Eben'r Hewit 1802

THE

# MEDICAL REPOSITORY,

AND

## REVIEW OF AMERICAN PUBLICATIONS

ON

## MEDICINE, SURGERY,

AND THE

## AUXILIARY BRANCHES OF PHILOSOPHY.

CONDUCTED BY

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AND

EDWARD MILLER, M. D.

*Molli paullatim flaveſcet campus ariſta,*
*Incultiſque rubens pendebit ſentibus uvâ,*
*Et duræ quercus ſudabunt roſcida mella.*

VIRGIL.

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MEDICAL REPOSITORY.

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## ARTICLE I.

*An* ACCOUNT *of a* MALIGNANT DISEASE *which appeared on board of the* UNITED STATES FRIGATE GENERAL GREENE: *In a Letter from Dr.* L. KOLLOCK, *of Savannah, in Georgia, to Dr.* MILLER.

My DEAR SIR,

THOUGH I had very cheerfully undertaken to collect the materials for a ſhort hiſtory of the fatal diſeaſe which occurred on board the United States Frigate General Greene, during her firſt and diſaſtrous cruiſe, ſo unſucceſsful were my inquiries, that I doubted whether the reſult would be ſufficiently important to make up a communication.

It ſeemed a very favourable opportunity for aſcertaining unqueſtionably, in one inſtance at leaſt, the origin of a fever which, in its complexion and conſequences, bore a ſtrong reſemblance to the terrible epidemics which have ſo ſeverely ſcourged many of our cities and towns for ſeveral years paſt.

Unfortunately, however, no medical regiſter or other journal was kept, from which a very accurate or particular account of the diſeaſe could be collected; and for the following ſketch of a hiſtory I have been indebted to the curſory recollection of the officers, and the little I ſaw of the ſick after the arrival of the veſſel in port. Defective as it really is, I have determined to ſubmit it to your inſpection. Should you believe it ſo far calculated to aid the reſearches of others as to make it worth publication, or to afford the leaſt gratification to yourſelf, I ſhall feel amply rewarded for the communication.

I am, dear Sir,
With great reſpect and eſteem,
Your much obliged friend,
And humble ſervant,
L. KOLLOCK.

*Savannah, Feb.* 20, 1800.

THE United States Frigate General Greene, under the command of Capt. Perry, failed from Newport, Rhode-Ifland, on the 3d of June, 1799, for the Havannah. She had on board two hundred and fourteen men, all apparently in good health. The fhip being new, we may fuppofe fhe was in a cleanly condition. She was alfo leaky. Having been caulked in winter, her feams opened as the warm weather advanced.

Her ballaft confifted partly of iron and partly of earth, taken from a clay fhore. This was intermixed with foft flate-ftone, fhells, and marine vegetables. Her provifions confifted of beef, pork, falt fifh, rice, Indian meal, flour, and a fmall quantity of poultry. The liquors were water and rum, with a fmall quantity of brandy and wine, as hofpital ftores.

The fhip was furnifhed with one ventilator, and wind fails; and, in this condition, put to fea, at the period above-mentioned.

After being fix days out, they were overtaken by a fevere gale of wind, which continued for feveral days. Her leakage was greatly increafed by this incident, part of her provifions damaged, and even her magazine affected.

This ftorm was fucceeded by very hot weather, and the extreme putrefaction of the falt fifh. The air in the hold of the veffel was fo contaminated as to extinguifh lights immediately; and candles in the cock-pit were almoft ufelefs from the fame caufe. The fifh was thrown overboard, the decks wafhed and fcoured, the ventilator and wind fails put in operation, and every meafure of purification adopted that their fituation allowed.

Notwithftanding thefe precautions, difeafe invaded them.—On the 18th of the month, the firft man was feized with the fymptoms of highly inflammatory bilious fever—fuch as violent pains in the head and bones, fuffufion of face and eyes, hardnefs and velocity of pulfe, proftration of ftrength, great thirft, vomiting, and coftivenefs.

Thefe fymptoms yielded readily to bleeding and the ufual evacuations, and the patient recovered in the courfe of eight or ten days. He was a midfhipman, whofe duty obliged him to frequent the hold. Four other cafes occurred fhortly after the firft, in men fimilarly fituated, with like fymptoms, but more urgent—yielding, however, to fimilar management, and terminating favourably in a few days.

On the 4th of July they arrived off the Havannah, when the fecond lieutenant was attacked with the fame kind of fever, but with fymptoms much more ferious and alarming than any of the preceding cafes. He became, at once, delirious, and vomited inceffantly a darker coloured fluid. This cafe appeared fo formidable, that they were induced to call in additional advice. Dr. Halliday (an eminent medical gentleman at the Havannah) vifited him. It was the concurrent opinion of this gentleman, the furgeon and mate, that this was a ftrongly marked cafe of *yellow fever*. The liberal ufe of mercury, in addition to the remedies exhibited in the former cafes, recovered this patient in a few days alfo. Until this period, no fufpicions had been excited, or apprehenfions entertained, of the fomidable nature of the difeafe; nor had they deemed it other than the neceffary confequence of fo fudden a change of climate as they had experienced.

The origin and caufe of fo ferious a calamity as was now forefeen and dreaded, became the fubject of immediate inquiry. They had had no communication with any veffel at fea; nor had they touched at any place in their paffage, or even had intercourfe with the town, or veffels in the harbour, till this period. Other veffels in port were no more than ufually fickly, and the inhabitants of the ifland were remarkably healthy.

The principle of difeafe feemed to have been generated on board, and to have gradually acquired virulence and activity as they approached the place of their deftination.

After this period, three, four, and five new cafes occurred daily; and the violence of fymptoms feemed to increafe with the multiplication of cafes, during the fix days they lay in port.

No death had as yet occurred; and the veffel was now ordered to convoy a fleet of merchantmen to the United States; for which purpofe they fet fail on the 10th, with many fick, and the difeafe increafing.

On the 12th, the fecond day from failing, the firft man died, with vomiting and delirium to the laft. He was attacked the 5th of the month (the next day after their arrival), and died on the feventh day of the difeafe. From this period, the uncontroulablenefs of the difeafe, and the frequency of deaths, excited fuch confternation and diftrefs as to produce almoft total neglect of dates, or particular circumftances of a difeafe, which raged, with unabated violence, till they arrived in the latitude of Virginia.

The furgeon and purfer were the laft who fell victims to this terrible difeafe. The latter died on the 22d. They were fick but two or three days, and, like the others, died with exceffive delirium and black vomit.

After paffing the Capes of Virginia, there was an obvious mitigation of fymptoms, and the difeafe gradually became milder as they approached the port of Rhode-Ifland, which they reached on the 27th of July, after a paffage of feventeen days; during which time they had experienced all the terror and defpair which a fituation hopelefs as theirs feemed, is capable of infpiring.

They were unceafing in their exertions to purify the fhip. Wafhing, fcouring with vinegar, burning powder and vinegar, old junk and brimftone, added to conftant ventilation, proved unequal even to the amelioration of their calamities, while they were in the latitude of great heat.

According to their computation, the whole number of the fick, from the time of their leaving port till their return, was forty—of which number twenty died, and all in the fpace of ten days. Moft of the deaths happened in twenty-four hours from feizure, and all within five days, excepting two; one on the fifth, and the other fo late as the feventh from the attack.

Thofe who frequented the hold, and were ftationed in the neighbourhood of the pumps, fuffered more efpecially during the continuance of the difeafe, as they had been the firft attacked with it.

From the furgeon's mate I obtained the following fketch of the medical management of the fick.

In moft inftances they had recourfe to bleeding and bliftering, in the earlieft ftage of the difeafe, but without any perceptible benefit: it produced no mitigation of fymptoms. The vefications dried immediately, and turned gangrenous. The blood was of a loofe, diffolved texture. Every other remedy ufed feemed totally unavailing, excepting mercury. Large dofes of calomel feemed to controul every fymptom: and, where ptyalifm could be produced, not a fingle patient died.

Shortly after the veffel came into port, the invalids of every defcription (fay about forty) were landed at the hofpital on Coafter's Harbour. Being requefted by the Town Council of Newport to accompany the late much refpected Dr. Senter in attending the hofpital, we vifited them as foon as they were landed.

We found but four or five cafes of recent difeafe. The others were convalefcents from fever and falivation. There was an uncommon number of ill-conditioned ulcerated legs, and fome with venereal complaints.

The new cafes of fever appeared of the bilious inflammatory type, but had nothing formidable in aspect; nor was there but a single case where the symptoms were urgent. There was nothing uncontroulable by the most ordinary remedies, or any thing singular in the management or progress of disease, but the ease with which it was controuled, and the rapidity of recovery, in this pure air, and under new regimen. Even the sore legs almost immediately assumed a more healthy aspect.

After the removal of the sick, the ship was disburthened of her stores, ballast, &c. cleansed and white-washed throughout. Still new cases occurred on board for nearly two months. Some days two, three or four, were sent off to the hospital, which would seem to indicate the retention of some portion of this noxious principle, which was lodged beyond the reach of the cleansing process. Not one out of about a hundred who were sent to the hospital died.

From the apprehensions of the inhabitants that the disease was communicable, intercourse between the vessel and the hospital was as much barred as possible: still communication was not to be altogether avoided, and nurses, &c. were, from necessity, constantly with the sick. Clothing, &c. was carried from the ship to the hospital; and, in short, had it been contagious, the intercourse was sufficient, in all probability, to communicate it to some one; yet no one felt its influence.

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## ARTICLE II.

*A* BRIEF ACCOUNT *of the* SITUATION *and* DISEASES *of* CAMPEACHY-TOWN, *on the* ISTHMUS *of* DARIEN; *shewing the Efficacy of Calcareous Earth (Carbonate of Lime), in overcoming the Exciting Cause of Fevers: From a Communication of Mr.* RICHARD V. W. THORNE *to Dr.* MITCHILL, *dated Campeachy, Jan.* 16, 1799.

CAMPEACHY, a sea-port town of the Province of Yucatan, in New-Spain, North-America, is situated on the western coast of the bay of the same name, somewhere about 19 deg. 45 min. north lat. and 16 deg. 11 min. east long. from Philadelphia. It is a port of considerable trade, more especially in logwood, of which article immense quantities are shipped from it.

Lime-ftone abounds here, and in the country round; and large quantities of lime are exported from this place for the market of La Vera Cruz.--The foil, in the neighbourhood of the city, is chiefly of a fandy loam, appearing to be fertile, and well adapted for cultivation. The city, however, is itfelf built on a bed or rock of lime-ftone, excepting a fmall portion of the fouth part. It extends from fouth-weft to north-eaft, being in circumference about two miles; and is furrounded by a ftone wall (the greater part of which is lime-ftone), in height upwards of ten feet. Owing to this, as well as to the city's lying behind a confiderable mountain, the atmofphere undergoes but little change from ventilation; and its inhabitants, who are eftimated to be about ten thoufand or upwards, fuffer all the inconveniences of a fultry and confined air. The trade-winds, alfo, paffing over the parched Province of Yucatan, lofe, at leaft, all the falubrity and refrefhing qualities on the way, if they do not imbibe others of a poifonous nature: for in the inner parts of the province are large plains of water, which they pafs over, and which are, no doubt, ftored with putrefying materials enough to engender no fmall portion of the peftilence that renders New-Spain unhealthy. The harbour of Campeachy is extenfive, but fhallow. The flats that run off, to the north and to the fouth, do not, at the diftance of above twenty miles, exceed in depth two or three fathoms; and the tides here, rifing and falling about two or three feet, neceffarily leave bare an extenfive tract of mud, fronting the city, expofed to the influence of a vertical fun.

The houfes are large and airy, built principally of ftone, a confiderable part of which is of a calcareous nature. White-wafhing is ufed inftead of paint.—The ftreets are wide and clean, and are paved by the rock on which the city ftands, except the back part of it, where the rock does not extend. There the ftreets are very muddy and filthy, owing to the immenfe quantities of rain that fall not being able to run off, and forming ftagnant ponds and mud-holes: but that part of the city under which lime-ftone extends is clean, and the air fmells fweet.

Fronting the large gates, which are oppofite to the centre of the city, is a dock (or, as it is called, a mole), which runs from thefe gates into the water about one hundred yards. The veffels that come to this dock are about from ten to fifteen or twenty tons burthen. Great quantities of filth of every kind are thrown off this dock. Large quantities of fish, also, that are brought here to market in small boats, and often spoil, add to the collection; so that, when the tide falls, it frequently leaves the mole nearly dry. This filth, then, with a considerable space of mud, is left exposed to the rays of the sun. After the sun has had its influence on the mud for some time, the stench that is emitted is intolerable, so much so, that a person who has not been used to it can with difficulty bear it.

Notwithstanding the large quantities of putrid matter that are exposed in the front of the city, and filth that collects in certain parts of the town, the inhabitants are very healthy; so much so, that it is an uncommon thing to hear of their being affected with the most trivial complaints. There is only one physician of note in this place, and his practice is so inconsiderable that he devotes much of his time to other business: he is even concerned in the French privateers which cruize from that port, which I take to be a lucrative connection.

The question naturally suggests itself, Why does not the yellow fever (as it is generally termed) rage here? La Vera Cruz, which is nearly in the same latitude, and but a few hundred miles from Campeachy, is sorely afflicted with endemic diseases. As to the disagreeable situations of the two places, they are nearly the same. The city of La Vera Cruz abounds in filth—Campeachy, on a general scale, does no less. The manner of living, among the inhabitants of the two places, is pretty much the same; dissipation being wanting on neither side. How, then, happens it that La Vera Cruz is so afflicted with diseases, whilst Campeachy is healthy? Campeachy abounds in lime-stone—La Vera Cruz has none, except the small quantities that are procured out of the keys, and that brought from other places. May it not, then, be owing to the powerful antiseptic quality which this lime possesses, neutralizing the acid of contagion whenever they come in contact; and, by this mean, rendering Campeachy healthy? The town of New-Providence, in the Bahamas, furnishes another striking proof of the good effects of lime-stone underlaying a city. I am warranted in saying, that this place is principally built on lime-stone; and, notwithstanding the filthiness of the place, the inhabitants enjoy good health.

From the information I have been able to collect, I find that lime-stone prevails more generally in these latitudes than almost any other stone; and, I believe, in greater quantities than in colder latitudes; from which it appears, that Providence has intended ſomething more by them than the mere ordinary uſe of building, &c. and, at the ſame time that they are uſed for theſe purpoſes, they ſtill ſhall poſſeſs that property of rendering the air that ſurrounds them ſweet, and fit for reſpiration.

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## ARTICLE III.

### OBSERVATIONS *on the* YELLOW FEVER. *By Dr.* FELIX PASCALIS, *of Philadelphia.*

*To the* Editors *of the* Medical Repoſitory.

*Philadelphia, Feb.* 1, 1800.

GENTLEMEN,

IN two former letters, directed to Profeſſor Mitchill, I had included obſervations, for the Medical Repoſitory, on various topics relative to the yellow fever. I promiſed, likewiſe, to complete, in a ſubſequent letter, my yearly tribute to your publication. This I am now happy to preſent to you, with new arguments on what I call the *ſedative* power of thoſe ſeptic or deleterious gaſes which breed malignant and peſtilential fevers. I ſubjoin, alſo, a little controverſy on the method of ſalivating patients in that diſeaſe, and on the nature of the contagious power which may be attributed to it.

*Sect.* 1. When I *firſt* ſuſpected that no ſpecific poiſon was received in the body, to produce the yellow or any other malignant fever, and that the only *negative* effect, but the moſt terrible, of ſeptic gaſes, was that of deſtroying animal *irritability*, I ought to have explained what is meant by that *ſedative* power, in oppoſition to thoſe modern ſyſtems which entirely explode the very meaning of any ſedative operation in animal life. I ſhould alſo have pointed out, by analogy, that there are caſes of diſeaſes, in which ſimilar ſymptoms to thoſe of peſtilential fevers are induced by gaſes internally formed.—Laſtly, if any ſerious objection againſt the truth of ſuch doctrine could be apprehended, it muſt be immediately diſcuſſed and anſwered.

1. If medical ſcience had not been diſtracted by too many ſyſtems, it would not be neceſſary inceſſantly to explain the words we are obliged to make uſe of, in any progreſſive view of the phenomena of life. In more than one inſtance, indeed, truth remains involved in doubts, or muſt be abſolutely rejected, by the ſole effect on the mind of *unexplained* words, which become the ſignals of party ſyſtems.—"There is no ſuch thing as a ſedative in nature," ſay the Brunonians; becauſe, when excitability is diminiſhed, in inverſe ratio excitement is accumulated; and if either excitement or excitability were ever conceived to ceaſe, death would be the neceſſary conſequence: therefore, a *ſedative* operation on the living body implies contradiction; for if it diminiſhes excitability, it increaſes excitement—or, if it deſtroys it, it cauſes death!

We ſmile at ſuch reaſonings, becauſe they appear, in medical ſciences, like the *modes* and abſtracts of entities *(chymeræ bombilantes in vacuo)* which conſtitute the philoſophy of the Peripatetics.—We can conceive what are the exciting powers and excitement of the Brunonians, although they imply a confuſed compound of cauſes and effects; but we do not know what is meant by their *excitability*. Dr. Brown himſelf declares, "*that ſuch ſlippery queſtions muſt be carefully avoided, as being incomprehenſible, and as having proved a venomous ſnake to philoſophy*:" § xvii. ch 3. yet it is on ſuch a ground that an immenſe theory of human diſeaſes has been laid; and it is from ſuch doctrine that inſtitutes of medicine are held, taught, and adopted, as modern improvements!!!

