red wine; but, my fpeech immediately failing me, I could not direct the fervant to give it to me. Death feemad approaching; coldness had seized all my limbs; my sight beame 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 fervant, as he afterwards told me. I fainted and continued in a state of intensibility, I believe, for about an hour. The loud lamentations of the fervant, bewailing his own misfortune in lofing his mafter in a country to remote from his own. seemed to recal me to life; I felt as if refrethed with a little fleep, and got out the words bark and wine; it was inftantly 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 fervant to give me a tea-spoonful of the bark every hour, in a glass of claret. By 8 in the morning I had taken fix dofes, and more than half a bottle of claret. I was confiderably ftrengthened, and could converfe with Mr. Beaumont, who encouraged me to perfevere in the back, and treated me with uncommon attention-I had been fasly neglected at Bufforah, 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 affist a fellow creature. He waited upon me like a nurse, confoled me under pain and fickness, 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 thifted. About this time my legs and thighs became covered with blotches of a dufky brown hue, some of them as broad as the paim of the hand, quite dry, and they itched intolerably. At the fame time feveral 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 difappeared. 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 toague, 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 back 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 suffication: 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 fame symptoms as the day before—drank a little chicken broth, which was the only suftenance I had taken for four days before—great oppression and heat in my stomach and bowels. Mr. Beaumont found out an Atmenian who professed physic. This man gave me a clyster, which gave me great telief, and a water to drink, samous as a sebrisuge 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 sever, 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 singer. I never had the tooth-ach. At this time the boil on my eye suppurated. From

From the 15th of June to the 5th of July, being feventeen days, my fever did not return. I recovered ftrength flowly, 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 discase hanging about me—restless, fatiguing nights—great thirst—bad taste in my mouth: every thing I took seemed bitter and falt—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 fprings lifted, as feamen 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 flight 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 it 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 sever, yet I suffered a good deal from the hot fit. Lest 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 sever.

Sth. Had a clyster thrown up, and early in the morning took a draught from the Armenian, composed of fine vinegar, sugar, and a country feed 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.

rith. Between 8 and 9 in the morning a cold and hot fit, much more fewere 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 insusion of vinegar and seeds.

rith. No fever—find the water-melon to difagree 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 difease, 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 thort 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 cruiter having arrived last night from Bushorah, on her way to Bombay.

At half past seven o'clock I had a very severe sit; the hot sit 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 Bustorah owed their lives entirely to the bark,

which had at last been given in very large dofes.

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 the Eagle and two passengers were taken ill from it last night. I got off

board very late, yet found myself refreshed from the sea air.

15th. The sever 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 sever 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 dofe, and continued in this manner till the Ath, when the fprings being over, and perceiving no fymptoms of fever remaining, I left off the bark

entirely. I had generally taken fix tea-spoonfuls every day.

From the 15th of July till my arrival at Muscat, a scaport on the coast of Arabia, my recovery was exceedingly rapid. I had a keen appetite, a pretty good digeftion, found, 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 falted and high-seasoned meats, and confining myfelf to three or four glaffes 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 fensible, at times, during my recovery, of a slight but troublesome pain under my fifth rib on the right fide, especially when I lay on that fide; 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 foon left me, the cause was probably trifling or accidental.

On my leaving Muscat a large boil came upon the hip-bone, the fize of a fmall melon, extending fome way up the fide, 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. If 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 doles of bark it left me. Those attacks happened at the change of the moon. Bombay to Europe I had three or four flight fits of the ague; the worft on our making the coast of South Guinea, at the fettlement of Benguela, where we found the wretched remains of a Portuguefe garrison, the furvivors 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 Lifbon, fince which time I have had no returns of the ague, although, when the wind continues long at cast, I am fensible of a tendency to that complaint.