But let us admit the theory in its *genuine* meaning; then *excitability* muſt be ſaid to be a certain energy or faculty, through which the whole *organized* ſyſtem is to be affected by *exciting powers*: it is, therefore, a certain quality or attribute of living matter; and, in other words, excitability muſt be the reſult of *organization*.*

Let us go farther.—What is meant by *excitement?* This is the operation of all the *exciting powers* on life, on ſenſes,

* As the functions, in every inſtance, depend on the mechaniſm or ſtructure of the organs (for they are invariably affected by every cauſe that affects this), it is a neceſſary conſequence, that life is not a principle ſuperadded to organization, but the effect of it: therefore we may ſafely regard the terms life, vitality, vital principle, living principle, excitability, as ſynonimous, and expreſſing a condition of the organs only.

[John Aitkin's Principles of Anat. and Phyſiol. vol. ii. p. 119.

The ſame doctrine has been recently more fully explained, in the book of Dr. Ontyd, on the Different Cauſes of Death.

and on each organ; fo that *life* begins with an exciting power which produces it—*fenfes* continue to be acted upon by various exciting powers for the fupport of life—and *organs* are various mechanical refults of the phenomenon of life, produced and fupported by exciting powers. In few words, confequently, we muft conclude, that *exciting powers*, or excitement, conftitute *organization*, and that *excitability* is the attribute of *organization.*

We begin now to underftand, that between excitement and excitability there is an intermediate ftate, which is the effect of one and the caufe of the other; and we may fafely fufpect that there cannot be fuch immediate correfpondence between excitement and excitability, that the rife of the one fhould neceffarily conftitute the fall of the other, and *vice verfa.*

Indeed, although exciting powers produce and fupport life, they may have an innumerable feries of degrees in their action, to conftitute good or bad *organization*; and when bodies exift with their ftrength and *organical* perfection, or with their weaknefs and malconformations, it remains impoffible further to lay down any rule of proportion between the excitement and *organized* life. While we might, in fact, defcribe the former within certain accurate bounds, the latter (that is to fay, organization) remains various, *ad infinitum*, even among healthy people, who enjoy different forts of conftitution, and whofe faculties, either of the body or of the mind, are never of the fame degree of perfection: yet every one of them has his own excitability, or *irritability*, which is the neceffary attribute of organization; but inftead of being in exact correfpondence with excitement, or exciting powers, that excitability will more certainly receive its vigour or weaknefs from the animated matter, or from organization, of which it is a mere quality. Now, the latter, in its perfect or in its difturbed ftate, offers to us another moft ftrange phenomenon, which further removes the poffibility of reducing the knowledge of excitability into tables and degrees: it is, that when it appears fhattered and almoft deftroyed, excitability is often the more accumulated, and *vice verfa.*

The theory which explains life and difeafes by the action of *exciting powers*, in certain and due proportion, and of the excitability in its accumulated or impaired ftate, is therefore falfe in its foundation. Organization is intermediate between excitement and excitability, which prevents them from being in direct correfpondence; and it cannot be faid that the lofs or accumulation of the one has any effect on the other, unleſs organization has been affected; and the alteration of this is as much ſurprizing and incalculable, in the terrible effect of a luxation of the head on the vertebral column, as it ſeems unalterable in caſes of the greateſt perturbations, loſs of ſubſtances and leſions of viſcera.

I have been led, gentlemen, to this explanation, to prove how gratuitous is the aſſertion of the Brunonians, and others who explode the idea of any *ſedative operation* in human life, becauſe it was for them neceſſary, on the ground of conſiſtency, to reject it, on account of the mechanical correſpondence they have eſtabliſhed between excitement and excitability, ſo that the riſe of the one is always the depreſſion and abatement of the other, and *vice verſa.*

This *excitability*, which, by analogy with the moſt ancient and approved doctrines, I will deſignate by the name of *irritability*, is the very attribute of organized matter, which experience demonſtrates to be liable to a kind of depreſſion, or ſedative operation. What conſtitutes that irritability? Is it a heat which may be abſorbed? an inſenſible motion which has been diminiſhed? a poroſity that could be contracted? Is it a ſituation or arrangement of parts expoſed to be inverted? Is it a collection of inhalent organs inceſſantly to be kept in activity? Theſe *hypotheſes* I do not pretend to fix and determine; but the probability of the exiſtence of any of them ſhews that irritability may be increaſed by external and internal cauſes, as well as it may be fatally depreſſed and deſtroyed; and this reſult has been proved by philoſophical experiments, as I mentioned in my laſt letter. Certain gaſes are now thought, by all chemiſts, to be deſtructive of life, and deleterious to all living bodies. That they are ſo, by deſtroying animal irritability, I will never take much trouble to prove *a priori*,* ſince the learned are in poſſeſſion of

* The doctrine of the French chemiſts, on the operation of deleterious gaſes on animated matter, is known; and, by their experiments, Fourcroy and Spallanzani leave ſome authority for the belief of their ſedative effects. Dr. Ontyd, whom I have already mentioned, takes ſome trouble to prove that they operate by their *ſtimulating powers;* but to me his arguments appear very inconcluſive. Among the modern medical theoriſts it is pretty much cuſtomary to term *ſtimulus*, or *ſtimulating power*, any kind of operation or impreſſion received by living bodies. They tell us, it is true, that various and many *ſtimuli* differ only in degrees. Dr. Brown had firſt introduced that mode of reaſoning, when he ſaid that cold was nothing but an inferior degree of heat, as *caloric* could never be perfectly exhauſted; and ſo he went on to claſs heat and cold among his *ſtimulating powers!!* When queſtions of this kind reſt merely on the ingenuity of their ſupporters, it is better to refrain from diſcuſſion, and continue to believe that oppoſite cauſes

so many ſtriking proofs of ſuch phenomena. I only add, that when the great attribute of living matter is no more, or when it is much impaired, fluids will no more circulate, and will be inſtantly ſubject to putrid fermentation, which conſtitutes all malignant and peſtilential fevers.—I will now prove the ſame reſult, by analogy with diſeaſes produced by a ſimilar loſs of animal irritability.

2. To point out ſome of the ſedative effects of deleterious gaſes on animal irritability, I need but to mention intermitting fevers, which, in all their various ſhapes, uniformly preſent the following facts:—1. They are endemic in low and marſhy grounds, at any time of the year, in warm climates—and, at leaſt, during the fall in others; that is to ſay, when and where the ſoil is thickly covered with vegetable ſubſtances reduced to putrefaction. 2. In thoſe fevers no ſpecific poiſon or contagious matter has ever appeared to conſtitute their cauſe, nor to be the means of their prevalence. 3. In their periodical paroxyſms no other diagnoſis can be formed, but that of the periodical return of a certain degree of debility, which is equal to an exhauſted animal irritability. 4. Making due exceptions of ſuch caſes of intermitting fever in which the conſtitution has been impaired, and chronic affections formed, by their repeated exacerbations, we ſee that they generally yield to the removal from the place where they prevail, to the ſucceſſion of ſeaſons, or to the internal uſe of powerful tonics and active ſtimulants.—If, now, we reſume all theſe true and well aſcertained characters, uniformly belonging to all the endemic intermitting fevers, do we not clearly perceive in them all the proofs of the formation of deleterious effluvia—of their action on the ſyſtem by inducing debility, or operating ſedatively, until irritability can be reſtored to its proper ſtandard, by natural or by artificial means? It would be here very intereſting to diſcuſs, how animated fibrous matter, and all the organized fabric of living bodies, is *convulſed*, as ſoon as irritability is impaired, and, no doubt, we would eaſily prove that a febrile exacerbation is nothing but the re-action produced on blood-veſſels by the convulſive

ſhould always produce oppoſite effects; ſuch are heat and cold, light and darkneſs, motion and reſt, &c. We, therefore, can ſafely conclude, that as there are certain principles or ſubſtances neceſſary or favourable to the action of life, there are others unfit, inimical and contrary to it. Their ſudden and fatal operation is a proof, that, inſtead of ſtimulating, they are abſolute *deſtroyers* of all the powers of life, and theſe we call *ſedatives*.

ſtate of the fibrous matter:* therefore, remedies which, by a ſtimulating power, may reſtore animal irritability, will, of courſe, put an end to the convulſive action, and prove the cure of intermitting fevers. This explains thoſe ſurpriſing, and often unexpected cures of ſuch diſeaſes, obtained by ſtrange applications, while they baffled medical ſkill. The variety of conſtitutions authorizes us to believe, that every one is not equally acted upon by the ſame known remedies, and that, among theſe, there are but few to be depended on as true reſtorers of animal irritability.

The tribe of malignant fevers offers none that cannot be traced to the action of deleterious gaſes. Thus we claſs thoſe fevers under the names of camp, jail, hoſpital, and ſhip fevers, beſides thoſe which are particularly deſcribed as peſtilential. Each of them, in fact, is known to originate from corrupt and dangerous effluvia, unfit for reſpiration and life, and deſtructive of animal irritability. Such effects, which we are obliged to aſcribe to *external* cauſes, muſt conſequently be attended to, when they are produced by *internal* ones: for let us admit that a ſufficient quantity of putreſcible matter is cauſed to ferment in the body, and it will, of courſe, emit deleterious gaſes, deſtroy animal irritability, and conſtitute a malignant or peſtilential fever. This aſſertion I may prove, gentlemen, by comparing with the yellow fever the child-bed fever, that aſtoniſhing diſeaſe, which, without any ſpecific contagion, has been obſerved to rage like an epidemic in the two principal towns of Europe.

The child-bed fever, called by the French *prima menſis*, had been anciently known, but variouſly underſtood. Its epidemic prevalence, in the Weſtminſter Lying-in Hoſpital, in the year 1769, and in the Hotel-Dieu of Paris, at different periods, but chiefly in the year 1774, called all the attention of eminent phyſicians, of the French and Engliſh faculties, to aſcertain the nature and the treatment of that formidable ſcourge. It will be proper to recollect here ſome of the obſervations written on that ſubject by Dr. Leak, phyſician to the Weſtminſter Lying-in Hoſpital, and contained in the report

* Convulſion or contraction of muſcular fibres is nearly the ſame; and when they take place, it is evident that *irritability* is loſt or impaired. Living fibres contract as ſoon as they are divided or *diſorganized*. In convulſive paroxyſms there is conſequently a ſtruggle between parts contracted and parts violently re-acting by theſe unnatural actions: fluids are immediately deprived of a free and eaſy circulation; they are carried tumultuouſly in ſome veſſels, *in inverſe ratio* of the contraction of other parts. This diſordered ſtate, I believe, conſtitutes fever.

ordered by and read before the faculty of medicine of Paris, ſitting in the Louvre, 6th September, 1782. It appears that, in the firſt outſet of the diſeaſe, the ſymptoms are abſolutely like thoſe of the yellow fever—ſuch as a violent inflammatory diatheſis of the blood, prodigious vomitings of bile, great pains in the loins and limbs, and ſtupefaction of mental faculties. Soon after a proſtration takes place—the tongue becomes thickly cruſted, and of a black, brown, or yellow colour—and the pulſe ſinks in a great depreſſion. It is, however, more peculiar to the child-bed fever, that its laſt ſtage is marked by a fœtid, black, and colliquative diarrhœa, which terminates it fatally; whilſt, in the yellow fever, this ſymptom, which is frequently obſerved, is oftener replaced by the black vomiting. Dr. Leak mentions ſeveral caſes of jaundice; and we muſt be ſatisfied, that in this diſeaſe, as well as in the yellow fever, the ſkin is covered, in many inſtances, with purple and black ſpots. In point of malignancy, and the ravages of gangrene in the alimentary canal, diſſection has offered the greateſt ſimilarity between this and yellow fever. The only difference in the former is, that a conſiderable effuſion of corrupted milk, reſembling whey, is effected in the pelvis, and that the omentum is moſtly ſuppurated: but the uterus, in the child-bed fever, is univerſally found in a ſound ſtate. From this circumſtance it has been juſtly inferred, in London as well as in Paris, that in no caſe whatever could this diſorder be aſcribed to parturition. When it prevailed, no other deſcription of people but women, four, five, and eight days after delivery, were ſubject to this, nor to any kind of fever. Thus it was impoſſible to trace the child-bed fever to any ſpecific contagion, or to any external ſource of deleterious gaſes. Its violence in the Hotel Dieu of Paris, where ſo many unfortunate or abandoned women are obliged to reſort, had ſo long baffled the humane and vigilant aſſiſtance of eminent phyſicians, that any effectual mode of cure was entirely deſpaired of, when Dr. Doulcet, of the faculty of Paris, happily found out, that a doſe of fifteen grains of ipecacuanha, adminiſtered every day, proved a real and powerful ſpecific remedy: all patients recovered. Dr. Leak himſelf tried and approved the remedy. It was conſequently evident, that a ſtimulating operation being kept up in the alimentary viſcera, an *artificial* irritability, as it were, was happily effected, to counteract any ſedative impreſſion whatever which might deſtroy it. But, it may be aſked, was there any particular focus of putrefaction in the inteſtines, in the uterus, or in the lacteal veffels? If fo, what did determine it? for fuch a diforder very feldom occurs in private practice. For my part, gentlemen, I conceive, that a very obvious caufe in lying-in hofpitals will induce debility, and, with it, expofe to putrefaction all fluids in the maternal bowels. This is a moral caufe: it is the painful fituation of young mothers, who have the difgrace of being in a lying-in hofpital, objects of medical obfervation to fome, of contempt to others, of charity to all. However profligate they have been, or ftrangers to the delicacy of their fex, can they remain unfeeling creatures in the bed of forrow, where they become mothers, and are to lofe immediately all the fweets of that ftate, even the knowledge and poffeffion of their innocent and unfortunate offspring? I afk the philofopher and phyfiologift, whether they can conceive a more powerful moral caufe acting as a fedative on animal irritability, and diffufing in the fyftem the deadly torpor which conftitutes a malignant fever? It amounts to the fame deplorable effects, whether animal irritability is overcome, in one difeafe, by the forrowful ftate of the mind, or by floating deleterious gafes, in others, as in the yellow fever.

3. There is, I believe but one objection to this hypothefis which requires to be difcuffed: this is, that nobody would be expofed to the dangerous effects of feptic gafes, unlefs they were actually immerfed in, or expofed to, a contaminated atmofphere; and that, confequently, no cafe of yellow fever fhould occur among perfons who remove themfelves from the feat of the epidemic, after a certain period of time. Yet many fuch cafes have occurred. They have been fo remarkable, that they have caufed many phyficians to adopt the opinion of a fpecific contagion being poffibly retained after a certain fpace of time. Here we muft previoufly obferve, that if a few fporadic cafes, in any part of the country, were to be traced to a fpecific contagion, we might as well afk why there are fo few of thofe cafes, and why all the fugitives who had been immerfed in the contaminated atmofphere are not infected with it? for it is a well known fact, that the inhabitants fucceffively defert the place, after the epidemic has proved its prevalence by a great number of victims: therefore they were all once expofed to that floating contagion which is thought to be fo powerful as to remain unaltered during a long fpace of time. It cannot be conceived that few only would receive it. The greater number, on the contrary, who were witneffes of fo many deaths within our city, although fugitives, would carry with them

the fatal and indelible poifon. This is not the cafe. We are happy to know that there is at leaft fafety in defertion. We do not fee, therefore, any conclufive argument in the alleged facts of a few people being taken with the yellow fever, fometimes fhortly after their removal from the feat of the epidemic. From thefe we only derive new proofs, that, during the heat of the fummer, there may be local fources of putrefaction in many parts of the country, emitting and diffufing ftreams of deleterious gafes, which, eventually, may be fatal to one or a few individuals. It is alfo more than probable, that, in the general revolution of the atmofphere, currents of feptic gafes may flow, without mixture or alteration, from one fpace into a diftant one.

Admitting, however, what is probably true, that an attack of yellow fever may take place in a few or many days after having been expofed to the deleterious atmofphere, it would by no means deftroy the truth of the aforefaid theory of the fedative effects of thofe gafes on animal irritability. That attribute of living matter, we have fufficiently fhewn, is the direct refult of organization; and, however impaired it may be, it muft take fome time before the ultimate refults of its alteration produce convulfion or fever, corruption of fluids, or malignant fever. When irritability is loft by the effect of a paralytic ftroke in a limb, or in other parts, we fee that it requires fome time before it is reftored, even after the caufe of palfy is removed; for irritability is progreffive as well as organization, which is its immediate caufe. For the fame reafon, when a fedative power deftroys irritability, there muft be a certain period of time before its alteration has materially injured the laws of animal life. We do not know what can be that neceffary period of time. It probably runs according to the intenfity of the impure gafes, and of the conftitution of individuals. Some facts, however, feem to prove, at leaft, that there muft be a certain interval of time between the action of the air and the breaking out of the yellow fever. During the late epidemic, we obferved, that the greater the heat was after rain, the greater was the number of the fick, but progreffively, during ten or fifteen days. We obferved, likewife, that fome days previous to an attack of the fever, many people will complain of head-ach and difordered bowels; others will have convulfions, &c. Finally, we know, that at the clofe of the feafon, and even one or two months after froft has begun to appear, when very little effluvium can be exhaled, a number of genuine cafes of yellow fever will occur; and theſe have been aſcertained, in December, 1798, and in January, 1800, in the city of Philadelphia. Theſe collected facts, gentlemen, give the beſt preſumptive proof, that a period of time muſt ſomehow precede the attack of a malignant fever, after the impreſſion received from ſeptic gaſes; and this muſt be the reaſon why few of our exiled fellow citizens have been its victims, after they had removed from the ſeat of the epidemic.

*(To be continued.)*

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## Erratum.

In Dr. Paſcalis' former eſſay on yellow fever, vol. iii. p. 349, line 38, for "rapid circulation," read *depreſſed circulation.*

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## ARTICLE IV.

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## EXPERIMENTS *on the* PRODUCTION *of* AIR *by the* FREEZING *of* WATER.

*By* JOSEPH PRIESTLEY, LL. D. F. R. S. *&c. &c.*

IN 1793, when I was in England, I publiſhed a courſe of experiments on the *generation of air from water*; and, after my arrival in this country, I reſumed the experiments, and publiſhed a *ſequel* to them. The reſult of the whole was, that, after all air had been extracted from any quantity of water, either by heating, or by taking off the preſſure of the atmoſphere, whenever any portion of it was converted into vapour, a bubble of permanent air was formed, and this was always phlogiſticated. The proceſs with the Torricellian vacuum I continued ſome years, and found the production of air equable to the laſt. The neceſſary inference from this experiment is, either that water is convertible into phlogiſticated air, or that it contains more of this air intimately combined with it than can be extracted by theſe proceſſes in any reaſonable time.

Finding that no air is contained in *ice* that is free from viſible bubbles, I thought to aſcertain the truth of one or other of theſe hypotheſes, by expoſing to froſt a quantity of water.

from which I had, by repeated proceſſes with the Torricellian vacuum, expelled all the air that I poſſibly could, thinking that, if it really contained no air, it would appear by the ice being perfectly ſolid; ſo that, when it was melted, no air could be got from it. This experiment I repeated ſeveral times, but always found that the outſide of this ice was perfectly tranſparent, and free from air. The central parts were opaque; and though there were no diſtinct air-bubbles in it, yet, when it was melted, a great number of bubbles iſſued from it. The whole quantity, however, was not greater than might have been pr cured from the ſame water, in the other proceſſes, in a reaſonable time: wherever ice was thawed the production of air had no limit.

Diſappointed in my expectations of getting, by this means, ice perfectly free from air (which, when a large quantity of wa er freezes very ſlowly, it is eaſy to do, the air contained in it retiring from that which is frozen to that which remains fluid), I diſſolved ice that was perfectly tranſparent, and, therefore, free from air, in veſſels containing mercury, and expoſed it to froſt a ſecond time: but I always found, that when the whole of it was frozen, though the extreme parts were tranſparent, and, therefore, free from air, the central parts were opaque, and, when diſſolved, yielded air. And though I repeated this proceſs ten or a dozen times with the ſame water, always letting out the air that was procured by freezing preſently after it was extricated, and before it could have been re-abſorbed, I never failed to get more air; and the harder the froſt was, the more air I procured.

As there is an evaporation from ice, no leſs than from water, the interſtices formed by the cryſtallization of the water, when it is converted into ice, will ſoon be filled with *vapour*; and this vapour, like that which is formed by heat, becomes, I ſuppoſe, the baſis of a quantity of air. Since, however, ice that is the moſt tranſparent ſwims in water, this alſo muſt have interſtices; but they contain no air, being ſuch as always exiſt in the moſt ſolid bodies, in which (gold itſelf not excepted) the component particles are not in perfect contact; ſince they are reduced into leſs dimenſions by cold.

As the veſſels I made uſe of in theſe experiments were either cylindrical jars or conical wine-glaſſes, and, conſequently, the bubbles of air produced by freezing were expoſed to a conſiderable ſurface of water, and would, in time (though I found not in the courſe of a day) have been abſorbed by the water, now free from air, I procured glaſs veſſels of a conical form, terminating in narrow tubes, into which the air diſlodged from the ice might aſcend, and not be ſubject to be abſorbed. I was ſo fortunate as to have ſeveral of ſuch veſſels, and they completely anſwered my purpoſe for five or ſix proceſſes. Theſe veſſels were firſt filled with mercury, and then I introduced into them a quantity of water freed from air by previous freezing; and when, after expoſure to froſt, the ice was melted, the air diſlodged from the ice aſcended into the narrow tubes, and remained, without any ſenſible diminution of bulk, ſeveral days; and every time that the water was expoſed to froſt, an addition was made to it. At length, however, though the veſſels were very ſtrong, and contained much mercury, which, by its tendency to deſcend, would give the water room to expand with the leſs danger of breaking the veſſel, none of them ſerved for more than the number of proceſſes above-mentioned.

After the breaking of my glaſs veſſels, I got other cylindrical ones made of iron, ſeven or eight inches in height, and near three inches wide at the bottom, the upper orifice cloſed with a cork and cement, in the centre of which was a glaſs tube, the diameter of which was about a fifth of an inch. And, as the glaſs tube was in the greateſt danger of breaking by the freezing of the water, and this had happened ſeveral times before, notwithſtanding all my care to guard it from the froſt, I now made uſe of ſnow and ſalt, to freeze the water in the iron veſſel only, placed in a veſſel of mercury, having been previouſly filled as the glaſs veſſels had been.

The water on which I now operated was about three ounces, and it had been made as free as poſſible from air by previous freezing. With this apparatus I repeated the proceſs of freezing nine times, without changing the water, and the laſt portion of air that I procured in this manner was as great as in any of the preceding; ſo that there remained no reaſonable doubt, but that air might be produced from the ſame water, in this manner, *ad libitum*; and having got near two inches of air in the glaſs tube, I put an end to the experiment; and, examining the air, found it to be wholly phlogiſticated, not being affected by nitrous air, and having nothing inflammable in it.

During the proceſs of freezing, the air in the tube was generally compreſſed into about one fifth of its uſual bulk; but when I began to thaw the ice, which I did by means of hot water in the place of the freezing mixture, it ſoon expanded to its former dimenſions, and no ſenſible portion of it was aſorbbed during the whole procefs, which was about a week. Sometimes the violence of the preffure, occafioned by the expanfion of the water in freezing, would force a little water out of the veffel, between the cork and the glafs tube, or the iron veffel, which prefently became ice. This I always carefully removed, and applied frefh cement to the place, to prevent the introduction of any air from without, before I began to melt the ice. And that no external air had entered was evident, both from the manner in which the air was produced as the water recovered its fluidity, and from the quality of it, when examined, after the procefs.

In the courfe of the experiments with the glafs veffels, a phenomenon occurred that was wholly unexpected by me, and which was very amufing. Having left the veffels filled, partly with water and partly with mercury, in the evening, I generally found them, in the morning, feemingly quite full of mercury, every part of the ice within the veffel being covered with it. This muft have been occafioned by a vacuum having been formed between the glafs and the ice, and into this the mercury had been drawn up on the principle of the capillary tube. When this was not the cafe, the interftices of the ice, towards the centre, were filled with thin laminæ of mercury, which alfo exhibited a curious appearance.

Sometimes, when there was no mercury between the glafs and the ice, an interftice was made between them when they were placed within the influence of the fire. In thefe circumftances I have feen the mercury drawn up to the height of feveral inches. As this fpace was enlarged by the increafe of the heat, the laminæ of mercury were contracted, till, coming into the form of balls, too heavy to be fupported, they fell down to the mafs of mercury in the bafon.

The moft natural inference from thefe experiments is, that *water*, when reduced, by any means, to the ftate of *vapour*, is, in part, converted into phlogifticated air; and that this is one of the methods, provided by nature, for keeping up the equilibrium of this conftituent part of the atmofphere, as the influence of *light on growing vegetables* is the means of recruiting the other part of it; and both of them are fubject to abforption and diminution in feveral natural proceffes. Inflammable air I have alfo fhown to be convertible into phlogifticated air; and this is another means of fupplying the atmofphere with this ingredient in its compofition.

That water contains phlogifton I have fhown to be probable, from feveral confiderations, efpecially that of its reſembling metals in their property of being conductors of electricity; for theſe ſubſtances certainly contain phlogiſton, if there be any ſuch thing. Mercury alſo becomes ſuper-phlogiſticated by agitation in water, and this without limit, and without changing either the water or the mercury; and the remaining water contains no more oxygen than before; for the air expelled from it is not more pure, and it is perfectly free from acidity.

I will further obſerve, that thoſe experiments, which prove the converſion of water into phlogiſticated air, are inconſiſtent with the modern antiphlogiſtic theory, which makes water reſolvable into dephlogiſticated and inflammable air; but that they are highly favourable to the hypotheſis of water being the baſis of every kind of air, the difference between them depending upon the addition of ſome principles which we are not able to aſcertain by weight.

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## ARTICLE V.

### *An* ACCOUNT *of a* HEBREW MANUSCRIPT COPY *of the* JEWISH SCRIPTURES, *now in New-York: In a Letter from Mr.* SOLOMON SIMSON, *the Proprietor, to Dr.* MITCHILL, *dated March* 26, 1800.

SIR,

THE old Manuſcript Bible in my poſſeſſion, of which you have deſired ſome information, was brought from Turkey to England, by a gentleman who left his library to a relation of his in this country, and from the latter my aged father purchaſed it, with ſome other books. It is written in a character ſomething reſembling Roſha, or rather, it is to be preſumed that Roſha borrowed or copied his from it. It is very different from the ſquare character we have in uſe, and is about the ſize of a large octavo, written in two columns, on parchment, or vellum, as fine as ſilk. The ſongs of Moſes, Deborah, and David, are poetical, written with the greateſt uniformity and neatneſs, with black, ſhining ink. It is alſo accompanied with marginal notes, written ſo fine and ſmall that it requires good eyes, or glaffes, to diftinguifh them. The Pfalms appear to be a moft mafterly performance, and the diverfity of the meafure feems pleafingly to ftrike the eye, even of thofe who are unacquainted with the language, and is fuppofed to be the original poetry in which they were written by David, &c. There appears a great play of words and letters —fome of the Pfalms beginning with the alphabet, and in order going through the fame, with many variations. The 119th Pfalm is written in two columns, of four lines each, each eight verfes beginning with the *aleph*, the next eight with the *beth*, and proceeding through the alphabet in that order, which is probably the reafon of its being marked, in our Englifh Bible, with *aleph beth*, &c.

The two firft chapters, and part of the laft, in the book of Job, are written in profe, in two columns. The other part of the book is in fhort Hemiftich verfe, beautifully written, and the whole handfomely pointed. The accents appear to be the fame as in our printed books, except the ten commandments, which are only with fingle accents.

In Jofhua, chap. xxi. between the verfes 35 and 36, two verfes are inferted, with the names of four cities of refuge, of the tribe of Reuben, &c. which are not in our Hebrew or Englifh Bibles: and Everardo Van der Hooght, in his edition, printed in Amfterdam, in 1705, mentions, in his preface, that thefe two verfes are only to be found in three old, corrected munufcript books—but which he fuppofes to be an error.— The order of the books in the manufcript is as follows:

The Law, in five books.

Jofhua, Judges, and Samuel, each in one.

Kings in one, without any divifion.

Ifaiah, Jeremiah, Ezekiel, Hofea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi, Ruth. Pfalms, Job, Proverbs, Ecclefiaftes, Song of Songs, Lamentations, Daniel, Ezra, Nehemiah, Efther, and Chronicles, each in one.

The late Myles Cooper, LL. D. Prefident of King's College, delivered my father, Jofeph Simfon, the following letter, with the book therein mentioned.

"SIR,

"I have been informed by Dr. Cooper, that you benevolently intend to lend me your curious Hebrew M. S. and when you have fo done, I fhall celebrate, in the moft grateful manner, your public ſpirit and generoſity. I will take the utmoſt care of it, and it ſhall be returned, in twelve months, to the perſon in London you appoint to receive it; and for this I will give a note of hand, or (if you require it) a bond of obligation.—You will receive of Dr. Cooper the preſent of a book of mine, in which I have publiſhed your kind intention; and I hope you will accept that book as a mark of the gratitude of, Sir,

" Your highly obliged, and
" Very obedient ſervant,
" B. KENNICOTT.

" *Oxford, March* 4, 1770."

In May following my father received the following note:

" Mr. Cooper's compliments to Mr. Simſon, returns him Dr. Kennicott's letter, which he did not ſend for yeſterday, but only for his own, and hopes that Mr. Simſon's determination on the point in queſtion, viz. the tranſmiſſion of the M. S. to England, is favourable to the grand ſcheme of collation, which the learned gentleman has now in hand.

" *King's College, May* 8, 1770."

The June following the manuſcript was delivered to Dr. Cooper, with the following letter:

" SIR,

" In obedience to my father's commands, which gives me particular pleaſure, I now anſwer your eſteemed letter, by the hands of Mr. Preſident Cooper; and though the M. S. is highly valued, it is cheerfully lent to promote the great work you have undertaken. The Preſident has engaged to return it ſafe in one year. Permit me to mention, that in the book you have favoured my father with, inſtead of his name (Joſeph), mine has been inſerted, which, no doubt, will be rectified. My good father commands his reſpects and beſt wiſhes with mine: that you may be bleſt with health to go through the arduous work you have in hand—that it may be completed with the ſtricteſt regard to truth, to your honour, and the good of mankind.

" I am, with all due reſpect,
" Reverend Sir,
" Your moſt obedient, humble ſervant,
" SAMPSON SIMSON.

" *Rev.* B. KENNICOTT."

In 1772, Dr. Cooper returned the M. S. with the following letter:

"Sir,

"I beg you to accept of my beſt thanks for the uſe of your valuable Hebrew M. S. which I am very glad of returning to you ſo ſafely as by the hands of Dr. Cooper. I ſhall take care publicly to expreſs my gratitude* for this act of your kindneſs.

"And am, Sir,

"Your highly obliged, and

"Obedient ſervant,

"B. KENNICOTT.

"*Oxford, May* 11, 1772."

There does not appear any certainty when this Hebrew M. S. was written. Gentlemen, learned in the Hebrew language, have differed greatly in their opinion—from 700 to 1700 years ago. Some have gone ſo far as to ſuppoſe it to have been written by Ezra the ſcribe: but all agree that it is a valuable as well as a very ancient manuſcript.

I am, Sir,

With due reſpect,

Your moſt humble ſervant,

SOLOMON SIMSON.

* Mr. Simſon's manuſcript is mentioned in the ſecond volume of Kennicott's Bible in folio, of which there is a copy in the library of Columbia College. In the catalogue of the ſeven hundred which he conſulted, this is the 144th, and is diſtinguiſhed by the words, "Americ. Neo-Ebor." It is conjectured, by him, to have been written between the years 1300 and 1400 of the chriſtian era.

E.

# ARTICLE VI.

*An* ANSWER *to Dr.* JOSEPH PRIESTLEY'S ARGUMENTS *against the* ANTIPHLOGISTIC SYSTEM *of* CHEMISTRY, *published in the Medical Repository, and a* VINDICATION *of the* PRINCIPLES *contained in the 72d Essay of the fourth Volume of the American Philosophical Transactions. By* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, &c.*

## No. I.

### *First.* OF THE REVIVAL OF A METALLIC CALX IN INFLAMMABLE AIR.

WHEN the focus of a burning lens is thrown upon a calx of mercury, confined in hydrogenous gas, according to the antiphlogistic theory of chemistry, the oxygen of the calx unites to the hydrogen, and forms water; but, according to Dr. Priestley, the hydrogen enters into the metal, while the oxygen is found mixed with that part of the hydrogenous gas which remains behind.

The Doctor declares, in support of this opinion, that, in several of his experiments, the pure air, expelled by the heat of the lens from the mercurial calx, was found mixed with the remainder of the inflammable air, as appeared by the test of nitrous air, and by some disagreeable explosions which happened in the process.

Having performed the experiment of the revival of red precipitate in hydrogenous gas, twenty times, without having met with an explosion, I concluded that Dr. Priestley's inflammable air must have been mixed with atmospheric air. I was of this opinion, because I never could detect any pure air mixed with the inflammable air, after the revival of a mercurial calx in it, by the test of nitrous air.

Since my answer to the Doctor's two pamphlets, I have frequently repeated these experiments, and with the same results as before.

The focus of a lens was thrown upon red precipitate, confined in sixty-two ounce measures of inflammable air, when fifty-two ounce measures of the air disappeared. One meaſure of the air which remained behind, tried by the teſt of nitrous air, produced no red appearance, and gave no abſorption.

A quantity of the black oxyd of mangaueſe was alſo expoſed to the focus of the lens, in fifty-ſix ounce meaſures of inflammable air, when fifty-four ounce meaſures of the air diſappeared: the remaining air was azotic, and contained no inflammable or pure air, as appeared by applying a lighted taper to it, and by the nitrous teſt.

Similar experiments were made in the preſence of Dr. Seybert, Dr. Jacobs, and Mr. Lee, gentlemen who are perfectly acquainted with the ſubject in diſpute, and who appeared ſatisfied, that pure air, expelled by heat from a mercurial calx confined in inflammable air, is not found in that portion of the air which remains behind.

I muſt, however, acknowledge, that I met with an exploſion in attempting to revive red precipitate in hydrogenous gas, which I expected contained no pure air. The inflammable gas had been obtained by adding the filings of bar-iron to water which had been impregnated with ſulphurated hydrogen gas. Upon throwing the focus of the lens upon one drachm of red precipitate, in eight ounce meaſures of this air, an exploſion *inſtantly* took place. The pure air, in this caſe, could not have been given out by the precipitate, for the mercury was not revived; and, as oxygenated muriatic acid* had been formed by the experiment, I cannot account for the exploſion until we are better acquainted with the action of iron filings in water impregnated with ſulphurated hydrogen gas, and the formation of the oxygenated muriatic acid which is found in the proceſs.

A ſtrong, and, in my opinion, a concluſive argument, in ſupport of the opinion that the oxygen of the metallic calx unites to the hydrogen, and forms water, is, that the diſappearance of the inflammable air is always in ſtrict proportion to the pure air which the calces contain.

I have ſhown that iron abſorbs twice as much oxygen as copper, and that the calx of iron makes twice as much inflammable air diſappear when heated in it by the burning lens; and if a part of the pure air be driven off from the oxyd of manganeſe by heat, and the oxyd be then expoſed to the action of the lens in hydrogenous gas, a very ſmall quantity of the inflammable air will diſappear. One drachm of the oxyd of

* Vide Medical Repoſitory, vol. iii. p. 214.

manganeſe will make twenty-two ounce meaſures of inflammable air vaniſh; but the ſame quantity of manganeſe, expoſed a few hours to a red heat, will make very little of the inflammable air diſappear.

In my firſt anſwer to Dr. Prieſtley, I ſaid the manganeſe was not revived, becauſe no inflammable air could be obtained from it by ſulphuric acid and water. It, however, in ſome caſes, appears to be revived, and is of a green colour, as the regulus of manganeſe is deſcribed by authors.