I shall now give a brief account of the fate of my fellow sufferers at Bufforah. This unfortunate party confifted of capt. Sheriff, of the Eagle cruifer; Mr. Brown, a Bengal merchant, carrying goods from India to Aleppo; Mr. Palmer, a gentleman returning with his fortune from Bengal to Europe; Mr. Robfon, furgeon to the factory; Mr. Abraham, the vice-conful; Dr. Rofs, who had practifed many years at Conftantinople, fome time in Bengal, and was then taking the opportunity of accompanying me serofs the defert; Mr. Smith, a merchant from India; and an Italian Carmelite, the vicar of Bufforah, who came from Bombay. It is unneceffary to fay that the feea dab is a common symptom in the Turkish fever, or, in other words, a strong defire of felf-destruction. We had a fatal instance of it in our party, Brown, the second day of his fever, heing 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 fame, had we been possessed of the means of accomplishing it.

Mr. Robson died the third day of his fever, in great agonies, but perfectly
fensible. His was a continued high fever, without any remission. Mr. Palmer died the 4th day, under the same symptoms as the preceding. The Carmer died the 4th day, under the fame fymptoms as the preceding. The Car-melite, the fecond morning after he was taken ill, had opened a vein in his arm, and bled to death, most probably intentionally. Captain Sheriff was feized with the fever on his return from Bussierah to Bushire. He died the third day, in a manner which is even painful to relate. He was a man of fingular

fingular 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 fooner dead but his body was covered with purple spots, and so offensive that the people could hardly carry it out to be buried. Mr. Sheriss was what they call the worst kind of plague.

, formerly mentioned as having escaped the plague at Bufforah by shutting himself up in a mud house, was seized on his voyage to Bussorah with a kind of infanity, imagining that people were conspiring against his life, and that he was capable of overhearing, at a great distance, even a whifper spoken to his disadvantage. He, however, escaped the infection, and re-

surned to England in health.

Nº 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.

3. TS the infection of the plague frequently received by the French? Answer, by Raymond, physician at Marfeilles: 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 perfon may inhabit the fame chamber, or even touch an infested person, with impunity; of which I have known instances; but all who approach the atmosphere of an infeded body may receive the infection by refpiration. 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 predifpofition 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 fmelt at, first by two persons who remained free; and then by a third, who fickened 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-Commonly in this But what this disposition is can scarcely be conceived. climate, the difease appears at the end of spring, and continues to the middle of fummer; with this particularity, that, in cloudy weather, and during the firecco winds, the attacks are more frequent. Also in the same diathesis of the air some receive the insection, while others exposed to the same dangers escape it. From observation it appears, that cachectic persons, and those of constitutions abounding in acid, do not readily take it. The contagious miassmata may be dormant in the body for some time without doing the least harm, till set in motion by sudden sear, 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 rife spontaneously?

Raymond: Incontestible experience shows that it only proceeds from contact.——Demolline: From all ages the plague has been brought to Marfeilles feilles by merchandife or perfons beyond fea .--- Giovanelli : As the difeafe always appears with the fame fymptoms, it is not probably spontaneous, but the confequence 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 .-- Merandi: 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 confidered as fuch. My reasons are drawn from the very different manner in which the plague appears in different years, and the different degree in which it fpreads. 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. Lulgi: Ancient and common observation in this city prove that the plague is derived folely from contagion.

3. To what distance is the air infeded? How far does actual contact,

wearing infected clothes, or touching other things, produce the difease?

Raymond: The infected are fasely conversed with across a barrier, which feparates 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 that up in an unventilated chamber, it may be faid that the whole chamber is dangerous; but if one fpeaks 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. Beor thing is proved to be very dangerous by fatal experience; but to what degree, is not afcertained. - They: The infection extends only fome 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 diffipated 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 furrounding the patient; the air being what abforbs, diffipates and communicates the contagious principle. Infected fubflances communicate the difease for many years, in proportion to the ventilation they have undergone, or of which they are fusceptible .- - Yew phyfician: The degree of infection in the air about the fick 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 fecurely fee a patient at the distance of two ells, if the chamber windows be not all thut .- .- Fra. Luigi: The infection is greater or lefs in proportion to the virulence of the contagion to but I have made no observation as to the diftance. The difease is communicated by contact of all infected things, and by close inspiration of the breath of the fick.