I have often heated a large proportion of red precipitate in inflammable air, confined by water, which would riſe in the veſſel which contained it until the inflammable air diſappeared, when it would immediately begin to fall from the pure air yielded by the precipitate.

In one of theſe experiments, the whole of the inflammable air having vaniſhed, and the pure air from the precipitate having nothing to unite with, was found, unmixed, over the water, and gave, by the teſt of nitrous air, an abſorption of 160.

If the theory of Dr. Prieſtley was true, that the pure air of the precipitate was diffuſed among the inflammable air, an exploſion would invariably happen, every time that a drachm, or any larger portion of precipitate, was revived in a conſiderable quantity of hydrogenous gas.

If one drachm of red precipitate was revived in ſixty ounce meaſures of inflammable air, it would give out ten ounce meaſures of pure air, which would be mixed with forty-eight ounce meaſures of inflammable air, and which would never fail to cauſe an exploſion.

## *Secondly.* Of the Calcination of a Metal in pure and atmospherical Air.

According to Dr. Prieſtley, when a metal is reduced to a calx, in pure or atmoſpherical air, ſomething which has been called phlogiſton is emitted from the metal, which unites with part of the pure air, and converts it into azotic or phlogiſticated air. He alſo ſays, that the phlogiſton, in ſome caſes, unites with a portion of the pure air, and forms fixed air, and that this fixed air is produced by calcining a metal which contains no charcoal.

In all my experiments upon the calcination of bar and caſt-iron, and copper, in pure and atmoſpherical air, I could not find that the air which remained behind was injured. When the focus of the lens was thrown upon ſixty grains of the filings of copper, filed for the purpoſe, confined in ſixteen ounce meaſures of oxygenous gas, twelve ounce meaſures of the air were abſorbed by the metal, which was reduced to a calx. No fixed or phlogiſticated air was produced, and the remaining air was perfectly pure.

Dr. Prieſtley replies to this experiment, that it is impoſſible to reduce ſixteen ounce meaſures of pure air to four, by calcining a metal in it, and that the remaining four ounce meaſures ſhould be perfectly pure—for to make dephlogiſticated air perfectly pure is hardly poſſible.

The oxygenous gas which was uſed was obtained from lead and the ſulphuric acid, and gave, by the eudiometer, an abſorption of 195 by the nitrous teſt. Oxygenous gas, equally as pure as this, is ſeldom met with. It was ſaid to be perfectly pure, becauſe it was ſuppoſed the whole of it was devoured by the nitrous teſt, and that the remaining five hundred parts of a meaſure conſiſted of the impurity of the nitrous air, which, Dr. Prieſtley acknowledges, is very apt to vary in its quality, and very difficult to obtain pure.

Although the Doctor has ſaid, in the Medical Repoſitory, that it is hardly poſſible to obtain dephlogiſticated air perfectly pure, yet, in his pamphlet entitled "The Doctrine of Phlogiſton eſtabliſhed," ſpeaking of dephlogiſticated and nitrous air as the component parts of nitrous acid, he mentions, that when they form this acid, "they unite without any reſiduum, or ſo ſmall as not to enter into any computation."* (Page 9). If, then, dephlogiſticated air can be obtained to unite with nitrous air, without any reſiduum, the dephlogiſticated air muſt be perfectly pure.

The oxygenous air which I have ſince uſed has been of various degrees of purity, as 180, 178, 169, &c.

The focus of the lens was thrown upon the filings of bar-iron, filed for the purpoſe, confined in fifty-two ounce meaſures of oxygenous gas, which had been well waſhed in lime-water, and was of the purity of 175. Thirty-two ounce meaſures of the air were abſorbed by the metal, which was reduced to a calx. One meaſure of the remaining air, tried in an eudiometer tube over lime-water, gave an abſorption of five hundred parts of fixed air. Another meaſure of the remaining air, firſt waſhed in lime-water, gave, by the nitrous teſt, 170.

* In the Tranſactions of the Royal Society of London, for 1791, p. 215, Dr. Prieſtley alſo ſpeaks of dephlogiſticated air ſo pure as to contain no ſenſible quantity of phlogiſticated air.

Repeating this experiment, by melting the filings of bar-iron in thirteen ounce meaſures of oxygenous gas, of the purity of 140, ſeven ounce meaſures of the air were abſorbed by the metal. The remaining air, after being waſhed in lime-water, was of the purity of 110.

The focus of the lens was thrown upon the filings of copper, in forty-four ounce meaſures of atmoſpherical air, of the purity of 93. Six ounce meaſures of the pure part of the air were abſorbed by the metal. One meaſure of the remaining air, tried in an eudiometer tube over lime-water, gave no abſorption, and, conſequently, contained no fixed air. With an equal meaſure of nitrous air, it gave an abſorption of 15.

In theſe experiments no phlogiſticated air was generated. The fixed air, formed by melting the iron in pure air, was formed by the coal, which all iron of commerce contains, uniting with part of the pure air. The air which remained behind was more impure than at firſt, becauſe a portion of the pureſt part had been abſorbed from it by the metals.

*Thirdly.* OF CARBONIC ACID, OR FIXED AIR.

Dr. Prieſtley, in order to prove that fixed air is produced without charcoal, mentions that this air is procured by heating charcoal of copper in dephlogiſticated air. To this I have replied, that charcoal of copper conſiſts principally of pure charcoal. It is made by paſſing the ſteam of alcohol, which conſiſts of hydrogen and carbon, over red-hot copper: the coal is depoſited on the copper, while the hydrogen is ſet at liberty, in the form of hydrogen gas.

The Doctor ſays, the French chemiſts have given a much better explanation of this experiment than I have done—but our explanation is exactly the ſame. The fixed air is formed by the carbon of the charcoal of copper uniting with the dephlogiſticated air. My opponent has miſunderſtood my meaning in explaining the experiment.

Another argument uſed by Dr. Prieſtley, to prove that fixed air may be made without coal, is, that large quantities of this kind of air may be obtained from heating a mixture of iron filings and red precipitate. He declares the experiment has never failed with him, and I ſay it has never ſucceeded with me.

If large quantities of fixed air can be formed, by heating the filings of pure bar-iron and red precipitate together, then I will pronounce, that fixed air may be made without coal; but I am confident this cannot be done.

From the proceſs which the Doctor has publiſhed, to purify iron filings,* it is evident that thoſe he uſed could not have been very pure, or they would not require to be firſt heated, then waſhed in water, and heated again.

Dr. Prieſtley never mentions whether he uſed the filings of bar or caſt-iron, which is eſſentially neceſſary. The filings of pure bar-iron, filed for the purpoſe, on a clean ſheet of paper, expoſed to heat with red precipitate, will not yield any kind of air; but caſt-iron alone, or mixed with precipitate, will yield both inflammable and fixed air.

One ounce of the borings of cannon, and half an ounce of red precipitate, gave thirty-two ounce meaſures of air, eleven of which were fixed, and twenty-one inflammable. The fixed air proceeded from the pure air of the precipitate uniting with the charcoal of the caſt-iron.

The borings, by analyſis, yielded eighteen grains of charcoal to the ounce.

In my opinion, the proofs that fixed air is compoſed of oxygen and carbon, are as ſtrong as that Glauber's ſalt is compoſed of ſulphuric acid and ſoda; for we are not only able to compoſe this gas at pleaſure, but to ſeparate it into its elementary parts.

Mr. Tennant, Dr. Black, and other chemiſts, have decompoſed the carbonic acid, by heating phoſphorus and powdered lime-ſtone. I have performed the ſame experiment with ſucceſs. Forty grains of phoſphorus, cut into very ſmall pieces, were mixed with powdered lime-ſtone, and introduced into a glaſs tube, coated with dung and clay. Upon expoſing the tube half an hour to a red heat, and breaking it when cold, the coal was found mixed with phoſphate of lime. The phoſphorus united with the oxygen of the carbonic acid of the lime-ſtone, and formed phoſphoric acid, which joined with the lime, and made phoſphate of lime. The coal of the carbonic acid was depoſited among the phoſphate of lime.

If fixed air is compoſed of inflammable and dephlogiſticated air,† why is it not obtained by exploding pure air, and the inflammable air from malleable iron?

Speaking on this ſubject, Dr. Prieſtley ſays, "when the inflammable air was from the turnings of caſt-iron, there was a conſiderable quantity of fixed air produced; whereas there

* Medical Repoſitory, vol. ii. p. 267, firſt edition.

† "We ſay that fixed air conſiſts of inflammable and dephlogiſticated air." Vide Doctrine of Phlogiſton eſtabliſhed, p. 61.

was either no fixed air at all, or the ſlighteſt appearance of it imaginable, when I made uſe of inflammable air from malleable iron."*

The reaſon that the inflammable air, from the turnings of caſt-iron, yields fixed air, when fired with dephlogiſticated air, is, that it holds coal in ſolution, which unites with the pure air to form the fixed air, and no fixed air is obtained from the inflammable air from malleable iron, becauſe it contains but a very minute portion of coal. If fixed air can be formed by exploding only one kind of inflammable air with pure air, there muſt be ſome foreign ſubſtance in the inflammable air; and what can this be if it is not coal? for bar and caſt-iron differ from each other only in the quantity of coal they contain—an ounce of bar-iron yielding but half a grain of coal, and the ſame quantity of caſt-iron, as I have ſaid before, eighteen grains.

The Doctor ſays, when any ſubſtance, known to contain oxygen, is heated in inflammable air, fixed air is found. (Conſiderations on the Doctrine of Phlogiſton, part firſt, p. 25.) In the ſecond part of the ſame pamphlet (p. 24), he informs us, he ſometimes gets fixed air. In the Medical Repoſitory, vol. ii. p. 164, firſt edit. he mentions that no ſenſible quantity of fixed air is procured in this proceſs. If red precipitate is heated in inflammable air, from malleable iron, the reſult will be uniform; no fixed air will be generated, but it will be invariably made, if the mercurial calx is revived in carbonated inflammable air, from the pure air of the precipitate uniting with the carbon held in ſolution in this gas. If fixed air was compoſed of pure and inflammable air, it ought always to be obtained in this proceſs.

When the focus of a burning lens is thrown upon two drachms of red precipitate, in thirty-two ounce meaſures of inflammable air, from malleable iron, twenty-two ounce meaſures of the air will diſappear; but when three drachms of the ſame precipitate are heated in thirty-ſix ounce meaſures of carbonated inflammable air, from the flowers of zinc and coal, which has been well waſhed in lime-water, but two ounces of the air will vaniſh. In the firſt caſe no fixed air will be obtained, but in the ſecond there will be a great production of this gas.

*Fourthly.* OF FINERY CINDER, *or the* SCALES *of* IRON.

Large quantities of carbonated inflammable air, mixed with a portion of fixed air, are produced by heating finery cinder

* Tranſactions of the Royal Society of London for 1791, p. 221.

and charcoal together, though both may have been previously exposed to ever so high a degree of heat. In considering what takes place in this process, we must call to our aid the decomposition of water, the clue which leads us through all the labyrinths of the antiphlogistic system of chemistry. The carbonated inflammable air is formed by the hydrogen of the water, which is supplied by the finery cinder dissolving part of the coal, while the oxygen of the water and finery cinder, uniting with another part of the coal, make the fixed air.

We are under a necessity of admitting the presence of water in the finery cinder. It cannot be in the coal, where Berthollet, Fourcroy, and other chemists find it; for, in my experiments, the coal had ceased to yield air, and, consequently, could not contain water.

In my first reply to Dr. Priestley, I said the iron was not revived. I find, however, after the finery cinder is exposed to heat with charcoal, it will yield inflammable air when mixed with sulphuric acid and water. The iron, then, must be in a revived state. I was deceived, by supposing that a calx of iron could not be revived in a degree of heat less than that at which it fuses. Cast-iron melts at 130 deg. and my finery cinder was exposed to but 24 deg. of Wedgwood's thermometer.

I consider the arguments of the Doctor, relating to finery cinder and charcoal, as a complete refutation of the doctrine of the French chemists, relating to this subject, though I do not think the new theory is essentially affected by any thing which he has advanced. Part of the weight of the scales of iron is certainly owing to water. The advocates of the antiphlogistic system have overlooked the agency of this fluid in the finery cinder.

If, in future, I find that no more fixed air is obtained from the scales of iron and charcoal than from coal and water, I will agree with my opponent, that they contain but a very small quantity of oxygen, or none at all.

## *Fifthly.* OF THE PRECIPITATION OF ONE METAL BY ANOTHER.

Inflammable air is produced, when zinc is used to precipitate lead from a solution of sugar of lead, or iron from its solution in the muriatic acid. The French chemists appear to be unacquainted with this circumstance, as well as with many other important discoveries made by my illustrious opponent.

Mrs. Fulhame, who has written on the precipitation of metals, was ignorant of the fact.

I have obtained inflammable air,

1ſt, From the filings of zinc, and a ſolution of the ſulphates of iron and copper.

2dly, From the filings of bar and caſt-iron, and the ſulphate of copper.

3dly, From copper, precipitated from blue vitriol by zinc, which was waſhed in water until the water would not precipitate muriated barytes, mixed with the filings of zinc. And,

4thly, From the oxyd of copper, precipitated from blue vitriol by cauſtic pot-aſh, and the filings of zinc and iron.

One ſcruple of the filings of zinc, and eight ounces of a ſaturated ſolution of blue vitriol, in eleven hours yielded no air: a ſecond ſcruple being added, in the ſame ſpace of time no air was obtained: upon adding the third ſcruple, in forty-eight hours one fourth of an ounce meaſure of inflammable air was produced. The precipitated copper weighed forty-five grains. It was not until after the eighth ſcruple was uſed that the air was obtained in any quantity.

Half an ounce of the filings of zinc, and eight ounces of a ſaturated ſolution of green vitriol, gave, in nineteen days, forty ounce meaſures of inflammable air.

One ounce of the filings of zinc, and eight ounces of a ſaturated ſolution of blue vitriol, gave, in ten days, ſixty-four ounce meaſures of inflammable air.

The filings of iron afford but a ſmall quantity of inflammable air, compared to zinc, when mixed with the ſulphate of copper. One ounce of the borings of cannon, and eight ounces of a ſolution of blue vitriol, in four days produced but ſix ounce meaſures of inflammable air. A conſiderable degree of heat is generated in this proceſs.

In theſe experiments, when the precipitant is added in ſmall portions, the operation which takes place is its ſolution without any production of air. The oxygen of the diſſolved metal unites with the precipitant, forming an oxyd, which is immediately diſſolved by the acid. The precipitated metal is in a revived ſtate, from the loſs of its oxygen. When the precipitant has robbed the diſſolved metal of the whole of its oxygen, it decompoſes the water by means of part of the acid to which the diſſolved metal was united. The oxygen of the water, united to the precipitant, converts it into a calx, which is diſſolved by the acid, while the hydrogen of the water is ſet at liberty.

When inflammable air is obtained from copper, precipitated by iron, mixed with the filings of zinc, the zinc robs the precipitated copper of its oxygen; but as there is not a sufficiency of oxygen in the copper to oxyde the zinc completely, it begins to decompose the water. When a solution of the sulphate of copper is precipitated by zinc, the whole of the precipitated metal is not in a revived state—part of it is calcined.

Upon throwing the focus of a burning lens upon some of this precipitated copper in inflammable air, it made four ounce measures of the air disappear.

*Sixthly. Of the* AIR CONTAINED *in the* PORES *of* CHARCOAL, WHICH HAS BEEN EXPOSED *to a* RED HEAT.

Dr. Priestley says, that charcoal contains azotic gas, but I have always found it to be atmospherical air. One measure of the air obtained from coal, by means of water, gave, with the nitrous test, an absorption of 90.

## ARTICLE VII.

## ON THE PHENOMENA, CAUSES, AND TREATMENT OF SEA-SICKNESS.

*By* EDWARD MILLER, *M. D.*

THIS disease affects most persons on their first going to sea. It is of various degree and duration in different instances; frequently slight and transient; sometimes severe, protracted and excruciating. In general, it continues only for the first day or two of a voyage, produces little trouble or confinement, and is attended with no danger. In a few cases it begins at the first moment of embarkation, harrasses the patient with incessant tortures for weeks and months, or, at least, recurs with violence at every return of bad weather, and only releases him from his sufferings at the end of the voyage. It has likewise happened, on some occasions, that the symptoms of sea-sickness have not disappeared even on the arrival of the vessel in port, and the patient's going ashore. And examples have not been wanting of fuch derangement of the fyftem, by the violence and obftinacy of this difeafe, as gradually to induce fever of the worft kind, attended with lofs of all retentive power of the ftomach, and terminating in death.

Sea-ficknefs is more apt to occur in the open fea, where the waves have an extenfive and uninterrupted courfe of motion, than in gulphs, bays, channels and rivers. It is chiefly troublefome when the fea is much agitated by wind. The vibrating motion of a veffel, from ftem to ftern, and from ftern to ftem, which is called *pitching*, or that from one fide to another, called *rolling*, produces the fevereft degrees of giddinefs and ficknefs. Thefe motions are obferved when the veffel is going directly before the wind, or when a calm fuddenly fucceeds a ftorm, and not when the wind blows obliquely, or on the *quarter*, for then the fucculfion which the fhip undergoes is much diminifhed.

In fmall veffels, on which the flighteft movement of the waves makes an impreffion, this diforder is more likely to take place than in very large ones, fuch as fhips of war, or merchantmen of great burden, deeply laden, which, comparatively, undergo little difturbance. It has been alfo obferved, that where habit produces accommodation to the motions of one veffel, removal to another, whether from a larger to a fmaller, or from a fmaller to a larger, will fometimes again awaken the difeafe.

Aged perfons are feldom affected with the difeafe, in comparifon of thofe at the younger and middle periods of life. Thofe of a dark complexion, in general, fuffer lefs than fuch as are fair: and infants are commonly altogether exempted.

As a defcription and an example of the fufferings fometimes endured from this difeafe, the following account is given, by a medical gentleman, of his own cafe, in the voyage of the embaffy from the King of Great-Britain to the Emperor of China. "He felt," he faid, "at firft, a ficknefs in his ftomach, followed by a retching, when he threw up whatever he had taken into it; then green, and afterwards yellow bile; to which fucceeded a thick, mucilaginous, infipid fluid, which he confidered to be the gaftric juice; and, laftly, grumous blood. Before he vomited the laft, he felt a fenfation as if his ftomach were twifting together, and which motion, he fuppofed, produced the hæmorrhage. Had the blood proceeded from the lungs, he judged it would have been fpumous, or mixed with air-bubbles (and florid). He felt conftantly a naufea in his mouth; his falivary glands fwelled, and the faliva became thickened and vitiated. His mind grew indifferent to all things, either paft or future, and even to his exiftence. Regret and hope were equally extinct within his breaft. His head felt light and fore, and as if its futures were feparated from each other. It likewife ached; and he had alternate fenfations of violent heat and chilling cold. He thought he felt the inverfion of the periftaltic motion, and its actual tendency upwards from the inteftines to the mouth. Whatever he fwallowed he returned, with no alteration of it in the ftomach. The bare mention of food, folid or liquid, was loathfome to him."*

## Causes of Sea-Sickness.

Sea-ficknefs† begins with giddinefs and vertigo, which not only demand attention in defcribing the order of the fymptoms, but likewife afford a clue to trace the nature and caufes of the difeafe. This fpecies of vertigo originates from difordered action of the organ of vifion, produced by the inftability and unaccuftomed movements of all objects upon the water. That fuch is the caufe of it, is proved from its being excited in fome people, though in a lefs degree, by gazing on the fluctuations of a river (provided no fixed objects appear within the fphere of diftinct vifion), or by the fight of a large revolving wheel, while the vertiginous perfons themfelves are perfectly at reft, and, by fhutting their eyes, can inftantly arreft this troublefome fenfation. Another proof that vertigo may arife from the effects of the inftability and indiftinctnefs of vifible objects on the eyes, is derived from our dependence upon the fteadinefs of fuch objects in walking and in balancing the body. We conftantly determine the diftances of the objects which we approach by our eyes, and, by obferving their perpendicularity, regulate our own: hence no one who is hood-winked can walk in a ftraight line for an hundred fteps together. And when children are learning to walk, it is eafy to obferve the efforts they make to adjuft their perpendicularity by furrounding objects, and how inftantaneoufly they fall, when either their attention is unexpectedly called off from this adjuftment, or when an object which had caught their eyes, and had been

* Staunton's Account of Lord Macartney's Embaffy to China, vol. i. p. 145 and 146.

† In this inquiry into the caufes of fea-ficknefs, I have adopted the theory of Dr. Darwin. I have alfo made ufe of feveral of his facts and illuftrations, as they are the moft familiar and appofite of any which are now within my reach. [*See Zoonomia, vol.* i. *fect.* 20.

hitherto ftationary, is made to undulate. This power of balancing the body by the view of furrounding objects is acquired with difficulty, maintained folely by habit, and may be readily impaired or deftroyed by difufe; for perfons who have been long confined to bed are found to reel and ftagger in their firft attempts to walk, and only by patient endeavours recover their former fteadinefs. The principle of our dependence upon vifion in balancing the body by external objects, and of the tendency to vertigo whenever that fenfe is impaired by difturbance or difeafe, is ftill further illuftrated by the vertiginous fenfations which often affect elderly perfons when they begin to fuffer dimnefs of fight, and which are frequently relieved by the ufe of fpectacles, or, at length, by acquiring the habit of adjufting perpendicularity by objects lefs diftinctly feen.

That diftinctnefs of vifible objects which is requifite to the balancing of the body with fteadinefs, and to the prevention of vertigo, may be diminifhed or deftroyed in various ways, all of which feem to throw light upon this fubject. Objects may become indiftinct, 1ft, by reafon of their *fmallnefs* and *fimilarity* to one another. Many perfons become dizzy in a room hung with paper coloured with fmall and fimilar figures, where the eyes do not readily find a refting place, nor diftinguifh their movements in continually paffing from one figure to another. But by affixing to the wall a fheet of white paper, or by drawing figures of a larger or more diverfified fize, the giddinefs becomes no longer perceptible. It is for the fame reafon that vertigo is produced, in fome, by paffing over a plain covered with fnow, without trees or other eminent objects. 2. Objects become indiftinct, and the beholder vertiginous, on account of their *diftance*, and the *direction* in which they are feen. It is for this reafon that many become giddy in afcending lofty heights, or in looking down a deep precipice. Objects, placed at fuch a diftance, are beyond the fphere of diftinct vifion, and, therefore, unfuitable to regulate our perpendicularity. The debilitating impreffion of fear muft likewife be admitted, in this cafe, to produce a fhare of the effect. 3. The diftinctnefs of objects is loft, and giddinefs produced, by their *unufual* and *exceffive motions*. Inftances of this fort are very numerous, fuch as the view of a great cataract, of a large revolving wheel, &c. the firft attempts to ride on horfeback, to mount a camel, an elephant, &c. riding backwards in a coach, fwinging, riding in a fleigh, fcating, turning fwiftly round on one foot, and more efpecially in the difeafe now under confideration.

The effect of thefe motions upon the organ of fight is alfo much increafed by the *ocular fpectra* of objects remaining fome time upon the retina, which exceedingly augment the difturbance of the eyes, and thereby add to the confufion of the vertiginous perfon. When any one turns rapidly round till he becomes giddy, and falls upon the ground, the fpectra of circumambient objects continue to prefent themfelves in rotation, and he feems to behold fuch objects ftill in motion. Thefe fpectra appear to be a continuation of the motions of the optic nerve, which had been excited by the objects which they feverally reprefent. They are apt to remain, to recur, or to be prolonged, in proportion to the degree of debility induced; hence they muft greatly aggravate the more violent cafes of fea-ficknefs, and produce an infinite number of deceptions of the fight and of imagination. Their effects are well known in fevers of debility, by producing the fymptom called *mufcæ volitantes*, &c.

Befides the vertigo of difordered vifion, it is probable fea-ficknefs is generally produced, in part, by another fpecies—that of difordered touch or feeling—and which has been called *tangible vertigo*. When a blind perfon turns round, or when one who is not blind revolves in the dark, a vertigo is produced belonging to the fenfe of touch: for his feet now touch the floor in manners or directions different from thofe they have been accuftomed to; and, in confequence, he becomes bewildered as to the fituation of his body in relation to the floor, lofes his perpendicularity, and is rendered giddy. This combination of vifual and tangible vertigo, in producing the phenomena of fea-ficknefs, feems to have efcaped the attention of thofe who have treated of this difeafe. Sailors remark, that fuch perfons as can fooneft accommodate themfelves to the fhip's motion, and acquire the habit of ftanding and walking uprightly, without reeling to and fro, are leaft diftreffed by fea-ficknefs, and moft fpeedily recover. The inftability of vifible objects, and the reeling induced in the beholder, reciprocally increafe one another.

Having thus mentioned fome of the various modes in which vertigo may be produced by a difordered and exceffive action of the organ of vifion and of touch, particularly fuch as arife from the rotation, undulation, or other irregular and unufual motions of external objects, as well as of the beholders, I am, in the next place, to fhow in what manner vertigo produces the naufea and vomiting which quickly enfue.

It does not appear, at firft view, how naufea and vomiting proceed from a difturbance of the action of the vifual organ. But when it is recollected that violent giddinefs, the immediate refult of fuch difturbances, precedes and occafions thefe perverfions of the alimentary canal, the difficulty vanifhes. Vertigo, and diforders of the alimentary canal, reciprocally produce each other. Profeffor Gregory, of Edinburgh, afferts this in the following words: "*Vertiginem naufea folet comitari, alteraque alteram inducere.*"* It is not the prefent object to inquire into all the fpecies and varieties of vertigo which may be found enumerated in fyftems of nofology; but whether accompanying the attack of apoplexy, palfy, epilepfy, hyfteria, or fyncope; whether induced by injuries of the head from external violence, by exceffive evacuations, or at the acceffion of fevers, it is generally attended with ficknefs of ftomach. And, on the other hand, when the alimentary canal is primarily difordered, as in cafes of indigeftion, taking emetics, drunkennefs, fwallowing of poifons, gaftritis, enteritis, &c. vertigo is generally found to take place. Sea-ficknefs is, therefore, a confequence of certain fympathies, or affociations of motions of different parts of the animal fyftem. And there is ground to conclude, that the vomiting caufed by a ftone in the bileduct or in the ureter, as well as that arifing from inflammation of the inteftines, or at the acceffion of fevers, is produced in a fimilar manner.

If it be admitted that certain organs, or parts of the body, become affociated in their actions (and the proofs of fuch an affociation continually recur in obferving the functions of the animal fyftem), it will follow, that, in a ftate of health, each organ, or part, in this affociated feries or circle, has its appropriate fhare of nervous or vital power. But if one of thefe organs or parts be fubjected to violent or irregular action, as fuch action confifts in the employment and expenditure of nervous power, the balance of the diftribution of this power muft be difturbed, and while one part expends too much, the others will poffefs too little. This is obvioufly illuftrated by the appearances of drunkennefs. While the ftomach is ftimulated to excefs by fermented or diftilled liquors, the mufcles of voluntary motion, the optic nerves, &c. are deprived of their fhare of nervous influence; and hence the inebriate becomes vertiginous, and his limbs refufe their accuftomed office. Juft fo it is with perfons unaccuftomed to the motions of the water, when they go on fhipboard. The exceffive,

* Confpectus Medicinæ Theoreticæ, vol. i. p. 145.

irregular and unufual actions of the organ of fight, expend a difproportionate fhare of nervous power, and, of confequence, the parts connected with it by affociation muft foon fuffer by a deprivation of their proper quantity. The ftomach, which poffeffes more extenfive and intimate relations with the reft of the fyftem than any other vifcus, will be the firft to feel, and afterwards to propagate this morbid impreffion to other parts of the body.

Attention to the following circumftances will go far to explain the feeming difproportion between caufe and effect, in this mode of accounting for the violence of fea-ficknefs in perfons unaccuftomed to the inftability of that element. 1. The motion is not only unufual, irregular and complicated, but exceffive. The movements of the waves, forming a vaft expanfe of furface, agitated and rolling in a thoufand fhapes —the diverfified movements of the fhip, with all its variety of parts and appurtenances—and the movements of the voyager himfelf reeling and ftaggering in every direction: all thefe form an aggregate of agitation fufficient to diftract the fteadieft head. The contraft between this fcene and fuch as are found on the land, where a great majority of objects are either at reft, or moving with fteadinefs and regularity, muft be apparent to all. 2. The exceffive action of the organ of fight, produced by this aggregate of unufual motion, will not appear ftrange if the quantity of nervous power expended on the eyes be duly confidered. No part of the fyftem, in proportion to bulk, is fo plentifully fupplied with nerves as the eyes. Each optic nerve is as large as a crow-quill at its entrance into the eye. Befides thefe, the third, fourth, and fixth pairs of nerves, as well as part of the fifth pair, belong to this organ. The inceffant employment and activity of vifion, during the day, confidered in connection with the fize and number of the nerves devoted to this fenfe, will evince that the confumption of nervous power in the eyes is fully as great, if not greater, than that beftowed upon the whole of the upper extremities. 3. The intimate fympathy between the brain and the ftomach is alfo to be confidered; whereby the difordered actions of the organ of vifion, which poffeffes fo large a branch of the nervous fyftem, make an immediate and powerful impreffion on the ftomach, invert its motions, caufe profufe difcharges of bile, &c. and produce all the train of diftreffing fenfations which belong to fea-ficknefs.

It is furprizing to obferve what flight caufes will, in fome conftitutions, produce vertigo. An unufual pofture, an in-confiderable elevation from the ground, and even a momentary view of objects moving fo as to attract the gaze of beholders, will fometimes excite this fenfation. Small modifications of motion will alfo ferve to relieve, as well as to produce it. A lady informed me, that, after conftantly fuffering naufea for fome time, from riding in a fleigh, fhe was relieved, in the latter part of the journey, by a more harfh and rugged motion, in confequence of the fnow fuddenly diffolving, and leaving the earth bare. In this cafe, it is probable that the fmooth and almoft imperceptible progrefs of the fleigh, while gliding over the fnow, prevented the lady's diftinguifhing the apparent motions of objects which were abfolutely at reft, from the real motions of them; and this confufion feems to have been, at leaft in part, the caufe of her giddinefs and naufea. The courfe of the fleigh over fand, gravel, &c. was a nearer approach to ordinary habits of motion.

It is fortunate for fuch as are deftined to a fea-faring life, and to other employments which are apt to produce fimilar giddinefs and naufea, that thefe affections are commonly of fhort duration. The dominion of habit, in thefe cafes, is extremely favourable. The Dervifes of Turkey, who practife the motion of turning themfelves fwiftly round as a ceremony of religion, foon learn to perform it without giddinefs. A fimilar habit is acquired among the *Shakers*, a fanatical fect of religionifts in the State of New-York. My colleague, Dr. Mitchill, informs me, that he faw a female of that fect turning herfelf round about fixty times in a minute, for the fpace of five minutes, without interruption; and this was done without any appearance of her becoming vertiginous.

A queftion naturally arifes on this fubject, why fome perfons are more liable than others to vertigo and naufea, in confequence of unaccuftomed motions. This is the refult of a greater promptitude, in fome conftitutions, to run into fympathetic or affociate actions. It is not eafy to affign the reafon why movements of the animal fyftem, which have once occurred in fucceffion or combination, fhould afterwards acquire a tendency habitually to fucceed or accompany each other. It is a property of animated nature, and diftinguifhes this department of being from others. There feems to be a peculiar temperament, confifting in the too great facility with which fibrous motions acquire habits of affociation, and in the ftrength with which thefe affociations are maintained. In conftitutions of this fort, fympathy acts with more certainty and energy, and to much greater extent, than in others.

And it is probable that fuch perfons are much more liable than common to all the clafs of fympathetic difeafes. For example, it might be expected that fuch would be peculiarly difpofed to the attack of intermittent fevers; that the periodical return of paroxyfms, in thefe cafes, would be more difficult to arreft; and that they would be liable to recur, from flight caufes, for many weeks after they had appeared to be cured. The force of memory feems alfo to depend upon the poffeffion of this temperament; for memory is underftood to mean facility and ftrength in forming and retaining affociations. It would be matter of curiofity to afcertain, whether perfons of retentive memory are more liable to fevers, to fea-ficknefs, and to all the various difeafes of affociation, than others.

## Treatment of Sea-Sickness.

Having thus endeavoured to defcribe the appearance of fea-ficknefs, and to affign the more probable caufes, I proceed, in the next place, to the treatment of the difeafe.

Much may certainly be done towards the prevention of this diforder. It has been propofed, that perfons intending to go to fea fhould, for fome time previoufly, accuftom themfelves to fwinging, or to fome other unufual motions adapted to induce giddinefs. The exercife of turning round upon one foot would probably anfwer this purpofe as well; and it may be acquired, after fome practice, fo as to be performed entirely without vertigo.

Sea-ficknefs, like many other difeafes of affociation, is greatly under the dominion of emotions and paffions of the mind. By forcibly directing the attention to a particular object, the naufea may be relieved, at leaft for a fhort time. By joyful or alarming news, by the terrors of a ftorm or of fhipwreck, by the profpect of battle, and by violent pain, fuch as the anguifh of a broken or diflocated bone, the difeafe may be inftantly arrefted. But as fuch degrees of emotion and pain cannot fafely be excited on many occafions, and are not fufceptible of meafure or regulation, they are obvioufly unfit for practical purpofes.

It has been afferted, that keeping the eyes fhut or covered, if begun immediately upon embarkation, will prevent fea-ficknefs. According to the principles maintained in this paper, fuch an expedient cannot be without ufe. In a fhort paffage particularly, lying horizontally, fitting or ftanding, fo as to be firmly and fteadily fupported in one pofition, with the eyes, for the moft part, fhut, is by no means impracticable, and deferves to be ftrongly recommended. I am informed, by a gentleman of obfervation, that, while at fea, he enjoyed almoft total exemption from this complaint during the darknefs of the night, and while he lay horizontally, with his eyes clofed, but always experienced a return of it the next morning, as foon as he arofe, and began to look at furrounding objects. All agree that it is proper to avoid watching or gazing at the waves, efpecially when they are ftrongly agitated by tempeft.

The proper management of diet will do much both in the prevention and cure of this difeafe. It is advifed to eat moderately and frequently, to avoid every thing calculated to produce indigeftion, and to felect fuch articles as the ftomach can digeft with the greateft eafe, expedition and certainty. For this purpofe mariners recommend bread and frefh meat to be eaten cold with pepper; but the occafional ufe of falted meats will not be found hurtful, and fometimes they undoubtedly deferve a preference. Some contend, that keeping the ftomach conftantly full, by eating bifcuit, &c. is one of the beft preventives; and it is not improbable that the ftimulus of nutritious and well-adapted food, combined with the ftimulus of diftention, may be fo adjufted as greatly to fortify the powers of the ftomach. For drink, it is recommended to ufe liquids impregnated with the vegetable or carbonic acids—fuch as lemonade, feltzer-water, found malt liquors, cyder, champaign, &c.

The fea-fick are advifed to keep much upon deck, even in all varieties of the weather. It is alfo enjoined upon them to take brifk exercife, fuch as affifting at the pumps, or any other active employment, with as little intermiffion as the nature of the cafe will allow: for it has been generally remarked, that indolent and flothful paffengers are moft apt to fuffer from this complaint. Governor *Winthrop*, in his *Journal*, mentions the efficacy of exercife, on a voyage, as a remedy for fea-ficknefs, in the following terms: "Our children and others that were fick, and lay groaning in the cabbins, were fetched out; and, having ftretched a rope from the fteerage to the mainmaft, we made them ftand, fome of one fide and fome of the other, and fwing it up and down till they were weary, and by this means they foon grew well and merry."*

As fea-ficknefs is undoubtedly a difeafe of affociation, and,

* Winthrop's Journal of the Tranfactions and Occurrences in the Settlement of Maffachufetts, &c. page 6.

in that refpect, akin to the nature of fevers, it is probable that the ftimulant and invigorating remedies employed to repel the attack, as well as to prevent the recurrence of the paroxyfms of intermittent fevers, might alfo be fuccefsful in guarding the ftomach againft the invafion of this complaint. The Peruvian bark and other bitters would be likely to anfwer this purpofe. And after the actual attack of the difeafe, if great proftration of ftrength and exhauftion enfue, thefe remedies. combined with wine and opium, as in fevers of debility, fhould be affiduoufly ufed.