4. What are the seasons in which the plague chiefly appears; and what is

the interval between the infection and the dileafe?

Raymond : The plague shows itself at all seasons, but less at the two fol-Rices .-- Demollins : Great ravages may be made in all feafons, but principally in the greatest heats of fummer. From the infection to the difease is two or three days .-- Giovanelli: The plague appears at all times, in the fame manner as poifons at all times produce their effects. But observations show that its ravages are greater in hot feafons than in cold; and it feems that fummer and the first months of autumn are must to be dreaded. There is no certainty as to the interval between the intection and the difease, as it depends on the particular conflitution of the patient .-- They : Warm, moilt forfons contribute to the production of all infectious difeafes. The interval from the infection to the feizure is various, according to the virulence of the poifon,

and the constitution of the patient. Sometimes it alls flowly, sometimes like a stroke of lightning.——**Perdoni: 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 ested, and then unknowingly communicates it to a third, in whom, if predisposed 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.— Yew physician: Answered in the first.——**Fra. Luigi: The plague is most satal 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 insection 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 swel-

ling 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 fymptoms of the plague vary; but the most sommon are, bubbes 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 fooner attacked than the armpit .-- - They: Swellings in the armpits and groin are indeed the characteristics of the plague; yet they are not the fole nor the first fymptoms, and often are not feen at all; as when the plague difguises itself under the form of other diseases .-- .- Morandi : Glandular swellings are properly the symptom of the fecond stage, and are preceded by those sebrile symptoms. which are immediately the confequence of receiving the infection; fuch as pain in the head, drowfinefs, great proftration of ftrength, drynefs of the tongue, vomiting, hiccough, tremor, diarrhoa . -- Verdoni : Its first fymptoms are relative to the conflictation of the year, and of the body feized, and the place where it was produced, or whence it came. In 1783 all the parts of Natolia were infected; and the difease transported to Smyrna, which is the centre, was extinguished without the lofs of a fingle person. Generally the plague of Confuntinople, 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 asfected .-- Few physician: The fwelling of the glands is feldom the first fymptom. Patients are every day feen who, being supposed ill of another diforder, 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 figns are supposed to have the plague, become well in a day or two, without any external fwelling. The first fymptoms are, herripilation, or actual shivering, naufea or vomiting, lofs of ftrength, and fever. These are common to many difeases; but the pathognomic signs are, a difference in the pulsations of the two fides, with this circumstance, that from the divertity a prognostic ariies; 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 fmaller, at shows greater malignity, and more is to be feared. Further, there is obferved among the first symptoms a visible pulsation in the carotids, greatest on the affected fide; and also a crystalline vivacity in the eyes, with a kind of contraction or diminution of the eye on the affected fide. -- 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 fenfe of great cold in the joins, vomiting, debility. Swellings of the glands are not among the first fymptoms.

6. Is it true that there are two diffinct fevers with nearly the fame fympsoms, one of which is properly termed the plague, and is communicated from a diffance by the air, and without contact; while the other, which is properly sermed contagion, is only communicated by the touch, or at least by near

approach to infected perfons or things?