Preferving regularity of the inteftinal difcharges, and occafionally exciting fome degree of artificial diarrhœa, will form an important part of the treatment. The aloetic preparations are among the moft fuitable of the cathartic clafs. If acidity be troublefome, as often happens to the feeble and dyfpeptic, magnefia will become neceffary. Injections of fea-water and foap are always convenient, and deferve to be very frequently employed. It is probable the injection of cold water, or iced water, which, according to Monf. Pomme, fo inftantaneoufly relieves the inverted motions of the alimentary canal in hyfteria, would likewife prove an efficacious remedy in this cafe. (See Pomme Des Affections Vaporeufes, p. 25.)

As the ftomach and fkin are very ftrongly affociated, the former may be often excited into action, and fupported, through the medium of the latter. For this purpofe the fea-fick may ufe the warm bath alone, or alternated with cold bath, friction of the fkin with oil and camphor, or dry, with powder of muftard: to the epigaftric region they may apply plafters, epithems or cataplafms charged with aromatics and opium, and, in fevere cafes, finapifms or blifters.

Compreffion of the abdomen, by means of a bandage or handkerchief, is recommended by feamen, and, there is reafon to fuppofe, on good grounds. The favages of North-America, when reftricted to fcanty food, and preffed by hunger, faften a belt round their bodies: by this they give fupport to the empty and enfeebled ftomach, and thereby provide a fubftitute for the ftimulus and diftention of food. When the ftomach has been long haraffed with the retchings of fea-ficknefs, this mechanical aid will affift in fuftaining the fyftem until it becomes habituated to its new fituation.

It will feldom be requifite to combine many of thefe remedies in the treatment of a fingle cafe. For the moft part, relief is eafily and fpeedily obtained, and the common method may be delivered in a few words: When naufea comes on, and cannot be fubdued by mental exertion, the patient fhould place himfelf in a horizontal pofition, fhut his eyes, and lie perfectly ftill. If vomiting fucceed, he fhould take fome draughts of an infufion of chamomile, peppermint or ginger, or fomething fimilar. Sea-water is commonly recommended by mariners. When the ftomach has been thoroughly emptied by the affiftance of fuch drinks, it becomes neceffary to ufe fome grateful ftimulant. I am informed, that on board of the packet-boats plying between the Britifh ports and thofe of the adjacent continent, for the conveyance of paffengers, that fpiced wine is the common remedy. Where this fails, recourfe may be had to fmall dofes of fulphuric (vitriolic) ether, frequently repeated, till it compofe the ftomach. Small dofes of opiates fhould alfo be tried. The effervefcent mixture of Riverius, feltzer-water, lemonade and warm punch, will fucceed in fome cafes. But if the difeafe, notwithftanding, fhould obftinately continue, the ftomach be haraffed with inceffant retchings, and exhauftion and debility take place to an alarming degree, it will be requifite to adopt the treatment ufually purfued in low fevers of debility. Preparations of Peruvian bark, or rather of columbo or quaffia, with wine and opiates, or ether, employed in rotation, and periodically repeated, fo as to fuftain a moderate and equable excitement of the ftomach, will efpecially claim attention. And, in fuch extreme degrees of the difeafe, the other remedies above-mentioned may likewife be felected or combined in fuch manner as to fuit the exigencies of the particular cafe.

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It is often neceffary to attempt the cure of one difeafe by exciting another. With this view phthifical patients and others often are fent to fea. Inftead of inquiring into all the circumftances of a fea-voyage which may prove beneficial in fuch difeafes, it will be fufficient for the prefent purpofe to confider the affection of the ftomach as one of the chief means of relief. The inftances of the efficacy of this remedy are too numerous and remarkable to admit of a doubt. But it has happened, in many cafes, from fome peculiarities of the ftomach or conftitution generally, that the ufual naufea and vomiting have not occurred, or have been fo flight and tranfient as to difappoint every hope of advantage from the voyage. If the efficacy of this remedy really depend upon the excitement of naufea and vomiting, it is much to be regretted that fuch a difappointment fhould take place; as it feems always to be in the power of the voyager to increafe the force and duration of the naufea, by artificial means, to any defirable extent. Swinging, in one form or another, may conveniently be employed in aid of the marine vertigo. If the ofcillating or pendulum-like fwing fhould not prove fufficient to create the requifite degree of vertigo, the patient might be whirled in a chair fufpended from aloft by two parallel cords hanging near to each other, which, after being circularly revolved fifty or one hundred times in one direction, would return with great velocity in the other. Or, if the debility of the patient fhould not allow this kind of motion, a fmall bed, affording room to lie in an eafy pofition, might be fufpended to a fimple machine adapted to whirl it with any proper degree of gentlenefs or velocity. By fome of thefe means, varied in fuch manner as to fuit the circumftances of each particular cafe, there can be no doubt that vertigo might be increafed and regulated at pleafure.

In other cafes, likewife, befides phthifis pulmonalis, the marine naufea might be ufefully augmented by additional unaccuftomed motions. The noted example of its efficacy, mentioned by Mr. John Hunter, in caufing the matter of a large bubo to be unexpectedly abforbed, is a proof of great power in promoting the action of the lymphatic veffels. The ufe of emetics, in chronic difeafes, might, perhaps, be entirely fuperfeded by fea-ficknefs, properly affifted and regulated by fome of the other means of exciting vertigo.

# REVIEW.

Art. I. *A Memoir concerning the Diſeaſe of Goitre, as it prevails in the different Parts of North-America. By* Benjamin Smith Barton, *M. D. Profeſſor of Materia Medica, Natural Hiſtory and Botany, in the Univerſity of Pennſylvania, and one of the Phyſicians of the Pennſylvania Hoſpital. Philadelphia.* Way *and* Groff. 8vo. pp. 94. 1800.

NOT only are the inhabitants of the weſtern continent afflicted with the more *common* diſtempers of Europe and the other quarters of the globe, but the rarer and more ſingular complaints to which the human conſtitution is there liable, are manifeſting themſelves in North-America. In a widely extended country, reaching from the confines of Acadia to the limits of Florida, there exiſts a great variety of climate. And in the range from the ocean to the ſtream of the Miſſiſſippi, the diverſity, occaſioned by alteration of latitude, is exceedingly increaſed by intervening and local circumſtances, which checquer the ſcenes and the ſeaſons in a remarkable manner. From the low plains in the vicinity of the Atlantic, through the gradual riſings, to the ſummit of the Blue, the Allegheny, and Apalachian Mountains, and the deſcent thence to the water-level on their further ſide, the earth preſents a ſurface changing almoſt perpetually. The high peak, the gentle declivity, the abrupt precipice, and the deep ravine, exhibit their reſpective peculiarities. From the lofty and ventilated mountain-expoſure, and the dry land agreeably alternated with hills and dales, the tranſition is gradual to the pent-up valley ſcarcely reached by the breezes, and the dead level where water ſtagnates, and fogs and exhalations overhang the watery marſhes, the diſmal ſwamps, and the tracts in their neighbourhood. In ſome diſtricts the great ſtrata of the earth conſiſt chiefly of granite, and of the ſeparate bodies which conſtitute that mineral compound; in others the predominant layers are of arenaceous matter, compacted and hardened into ſtone. Now the eye of the traveller, day after day, as he journeys along, beholds *ſlate*; and the different ſpecies of ſhiſtic foſſils lie thick beneath his feet; and then again he proceeds, for an equal diſtance, over beds of calcareous earth, exhibiting the forms of lime-ſtone and marble. Here the eye ſurveys a wide and barren extent of land; there it dwells upon a tract rendered fertile by the overflowing of rivers, and the gradual depoſition of decaying animal and vegetable ſubſtances for ages. To theſe differences of ſituation are to be added the great changes to which the weather is liable, from moiſt to dry, from tempeſt to calm, and from exceſſive cold to almoſt intolerable heat, in a region influenced by Ontario, Erie, Huron, and the other lakes, on the one ſide of the interjacent mountains; and by the ocean, and the gulphs of Mexico and St. Lawrence, on the other.

In ſuch a country, it may be expected that the human conſtitution will ſuffer many and variegated diſeaſes. As far as there is a coincidence or ſimilarity of morbid cauſes, in this as in the other hemiſphere, diſtempers of a like kind can hardly fail to break out. And this diſpoſition of the phyſical powers to debilitate or disfigure the body in America, may be facilitated by the prediſpoſition to a given diſtemper, or the actual exiſtence of it, in an emigrant from any part of Europe in which ſcrophula, phthiſis, or goitre prevails.

To the inveſtigation of the latter of theſe diſtempers, as it occurs in North-America, the author of the preſent tract has turned his attention. This is the work which was announced, as our readers will recollect, in our vol. i. p. 386, firſt edition.

Dr. Barton found the goitrous ſwelling of the neck among the Oneida and the Brother-Town Indians, and deſcribes it as occurring on the German Flats, at Fort-Dayton, and at Henderſon-Town, among the white inhabitants, in the neighbourhood of the Mohawk River.

" Some of the moſt remarkable caſes of the diſeaſe are in a Dutch family which lives upon the north ſide of the Mohawk River, immediately oppoſite to Old Fort-Schuyler. This family conſiſts of a father, a mother, and four or five children. Every one of them is afflicted with the goitre. The ſwellings occaſion ſome of them to look hideous. This family removed from the river below this, to the place where they now dwell, about fifteen years ago, at which time they had nothing of the diſeaſe among them."

He found it to be frequent, alſo, in the military tract, eſpecially in the town of Manlius, in the Onondago-hollow, and the neighbourhood of the Salt-Springs, affecting both

Indians and whites. Though infants at the breaft are not exempted from it (fuch cafes being rare), yet it is much more common among adults. Perfons who have removed into the country where it prevails, have become fubject to it at a very advanced age. Females are more liable to it than males; they are efpecially its victims. It is faid, alfo, to affect brute animals, efpecially fheep and young calves, in the above-mentioned town of Manlius, in New-York. Within this State, the author thinks its exiftence limited between the Little Falls of the Mohawk, eaftward, and the fettlement of the Tufcaroras, near the extreme wefternmoft boundary, in the vicinity of the Great Cataract of Niagara. Its northern and fouthern extent he has not been able to define; though he obferves it has occurred in Lower-Canada, between St. John's and Montreal—on the Connecticut-River in New-Hampfhire—in the county of Bennington, in Vermont—in the Cohofs Country in Connecticut. Within the territory of Pennfylvania, it is ftated as occurring at Pittfburgh, on the waters of the Allegheny and French Creeks, at Sandufky, on the Monongahela, and among the Indians on Big-Beaver-Creek: alfo on the River Mufkingum, among the aborigines; and here, as at the laft-mentioned places, principally affecting the women and girls. There have been feveral cafes, too, among the Canadians of Detroit, and among the fettlers at St. Vincennes, on the River Wabafh.

In the part of the author's inquiry which refpects the caufe of goitre, he examines the opinion of De Luc, that it proceeds from water impregnated with earthy fubftances, prone to form tophous concretions; of Coxe, that it is caufed by *tuf*, or calcareous earth, held in folution by the water which the goitrous inhabitants of the Alps conftantly drink; and, *of the inhabitants of the State of New-York*, that it is owing to the quality of the water of the country, which is highly charged with lime-ftone. Thefe, which form what may be called the CALCAREOUS HYPOTHESIS, Dr. B. with great candour and impartiality, examines and rejects. He even doubts whether the water drank by the people of a region or diftrict, in any manner, occafions this complaint, and quotes the great Haller of Berne, as poffeffing a fimilar fcepticifm.

He then confiders the notion of the goitre being produced by *fnow-water*, or the water of melted fnow, and fhows its impoffibility very ftrikingly; the opinion of Gautiere, that it arifes principally from expofure *to cold*, and the drinking of very *cold* water; and that of G. Forster, that it is caufed by drinking of water deprived, by freezing, of its *fixed air*; to both which he offers decifive objections. He alfo examines and rejects the ideas of this difeafe being induced by the drinking of water fupplied by fprings *near beds of foffil coal*, or of the fame fluid impregnated *by certain vegetables*; as alfo the notion of its being produced by *infects infefting the water*, or the ANIMALCULAR HYPOTHESIS; and that of its origin from *coarfe* and *unwholefome food*, except as fuch diet may operate as a predifpofing caufe, with feveral other fpeculations.

The learned author next difcuffes the theory of Mr. DE SAUSSURE, according to which goitre is caufed *by a heated and ftagnated air*, owing to the confined fituation of the valleys in which the difeafe frequently appears in Switzerland. This, however, he does not adopt, becaufe, in America, the goitre is not confined to valleys, but prevails in fome of the high and level plains of the country—and in fome of the more deep and narrow valleys it is altogether unknown.

Laftly, Profeffor Barton, with great caution and modefty, offers his own opinion on the exciting caufe of goitre, which is, that it is a miafm of the fame fpecies as that *which produces intermittent and remittent fevers*, *dyfenteries*, and fimilar complaints. The author expreffes himfelf thus:

"Do intermittents and remittents prevail in thofe parts of the countries of North-America in which the goitre is moft commonly met with? I have already faid that they do. Many facts, however, muft be collected before this queftion can be anfwered as extenfively as it ought to be. Meanwhile I fhall mention fome of thofe diftricts in which both thefe fevers and the difeafe of which I am treating are very common.

"I have already obferved, that the Onondago-Valley, where goitres are frequent, is unwholefome. Intermittents and remittents, and thefe fometimes of a very malignant kind, are frequent here. Thefe complaints are frequent in Manlius, Pompey, and other parts of the military tract. They are frequent along the Mohawk and Connecticut Rivers; between St. John's and Montreal; about Detroit; on the Mufkingum; and in almoft all thofe parts of our country in which the goitre is found. It has, indeed, been faid, that intermittents are unknown at Pittfburgh. This is not ftrictly true. On the contrary, thefe complaints are known to exift in that place, and have evidently increafed within a few years.

"In the prefent ftate of our information, it will be difficult to prove that the goitre does actually owe its origin to the fame caufes which induce intermittent fevers. We are certainly not yet prepared to decide upon this fubject (as philofophers fhould decide upon every fubject which they undertake to inveftigate) with caution. I may add, that many difficulties oppofe themfelves to the conjecture which I have thrown out. In particular, it is not eafy to conceive how a general caufe, ftimulating the fyftem, and inducing the cold and hot ftages, and other phenomena of fevers, fhould concentrate its action fo completely upon the thyroid and neighbouring glands of the head and neck, and give rife to the difeafe of goitre. Perhaps, however, an extenfive view of facts relative to the production of difeafes by the *miafmata* of marfhes, would ferve to fhow the immenfe variety of ways in which thefe miafmata affect us, and the multifarious difeafes which they induce in man and other animals. There is fomething very capricious in the operation of thefe agents. And I do not know that it is more inconceivable, that the effluvia of which I am fpeaking fhould efpecially affect the thyroid gland, and induce goitre, than that they fhould efpecially affect the parotid glands, producing mumps, or the liver, producing hepatitis.

" It may, perhaps, give fome additional weight to the theory which I have propofed, to obferve, that the marfh miafmata of fome parts of our country exert a particular action upon the glands of the neck and throat. Kalm has given fome account of a difeafe, called by the Swedes the ' ftitches and burning,' which, at different times, has committed great havoc at Penn's Neck, in Jerfey. ' It was (fays our author) a true pleurify; but it had a peculiarity with it, for it commonly began with a great fwelling under the throat and in the neck, and with a difficulty of fwallowing.'*

" The complexion of many goitrous perfons, efpecially thofe in whom the difeafe has arifen to a confiderable height, is an additional circumftance in favour of the opinion which I have advanced. ' Their complexion (fays De Sauffure, fpeaking of the crètins) is a yellow approaching to brown, from which, probably, they obtained the name of *marons*,† which is given to them in the valley of Aofte.'‡

" I was informed that, in the State of New-York, thofe

* " Travels into North-America, &c. vol. i. p. 376, 377, &c. Warrington. 1770. Englifh tranflation.

† " The maron is a large kind of chefnut.

‡ " Voyages, &c. tom. ii. p. 481.

persons who are affected with goitre are commonly exempt from intermittents, though in the midst of persons labouring under these latter complaints. If this be a fact, it would rather serve to show, that the goitre and the intermittent are owing to the same cause.

"I am far from imagining that the preceding facts completely establish the origin of goitre from the miasmata of marshes. I have offered this opinion merely as a conjecture or hypothesis. I cannot, however, help suspecting that future and more extensive inquiries will establish the fact, that there is a very intimate connection between the disease in question and the exhalations from marshy grounds. Persuaded I am, that there is a necessary connection between the disease and a moist atmosphere.*

"Mr. Foderè is of opinion, that a warm and moist atmosphere is the cause of the goitre. This writer, whom I have so often quoted, made his observations in Maurienne, where the disease is extremely common, perhaps more so than in any other part of the world. It is remarkable that the goitre prevails to the greatest degree in the western parts of North-America, where many observations have conspired to show, that there is a greater quantity of moisture in the atmosphere than in the countries between the Atlantic and the Allegheny Mountains. 'From a variety of observations (says Mr. Andrew Ellicott), I am convinced, that the atmosphere in the western country, and particularly in the vicinity of the lakes, contains a greater quantity of moisture than in the middle Atlantic States. The wooden works which contained my instruments were always uncommonly swelled, and frequently very much injured in that country, though constantly defended from the rain, and occasionally exposed to the sun. The ivory and wood of my sectors, with brass joints, always expanded above the metal. This expansion was not sudden, but effected by slow degrees.'†

"My own observations, which will be detailed at length in another work,‡ coincide with those of the ingenious gentleman

* "I do not now speak of insulated or detached cases of the complaint, for they occur every where; but of the disease where it is a common complaint. Even those aërial tumours which arise in women after parturition, seem only to arise in those situations where the complaint, from marsh miasmata, or from moisture, is endemial.

† "Transactions of the American Philosophical Society, vol. iv. No. xxv. p. 225 and 226. Philadelphia. 1799.

‡ "Travels through part of Pennsylvania, Virginia, New-York, &c. &c.

juſt quoted. The greater degree of moiſture, in the neighbourhood of the lakes, is, perhaps, the beſt explanation of the fact which I have already mentioned, that, in general, the goitre 'prevails to the greateſt degree in the neighbourhood of the lakes of the country, or about the firſt ſources of the rivers which ariſe near theſe lakes.'

"Mr. Ellicott has likewiſe obſerved, that 'fogs are very common, and of remarkable denſity,' on the Ohio and Allegheny, and their branches. This accords with my own obſervations. I cannot, however, agree with Mr. Ellicott, that theſe fogs do not contain 'any portion of thoſe noxious miaſmata which are ſo frequently combined with the fogs on the eaſtern ſide of the mountains.' On the contrary, I am perſuaded, that the fogs of the weſtern, as well as of the Atlantic country, are often very inſalubrious. I know, at leaſt, that many parts of the country along the Ohio, and other weſtern waters, are very unhealthy. I do not doubt that the denſe fogs are one great cauſe of this unhealthineſs; and, I believe, that ſuch fogs are inſalubrious, chiefly by reaſon of the miaſmata which they contain. This is not the place to examine the contrary opinion, which has been adopted by Mr. Ramel."

The work is concluded by a ſhort chapter on the medical treatment of the diſeaſe; and blood-letting, purging, quickſilver, burnt ſponge, ſulphure of pot-aſh, and ſeveral other remedies are mentioned. An appendix of ſixteen pages contains a variety of learned and inſtructive matter.

As, in the courſe of this work, Dr. B. has ſeveral times referred to the Eſſay on Goitre and Cretinage of Mr. Foderè, publiſhed in 8vo. pp. 290, at Turin, in 1792, we ſhall lay before our readers an account of this publication, with the intent, as far as we are able, of aiding the reſearches of thoſe who are ſtriving to detect the cauſe, and thereby the prevention and cure, of a diſeaſe which always disfigures the body, and is frequently connected with idiotiſm, ſtupidity, or deplorable imbecility of mind.

*(To be continued.)*

Art. II. *A Treatise on the Plague and Yellow Fever, &c.* *By* James Tytler.

[Continued from vol. iii. p. 379, and concluded.]

HAVING offered the fruit of his refearches concerning the *plague*, as a difeafe fpecifically diftinct from every other, in the firft part of his treatife, Mr. Tytler proceeds, in the fecond great divifion of his work, to exhibit the product of his labours on the fubject of *yellow fever.*

This diftemper, he inclines to think, was not originally a native of the weftern world, but was imported into Martinique from Siam, in 1685, and fpread thence, by contagion, to St. Domingo, Barbadoes, and the neighbouring iflands, till, at length, its baleful prefence afflicted the continent of America. He does not give us any account of its hiftory among the Siamefe, nor even ftate the proof of its exiftence in that country; nor does he mention whether this malady was a fcourge in the hand of Providence to chaftife the Eaft-Indians for their fins—nor, if fo, what the kind and enormity of their offences were. We are left to conjecture the caufe, and, by the fimilarity of the cafes, to fuppofe it was fome mifdemeanor not unlike that for which the Jews were punifhed with the plague. This latter ftory feems to us full as philofophical and worthy of credit as the former. Mr. T. alfo leans towards the poffibility of the Indians of the more northern latitudes having received the feeds of malignant difeafes from the fleet of Sebaftian Cabot, who coafted along the continent in the reign of Henry VII. as, in the army of that prince, not many years before, the fweating ficknefs, he fays, had been introduced into England. The *poffibility* of this we fhall not deny; but we can fee no more likelihood or *probability* in *this* than in the *two* other examples of origin and derivation this gentleman has favoured us with. This is his firft chapter, which abounds with quotations from Mofely, Hillary, Hughes, Webfter and Sauvages.

In his fecond, which runs to the length of one hundred and twenty-four pages, Mr. T. ftates, at fome length, the defcriptions of yellow fever by a number of the more diftinguifhed writers on that difeafe, fuch as Mofely, Lining, Lind, Hillary, Jackfon, Chifholm, Rufh, and other practifers and diffectors. From an examination of all which he gravely concludes, not only that the plague is *effentially* different from the diftempers defcribed by thefe authors, but that the *yellow fever*, the *fever of Boullam*, and *that of Philadelphia*, in 1793, "though nearly allied," "can none of them, with any kind of propriety, be called higher and lower degrees of the reſt," (p. 433). He then proceeds to an inquiry, whether or not they are *contagious?* And, after reviewing the controverſy about the diſorder, as it appeared in Grenada, New-York, Philadelphia, Norfolk and New-Haven, determines the queſtion in the affirmative, and that the contagion is, in all caſes, *ſpecific* and *immutable* (p. 465); yet allows, afterwards (p. 479), the poſſibility "that diſeaſes may change their nature"—and that the peſtilential poiſon, when tranſported "to the weſtern continent (from Europe or Aſia), 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 admitted that the aborigines of North-America were afflicted by peſtilential diſeaſes before their country was poſſeſſed by the whites. Mr. T. explains this, by ſuppoſing that two Indians, who, in the time of Sir Ferdinando Gorges, had been to England, brought the *contagion of plague* with them, which, in the American climate, turned to yellow fever, or ſomething like it. What a pity that the bodies and clothes of theſe men, as well as Dr. Brattle's and Mr. Anthony's *wigs, had not been ſmoked!* (p. 466). In our judgment, the contagion contended for, which we never conſidered as proved before, has not acquired any additional evidence: for we muſt own that Mr. T. with all his learning, induſtry and conjectures, inſtead of convincing our underſtandings, has only ſhown, more glaringly than we have obſerved on any former occaſion, to what deſperate ſhifts the ſupporters of the contagious hypotheſis are driven.

Mr. T. in his third ſection, mentions various preventative modes and cautions, and, among others, abſtinence from animal food, tea, coffee and chocolate, with ſomewhat a ſentiment of diſapprobation. He then recites ſome of the means of prevention recommended by Ruſh and Chiſholm.

After this the writer gives an account of the fumigation of rooms and ſhips which contain infection, by the vapours of the *acid of nitre*. He relies on this as a deſtroyer of putrid contagion, and as an agent whoſe ſovereign efficacy is determined by facts which cannot be overthrown. The deciſion of Mr. T. on this point, we conſider by far too poſitive and peremptory. It becomes him, and the gentlemen, many of them of the moſt reſpectable character in England, who think as he does, to re-confider thefe boafted experiments on nitrous fumigation. We deliver it as our firm and folemn conviction, that thefe trials have been egregioufly mifunderftood and mifinterpreted. They do not militate againft the theory of Dr. Mitchill, as Mr. T. fuppofes, but, on the contrary, are capable of entire reconcilement with it. We fhall not, however, go into the difcuffion in this place; but, inftead thereof, refer our readers to vol. ii. p. 229 & feq.—to vol. iii. p. 200 & feq.—and to Mr. Carendeffez's experiments on the conftitution of nitrous and nitric acids, in vol. iii. p. 418, of the Medical Repofitory, where they will, we truft, find enough to fatisfy them that this very fumigation with acid of nitre ought to be confidered as a miftake or delufion in fcience.

On the cure of yellow fever, he enumerates, under different titles, quick-filver, venefection, emetics, cathartics, ftimulants, alkalies and refrigerants, with fome remarks from practical writers on each. Next follows the fourth and laft fection, which is filled with remarkable cafes, to the amount of ten; of which, the one on the *fpontaneous combuftion* of the human body does not feem to us to have any particular connection either with plague or yellow fever.

The appendix to the volume contains feveral papers relative to peftilential diftempers, fome of which are quotations, and others abftracts, from different books. Of the former are, a defcription of the ficknefs of Athens during the Peloponnefian war, from Smith's tranflation of Thucydides—a remarkable cafe of a remitting fever at Bafforah, in 1780—and the queries furnifhed by Aikin and Jebb to Howard, and put, by him, to feveral phyficians in the countries he vifited, concerning the plague. Of the latter are, the account of the great plague in the time of Juftinian, from Procopius—of the plague in London, in 1665, from Hodges and others—of the plague at Marfeilles, in 1720, from the periodical publications of the time—and of the plague in Syria, Cyprus, and other parts of the eaft, from P. Ruffel's Treatife. We are willing to believe thefe abftracts are correct, though we have not compared them with the originals.

ART. III. *Tranfactions of the Society, inftituted in the State of New-York, for the Promotion of Agriculture, Arts and Manufactures, Part* iv. *Publifhed by order of the Society.*

[Continued from vol. iii. p. 389, and concluded.]

ANOTHER gentleman, whofe pieces make a diftinguifhed appearance in this volume, is Simeon De Witt, furveyor-general of the State of New-York. A fenfible and well-compofed addrefs is prefixed to the other communications, which he delivered before the fociety in the affembly-chamber, in Albany, on the 20th February, 1799. From this piece we offer our readers Mr. D.'s remarks on the eftablifhment of an agricultural garden for experiments (p. 15).

" Notwithftanding all the perfuafives that can be employed to excite gentlemen, difperfed through the State, to bend their endeavours to the improvement of agriculture; notwithftanding the confeffed importance of the fubject, and the general confent that our wealth and greatnefs as a people muft hence be derived; notwithftanding it be acknowledged that here is a field without bounds for the difplay of talents and tafte, and that incentives from the moft amiable paffions of the heart urge us to it; I fear that we will not find the defign of this inftitution fully executed, if we wholly rely on the efforts of its fcattered members. We have, indeed, no reafon to doubt that their contributions to the fund of experiments will be large and fpirited; but they will be too heterogeneous, and not always fuch as will ferve completely to demonftrate the facts moft neceffary to be proved. The only way by which we can fyftematically and effectually do our bufinefs, is by eftablifhing an *experimental agricultural garden*. This, to us, will be the fame thing that a laboratory is to the chemift. He, with his apparatus in his room, has diffected earth, air and water—chafed nature through all her intricate flights, and formerly deemed infcrutable mazes—penetrated to her fecret hiding places—explored her dark receffes—unlocked her cabinets—rifled them of her richeft jewels—and filled the treafury of fcience. What would he, or could he have done, if his dependence for information had been altogether or chiefly on the labours of others? It is to be prefumed that a cloud of darknefs would yet enfhroud that moft ufeful and delightful of fciences. In the fame manner an agricultural garden, properly conducted, might be made a little reprefentative, a miniature of the world, and furnifh, in a fhort fpace of time, more facts relative to the hiftory, nature. difpofition, conftitution, laws, government, and general economy of the republic of vegetables, than could, by any practicable means, be obtained from all America in a large portion of a century. Here exotics might be collected and naturalized—our wild, indigenous plants tamed, and their ufeful qualities inveftigated—every mode of culture tried, and the beft accurately afcertained--experiments made of whatever promifes fair in theory, or may lead to future difcoveries and proofs of all thofe exhibited to the eye, fo that no one fhould have occafion to rifk any thing by venturing on doubtful projects.

"This State, it muft be confeffed, does not unfold to the philofophic world a much admired feature in the portrait of America. By what inftitutions for the furtherance of ufeful knowledge, or by what extraordinary efforts of our citizens to advance the arts of peace, truly patriotic, have we diftinguifhed ourfelves? A univerfity, colleges and academies, we have, it is true. They ferve to fave us from the fhame of not following the fafhion of nations. Nothing extraordinary can be placed to our credit on their account. What more have we to boaft of? How few of our learned characters ftep afide, for a moment, from their profeffional employments, to fhow themfelves interefted in diffufing a tafte for ufeful philofophy and works of ingenuity!"

A fecond communication, by the fame hand, is on the methods of introducing heat into rooms and preventing its efcape. This is the piece which is inferted at large in our vol. iii. p. 229; and to this we refer.

A third contributor of materials for this volume is Ezra L'Hommedieu, the Vice-Prefident of the fociety. His effays are on the following fubjects: 1. Obfervations on the fmut of wheat, and the means of preventing it. This is principally an extract from Young's Annals, vol. x. p. 231; where it is ftated, that arfenic, alkaline ley of wood-afhes, and lime-water, were the beft preventatives of that difeafe. 2. On preferving mildewed wheat from injury—from Marfhall's Gloucefterfhire, vol ii. p. 54; where it is recommended to cut the crop as foon as it is ftruck by mildew, upon the principle that the fap or nutriment which is in the ftalks of the wheat that is cut unripe, circulates to the ear, and fills the grain in the fame manner it would have done had the ftems remained upon their roots. 3. The method of curing difeafes of fruit-trees, &c. This is merely a defcription of the receipt of Mr.

Forfyth, of Kenfington; confifting of one bufhel of frefh cow-dung, half a bufhel of lime-rubbifh of old buildings, half a bufhel of wood-afhes, and one fixteenth of a bufhel of pit or river fand, mixed together, and applied as a plafter. 4. Obfervations on the growth and nourifhment of plants, by Mr. L'H. himfelf; wherein he adopts the opinion that *air* and *water* conftitute the nutritive ingredients of plants. 5. On improving the breed of horned cattle, fheep and hogs. Mr. L'H. thinks the changing and croffing the breed of thefe animals a matter of great importance in hufbandry, to prevent dwindling and degeneracy of the ftock; and illuftrates his doctrine by the experiments of Mr. Eaton and Mr. Clift, in New-York, and by extracts from the publifhed fales by Englifh farmers. 6. Method of diftilling ardent fpirit from potatoes, with obfervations—from the fourth volume of the Bath papers. The object is to fhow that feventy-two pounds of potatoes will afford five quarts of brandy, and, of courfe, that one hundred pounds, which Mr. L'H. fuppofes will amount to about two bufhels, will make feven quarts, and be worth feven fhillings. Whence he is led to afk, "Whether it would not be much for the intereft of our *new* country to make brandy from potatoes rather than from wheat or rye, which are fo much wanted by the new fettlers, and will bear tranfportation to market, to enable the farmer to preferve the neceffaries he wants? and whether it would not be better for our *old* fettled country to make their fpirits from potatoes rather than from apples, which would afford cyder, which is more wholefome and palatable than the fpirits made from that fruit?"

We likewife obferve feveral papers under the fignature of Samuel L. Mitchill. They are as follow: viz. 1. Obfervations on canker-worms, a fpecies of phalæna exceedingly injurious to orchards of apple-trees. The object of the writer is to fhow that the male only of this fpecies of infect has wings, but that the female is apterous, and can only creep; that fhe afcends the trunk of the tree from the ground, as early in the fpring as the 25th of March, and depofits her eggs upon the nafcent leaves; and that the way to prevent their ravages would be to impede their progrefs as they crawl up to the branches. 2. On the providential or white-knobbed clover. This is a note, accompanying fome clover feeds, received from England under that name, faid to be a new fpecies of trefoil. The trials made with it have not, that we have learned, fhown that any advantage arifes from the cultivation of it. 3. A fketch of the mineralogy of the State of

New-York. This is an abſtract of the report which the Commiſſioner preſented to the Society, after having made a tour, purſuant to their appointment, in 1796. The particulars of this may be much more completely and correctly ſeen in our vol. i. p. 293 and p. 445 firſt edit. and vol. iii. p. 325.

There are ſeveral other papers in this volume: as, 1. An account of ſome of the natural productions of the weſtern parts of the State, by John W. Watkins. 2. On the effects of ever-green trees in augmenting the coldneſs of climates, by Noah Webſter, jun. 3. On the cultivation of the poppy-plant for opium, and of palma chriſti for caſtor-oil, by Shadrach Ricketſon. 4. On the effects of nitre and ſalt-petre in promoting the growth of corn and wheat, by Robert Johnſon. This writer's directions are thus expreſſed:

"Take three ounces of ſalt-petre, bruiſe it fine, and diſſolve it in as much ſoft or brook water as will immerſe one half buſhel of corn, to which add one pint of ſtrong ley; ſteep the corn in this liquor, before planting, twenty hours, then ſpread it on a dry floor about five or ſix hours, when it will be fit to plant. I make no doubt but this treatment would be uſeful to ſeed wheat or other grain, and ſhall here relate an experiment I made about two years paſt. Late in the fall, a neighbour of mine being at my houſe, was lamenting that he had met with ſome embarraſſment that had prevented him from ſowing part of his crop of wheat in proper time: I told him, if he would follow my directions, I would engage the wheat he would now ſow would be as forward in growth as what he had ſown a fortnight paſt. He promiſed to follow whatever I would preſcribe; and I gave him as much ſalt-petre as was ſufficient for what wheat he had to ſow, enjoining him, at the ſame time, to give me an accurate account of the ſucceſs of his crop. About the time his wheat was fit to reap, he came and told me the wheat he had ſown by my directions was on the ſame kind of ground his other wheat was ſowed on—that it was ſooner ripe—that it grew four inches longer than what he had ſown early, and was at leaſt 25 per cent. better."

5. Obſervations on marle, by the ſame. He informs the ſociety, that in Eſſex and Suſſex counties, in New-Jerſey, there are good beds of marle, and that he is confident it may be found, in great abundance, in New-York. 6. An experimental eſſay on the properties of the gallium tinctorum, and its uſe in the art of dying, by Profeſſor Woodhouſe. 7. Deſcription of a new-invented fire-place, by John Stevens

The book alſo contains the report of a committee appointed to report a plan for the preſervation and propagation of trees; as wood for timber and fuel are becoming ſo alarmingly ſcarce; and a part of the repreſentation made to the Legiſlature, on the beſt mode of ſalting and preparing beef for exportation, being the ground-work of the act relative to this ſubject, paſſed during the ſeſſion of 1799.