Morandi: It is certain, from multiplied observations, that there are two forts of pestilential severs, 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 sever, the latter a contagious one.——Verdonis The distinction of these severs 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 difease is treated as inflammatory. No specific has been discovered for it .-- Demolline : At the beginning, bleeding, vomiting, purgatives, diluents, refrigerants and antifeptics are used; afterwards antiseptics and cordials, relatively to the temperament and fymptoms .-- Giovanelli : Tha plague caufing always a difposition 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 feems 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 roufing. The vitriolic acid in large dofes has been found very ferviceable in the plague at Motcow, attended with carbuncles. When the inflammation is over, and marks of suppuration appear, the bark, with wine and other cordials, is proper. The furgeon's affiftance is proper in the treatment of boils and anthraces, which laft are feldom cured without the actual cautery .-- They: In the beginning of postilential fevers bleeding is somezimes 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 diffolution of the blood .-- Morandi : In the first period, evacuations, according to the particular circumstances of the eafe, are proper: in the fecond, bark mixed with wine, and opium as a temporary fedative. 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 raife the buboes. Upon these he applies. greafy wool, caviare, honey of refes, dried figs, &c. to bring them to Suppura-The Turks and Arabs drink bezoar in powder with milk, and other They vomit, and posibly a fecond fudorifies, in order to expel the virus. fine. At Cairo they take opium, and cover themselves with mattresses in order to excite fweat; and, though parched with heat and thirst, they drink They open the immature buboes with a red hot iron. At Con-Rantinople and Smyrna they eat nothing, and drink much water and lemonade. The Jews drink a decoction of citron feeds, 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 years cured the plague by bleeding, and an antiphlogistic regimen. My brother in Cairo treated it like a biliary fever, with vomits, faponaceous attenuants, and antiphlogiftics; and fuccefstully. Some failors at Conftantinople in the frenzy of the plague have thrown themselves into the sea; and it is faid 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 conflitution of the year, and of the patient, by which the nature of the difease itself is greaty altered .-Jeso physician: Bleeding in many cases may be serviceable, as I have known patients, who were blod by mistake, recover; and others recovered from a most desperate condition by a spontaneous hemorrhage. On the other hand, perions

persons have been apparently injured by both these circumstances. The difference of effect feems 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 hefitate to try ipecacuanha in substance, exhibiting half a foruple at two or three times, in the expectation that in this manner it would not run down. Bark may be ufeful in diffolutions of the blood; and also Amall doses of opium, and other medicines prudently administered. In exceffive 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 fnow, and apply it all over their bodies, and also eat it; and fometimes threw cold water on their feet. But whether this is of fervice or not cannot be determined; as these people in other respects, pay no regard to rules of diet .- Fra. Luigi: They who practife empirically in the plague use none of the recited methods, but only firong fudorifics, and ventilation of the air; and complete the cure by proper treatment of the fores by fuppuration.

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 sieth; others, no sish; 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 hoiled 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 cossee with a biscuit every day. For drink they only use toast and water; and they follow this absence of the distance of the

9. Are convalefcents subject to repeated attacks from the same infection? Raymond: Not unless they touch fomething infected .--- Demollins: Convalescents are fent 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 diforders, fuch as confumption, hæmoptoe, &c .-- They : Convalefcents are without doubt liable to a relapse, and authors are full of instances of it. In the plague of Meffina M. Cotogno fays that a man had fucceffively fourteen buboes, and was cured at laft .- 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 cating and drinking, bodily fatigues, affections of the mind, especially anger, they are liable to repeated and very dangerous relapfes.

Raymond: The mortality is different in different feafons and years.—Demollini: In the plague of Marfeilles 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 satal, the patient generally dies within five days from the first invasion of the sever, or first marks of the plague. When he recovers, no certain termination can be assigned. If the time of healing all the fores 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 sever generally runs on to twenty or twenty-one days.—Merandi: 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.)——Verdani: The proportion of deaths

varies infinitely. It has been observed that the Jewsin Constantinople and Smyrna lose only one third; which is attributed to the care they take of their fick. At Cairo, on the other hand, they are the first attacked, and lose more than three fourths. The Turks lose two thirds; other sations a little more or less. Europeans in Cairo lose five fixths. 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 fiesh, which instantly causes a return of sever, and death. It never passes beyond the fortieth day.—-Jew physician: The mortality is various, as also the duration: some in two, three or sour days; some hold out fix, 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 fick, the number recovering has, for eighteen years pass, exceeded that of the dead.

11. What are the means to prevent the plague, to stop its contagion, and

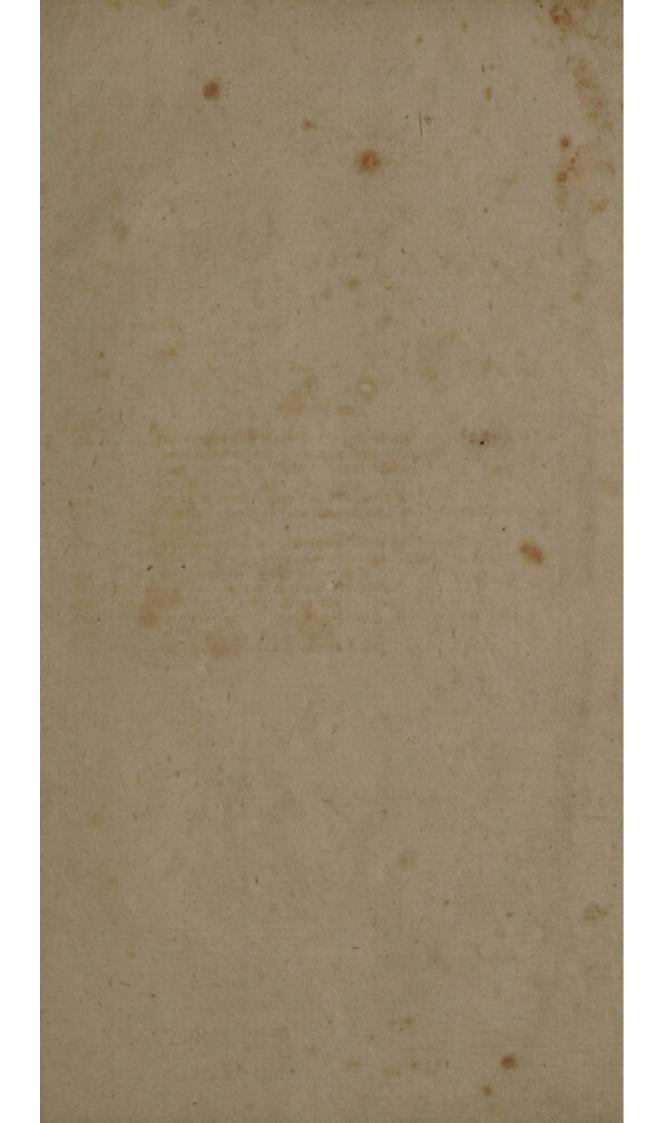
to purify infected places?

Raymond: There is no other method of preserving one's felf 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 su-migation with aromatics and sulphur. — Demollins: Here, in the lazaretto, infeeted goods and furniture are exposed to a current of air for forty days. The air of infected places is purified by burning all forts 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 feraping the lime from the walls, (which is then thrown into the fea) and whitewashing them anew with lime and feawater, by washing the sloors, 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 fet apart for that purpose; and their beds and bedding are burned. As to other things not used during the illbeds and bedding are burned. As to other things not used during the illness, the linen is washed with foap and ley; the woollen clothes are put into fea-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 fumilized from time to time according to their quality.—Morandi: A fire is to be kept constantly in the fick chamber in all feasons. At seces, &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.——Few 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.— 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 persumes, ventilation and sumigation. The Greeks in Smyrna during lent, when they eat only vegetables, are feldem attacked; while among those who cat fieth 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 fprinkle 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.

ERRATA.

23. For 'destroying three or four thousand,' read 'destroying fixe teen hundred out of three or four thousand.'
13. from bottom, for 'Zabira.' read 'Zebire.' 39· 86. 10. for 'obscured,' read 'obscure.'
20. for 'acid other,' read 'acid in the other.'
15. from bottom, after 'the inhabitants,' add, 'Farther east it does ¥53. 202. not go." 7. from bottom, for 'flattering,' read 'fluttering.'
8. from bottom (in a few copies) for 'gout, fever,' read 'gaol-fever.' 380. 303. 10. for 'fafety to,' read 'fafety of.'
2. from bottom, for 'fluid,' r. 1 'fluids.'
12. from bottom, for 'Black affizes,' read 'Black Hole.' 109-460. 480. 5. for 'Hansforth,' read Hansford;' also in pages 489 & 510.
1. for 'parcity,' read 'paucity.
1. bottom, for 'yol. x,' read 'yol. iii.' 486. 502. 512.

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