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ART. IV. *A Treatiſe on the Nature, Origin and Progreſs of the Yellow Fever, with Obſervations on its Treatment; comprizing an Account of the Diſeaſe in ſeveral of the Capitals of the United States; but more particularly as it has prevailed in Boſton. By* Samuel Brown, *M. B. Boſton.* Manning *and* Loring. 8vo. pp. 112. 1800.

ON peruſing this Treatiſe, we find it is a prize-diſſertation, the ſubject of which was propoſed by the Humane Society of Boſton, and which we announced in our vol. iii. p. 413. That town, in common with all the other principal ſea-ports of the United States, has been ſeverely viſited, of late, by peſtilential diſeaſes; and it gratifies us to obſerve, that its public-ſpirited inhabitants have not been idle ſpectators and ſufferers of this calamity. The medical gentlemen of Boſton have ably co-operated with their brethren in other parts of our country, in the inveſtigation of this ſubject. In that town we are happy to recognize ſeveral diſtinguiſhed phyſicians, who have not only meritoriouſly exerted themſelves in this inquiry, but whoſe whole character does honour to their country and to their profeſſion.

To the author of this Treatiſe, already favourably known to our readers by his attention to this ſubject (ſee our vol. ii. p. 390, firſt edit.), was adjudged, after careful deliberation, the premium of the Humane Society. The firſt part of the performance is chiefly devoted to the hiſtory of the diſeaſe, as it prevailed in Boſton in the ſummer and autumn of 1798. The leading facts on this point were ſtated in the paper juſt referred to, and do not materially differ from ſuch as have occurred in other places.

In tracing the cauſes of peſtilential diſeaſes, our author reviews many of the more prominent facts concerning the operation of marſh exhalations and human effluvia. For this purpoſe he ſtates inſtances of the occurrence of ſuch diſeaſes in ſome of the moſt baneful climates in the world, where the relations of cauſe and effect are ſo evident and pointed as to preclude all doubt on the ſcore of origin and locality. As to the conſtitution of this peſtilential principle, he ſets forth, and is inclined to adopt, the opinion of Dr. Mitchill, that it is formed by the different modifications of ſeptic (azotic) and oxygenous matters evolved and chemically combined in the putrefaction of animal and vegetable ſubſtances. Conformably to th s doctrine of the noxiouſneſs of the acid of putrefaction, he mentions the ſalubrious properties of alkaline and calcareous ſubſtances, and of all the neutral ſalts whoſe alkaline baſes may be ſeized by this ſtronger acid.

The treatment of this diſeaſe in Boſton did not materially differ from that adopted in moſt other places. It is thus deſcribed, in general terms, by our author:

" The method of cure generally adviſed and purſued by the phyſicians here, was conciſely this:—On the commencement of the diſeaſe, or in the firſt paroxyſm, when there is great heat and convulſed motion of the heart and veſſels, evacuate thoroughly and univerſally, by mercurial cathartics, by diaphoreſis, and by blood-letting: all theſe, with poultices, fomentations, pediluvium, bathing (cold and warm), bliſtering, enemas, &c. in ſuch extent, variety, and continuance of application, as circumſtances require. After one or two effectual cathartic evacuations, give mercurial pills, of one, two, or three grains, every one, two, or three hours, as ſymptoms ſhall indicate. Move the bowels with ſomething cathartic, every, or every other day. *Drinks*—ſubacid, diluent, emollient. Continue thus till arterial commotion and heat ſubſide, ſecretions and excretions are in ſome meaſure reſtored, and the ſigns of returning health appear: then uſe reſtoratives, viz. wine, bark, &c. *Food*—light and eaſy to the ſtomach, but generous and gently ſtimulating; in ſmall quantities, and often."

Among preventative means, the author enumerates moſt of thoſe regulations of police which have been ſo often urged, and ſo commonly neglected, or inadequately executed, in American cities. Theſe ſuggeſtions are of great importance, and deſerve to be reiterated on every proper occaſion. But it is to be feared that a much longer lapſe of time, and more accumulated experience of the ravages of ſuch diſeaſes, will be neceſfary to induce our countrymen to adopt efficacious means of combating the effects ariſing from the infelicities of our climate, and from thoſe peculiar local circumſtances in which we eſpecially differ from the regions of northern and weſtern Europe. This is one of the many points in which the citizens of the United States are unwilling to detach themſelves from tranſatlantic habits and prepoſſeſſions, and to conform to that ſyſtem of duty and intereſt which nature and reaſon combine to impoſe.—The other directions which are given by our author concerning diet, and particularly the moderate uſe of animal food, as well as of diſtilled and fermented liquors, concerning perſonal cleanlineſs, dreſs, the regulations of exerciſe and labour, government of the paſſions, the avoiding of expoſure to cold, night air, &c. &c. and likewiſe the preſerving regularity of the inteſtinal diſcharges, are all ſo judicious and proper that we are confident they will be adopted by every reader.

Dr. Brown denies that yellow fever is originated or propagated by any ſpecific contagion. After exhibiting many ſtrong examples and authorities in ſupport of this opinion, he proceeds thus:

" The facts and conſiderations already adduced, ſeparate from what might be further obſerved, ſhow, ſufficiently clearly, that thoſe only are rightly denominated contagious diſeaſes which invade the conſtitution only once; which act, with almoſt equal effect, upon every variety of conſtitution, and temperament of body; which always bear the ſame type, and are invariable in their characteriſtic ſymptoms; and which are not changed, in theſe reſpects, by climate, or by any variety of atmoſphere: but thoſe diſeaſes which are either ſporadic or epidemic, according to the quantity and degree of heat, cold and moiſture, or which vary with the ſtates and conditions of the atmoſpheric elements; which are confined to particular complexions, conſtitutions and climates; which are capable of every degree of variation in type and ſymptom, from the mildeſt form up to the higheſt degree of malignancy; which invade the conſtitution an indefinite number of times, and with the greater malignity the oftener it has been attacked, are not ſpecifically contagious; they may be called infectious, if by infection we underſtand the effluvia of putreſcent ſubſtances, elevated by heat, and then denominated the gaſeous oxyd of azote; or, combined with oxygen, forming ſeptic acid gaſes. Inaſmuch as theſe materials, thus produced, and diffuſed in the atmoſphere, thereby deſtroy its ſalubrity, and occaſion fuch a depravity as to give rife to putrid difeafes, either fporadic or epidemic; according to the locality or more general extent of the peftilential atmofphere, it is accurate to fay that fuch difeafes depend upon certain ftates or certain viciffitudes of the atmofphere, together with fuch other caufes as produce debility in the conftitution.

"The beneficial confequences which would refult from a full and an implicit adoption of the doctrine above advanced, are numerous and important. In general, we fhould no longer find men wafting their time and ingenuity in infifting upon an ideal being, a *fomething* and a *nothing*, as the fource of epidemic difeafe, and in tracing it from city to city, from continent to continent; which, when traced to where they *choofe* to find it, will not allow it to be any thing obvious to the fenfes—cannot be known by any chemical teft—is 'imperceptible,' &c. &c. On the contrary, we fhould fee that the fource of mifchief might be among ourfelves, and is the offfpring, however monftrous, of our own vices; by thefe it is nurtured; the parentage and filiation is [*are*] wholly ours. We fhould be convinced, that there is not a city or town, in any climate, fea-port or inland, houfe or habitation in either, wherein malignant difeafes may not originate. The regulations neceffary to cleanlinefs, in doors and out, would be unremittingly attended to; and any thing that might tend to deftroy the healthy temperament of the atmofphere, either generally or locally, would be immediately profcribed, by thofe vefted with adequate authority."

We cannot conclude without expreffing approbation of the difpofal of the patronage and premium of the Humane Society of Bofton, on this occafion, as worthy of an enlightened and patriotic affociation; and we recommend the perufal of the pamphlet to all who are defirous to fee a brief and compact exhibition of fome of the more important facts and authorities concerning this fubject. The author difplays the features of an inquifitive and difcriminating mind. We hope he will continue to employ his refearches in a courfe where fo many interefting things are ftill to be learned, and where fo many incentives are found to urge the purfuit.

Art. V. *Tranſactions of the American Philoſophical Society, held at Philadelphia, for promoting uſeful Knowledge. Vol.* iv. *Philadelphia.* Dobſon. 4to. pp. 531. 1799.

THIS volume preſents to the public a continuation of the labours of the oldeſt aſſociation for promoting ſcience in the new world. Founded principally by the enterpriſe, exertions and influence of Dr. Franklin, this Society has preſerved, from the period of inſtitution to the preſent moment, much of that zeal for the advancement of practical and ſubſtantial inquiries, as well as of ſound learning in general, which diſtinguiſhed the character of that illuſtrious citizen. The efforts ſince made, in ſome of the other States, to promote the ſame objects, may, perhaps, in part, be juſtly aſcribed to the excitement and emulation originally inſpired by the reputation and ſucceſs which have invariably attended the career of the Philoſophical Society at Philadelphia.

This ample volume contains ſeventy-ſix communications on a great variety of ſubjects. Though we have not confined our work to objects merely medical, nor even always to diſcuſſions uſually ſuppoſed to bear relation to medical objects, we deſign, in the review of this volume, as its contents are ſo numerous as well as multifarious, to purſue a more reſtricted courſe, and to examine ſuch papers only as claim the notice of profeſſional readers.

The firſt paper conſiſts of *experiments and obſervations relating to the analyſis of atmoſpherical air, by the Rev. Dr. Prieſtley.* Two poſitions are attempted to be experimentally eſtabliſhed in this paper: firſt, that, in what he calls the *phlogiſtication* of atmoſpherical air, there is not merely an abſorption of one portion of it, to wit, the oxygenous portion, but that the phlogiſticating material emits a ſomewhat which may be properly called phlogiſton, or the principle of inflammability: and, ſecondly, that the baſis of phlogiſticated air, or azote, is compoſed of phlogiſton and dephlogiſticated air, and is not a ſimple ſubſtance, as the antiphlogiſtians contend to be the caſe in the preſent ſtate of chemical knowledge.

In order to ſupport the former of theſe poſitions, Dr. P. adduces the experiment of phlogiſticating air by a mixture of iron filings and ſulphur with a little water. Here hydrogen gas, or fulphurated hydrogen gas, will be extricated. There is no doubt that iron, in the ftate in which it is commonly prefented to us, contains hydrogen; it contains carbon alfo, more efpecially caft-iron, in which the quantity of carbon is confiderable: of confequence, the antiphlogiftians, in maintaining that iron and zinc are fimple fubftances, undoubtedly run into error.—Dr. P. made another fet of experiments with *calcined black bones*, by heating them in air confined over water, by means of a burning lens, till they became white. Thefe bones gained no addition of weight; the air was diminifhed, and the remainder of it was completely phlogifticated. But it is furely not difficult to explain this on antiphlogiftic principles. The pure air, by combining with the carbonic matter of the black bones, formed fixed air, which was abforbed by the water; while the whitened bones, by the abforption of water, and, perhaps, of fome portion of the pure air, received a compenfation for the weight loft by parting with their carbon. This feems to be proved by Dr. P.'s own acknowledgment, that " when thefe bones are heated over lime-water, there is a copious precipitation of the lime." The Dr. alfo admits, that " in thefe experiments with bones there is fometimes a fmall lofs of weight." Similar refults were obferved from experiments made with fmall polifhed *fteel needles*: for when they were heated fo as only to become blue, and were not melted, they gained little, if any, weight, and diminifhed the air nearly in the fame proportion as the black bones, leaving the remainder almoft completely phlogifticated. The only way in which we can account for thefe experiments, is by fuppofing the fteel to have been only flightly oxydated, and the remainder of the pure air, with the hydrogen of the fteel, to have formed water.

To eftablifh his fecond pofition, that phlogifticated air, or azote, is not a fimple fubftance, but confifts of phlogifton and dephlogifticated air, Dr. P. brings forward feveral experiments. He mentions a fact related by M. Metherie, that after a mixture of dephlogifticated and inflammable airs had been kept a long time, the mixture was found to contain a confiderable portion of phlogifticated air. Dr. P. found, himfelf, that thefe two kinds of air unite completely by being confined fome time together in a moift bladder. But the inference of union, in this cafe, feems not to be abfolutely legitimate, when we recollect the experiment, made a long time ago by our author, to prove that dephlogifticated air may readily pervade the coats of a moiſt bladder. Another argument in favour of the union of dephlogiſticated and inflammable airs, in forming phlogiſticated air, is drawn by Dr. P. from the experiment of producing the latter by expoſing inflammable air to a ſurface of ruſted iron, which is known to become ſo by imbibing pure air. In the courſe of this experiment, the iron, from being red, became of a very dark colour. It ſeems to us to be a more probable ſuppoſition, that the baſe of inflammable air, which we admit to enter into the ordinary conſtitution of iron, was, in this caſe, gradually abſorbed by the iron, and that the remaining phlogiſticated air was the reſult of azotic matter which had been entangled in the ruſt, or of the ſame matter introduced by the accidental and almoſt unavoidable impurity of the inflammable air.

The ſecond paper, which alſo comes from the pen of the Rev. Dr. Prieſtley, is entitled, *Farther experiments relating to the generation of air from water.*

Having, in a former publication, delivered an account of ſome experiments made to prove that air may be produced from the ſame water, by means of heat and the Torricellian vacuum, without any perceivable limit, the learned author, in this communication, ſtates the reſult of farther experiments, to throw light on the ſubject. He had not obtained from water, in the former ſet of experiments, any other kind of air than ſuch as was, in a greater or leſs degree, purer than that of the atmoſphere; and, therefore, he ſuppoſed that this might have been the ſource of all atmoſpheric air. But he has "ſince found, that though the firſt quantity of air that is expelled from water is much purer than that of the atmoſphere, the next is leſs pure, and, at laſt, is wholly phlogiſticated." It may be inferred from this fact, according to the opinion of our author, "either that the air produced from water is not that which had been imbibed from the atmoſphere; or that, though it imbibes moſt readily that which is pureſt, it retains, with the greateſt obſtinacy, that which is leaſt pure, which is analogous to other chemical affinities." With the view of carrying the experiments on this ſubject as far as poſſible, Dr. P. endeavoured to convert the whole of a ſmall quantity of water into air, but without effect.

After the experiments thus made with water, our author proceeded to make ſimilar ones with ſpirit of wine; and found that inflammable air is produced, without any limitation, as far as he could diſcover, from repetition of the proceſs.

Dr. P. concludes his account of thefe experiments with the following obfervations: " The only objection that, after giving much attention to the fubject, I think, can be made to the conclufion that I firft drew from thefe experiments, viz. that air is actually produced from water, is the very fmall quantity that is produced in proportion to the bulk of the water, after the air naturally contained in it is wholly expelled. But if it fhall appear, after a long courfe of time, that this fmall production of air, from the fame water, is conftant and equable, I do not fee how the conclufion, extraordinary as it may be thought, can be difputed. This air being wholly *phlogifticated*, is a fufficient proof that the air fo produced is not abforbed from the atmofphere in the courfe of the procefs: for then it would have been dephlogifticated, or, at leaft, purer than that of the atmofphere, which water always feizes upon in preference to that which is impure."

Dr. P.'s diftinguifhed accuracy in conducting experiments fcarcely allows the fuppofition of any material error from that fource. And if we take his facts for granted, we cannot fatisfactorily reconcile them to the conftitution of water affigned by the antiphlogiftic theory.

*(To be continued.)*

# Medical and Philofophical News.

## DOMESTIC.

### WATER-WORKS IN THE CITY OF NEW-YORK.

THE Manhattan Company, incorporated by an act of the Legiflature, paffed April 2, 1799, for the purpofe of fupplying the city of New-York with pure and wholefome water, have already made great progrefs in that excellent work. The water, which is of a good quality, is raifed, by means of forcing-pumps and the ftrength of horfes, from a well on the fide-hill in the rear of the debtor's prifon. From the refervoir in its neighbourhood, which is on a high and commanding piece of ground, the water is conducted through bored pine logs to the different parts of the town. Already the principal ftreets are furnifhed with thefe aqueducts, which are laid about three feet below the pavement. Private houfes are fupplied with the water by a fmall leaden pipe, reaching from the main conduit to their cellar or kitchen; and the expenfe, both of this and of the fupply of water by the year, is very moderate.—In paffing from the refervoir to its places of confumption, it lofes that extreme coldnefs which renders water frefh drawn from deep wells dangerous to be drunk in hot weather, and frequently deftructive of life. We have not heard of an inftance of any perfon killed, or even incommoded, in this way, by the Manhattan water. Befides the WATER, this company takes the lead in introducing CALCAREOUS MATERIALS, in the form of *lime-ftone* and *marble*, for fome of their works; and has already fhown, that ftone of this quality, from Hudfon's River, can be obtained as cheap as the filicious *fand-ftone* and *granite* heretofore generally in ufe.

### CALCAREOUS STRATA IN THE NEIGHBOURHOOD OF NEW-YORK.

Dr. J. Browne, the fuperintendant of the water-works, has happily afcertained, that there is, in the county of Weftchefter, near the margin of the Eaft-River or Sound, a confiderable ftratum of calcareous ftone, well adapted for building and flagging. It extends from Morrifiana many miles to the eaftward, and is very acceffible from a number of the principal landings. Some of the famples of the ftone he has exhibited to the Manhattan Company, are of a white and granulated or cryftallized ftructure, and fufceptible of a handfome polifh. It is eftimated it may be brought to New-York, by a water-carriage not much further than Hell-Gate, upon very moderate terms. Among the means of guarding againft peftilence in our cities, the introduction of calcareous ftone is an object of great concern.

CHEAP METHOD OF MANUFACTURING SULPHATE OF SODA *(Glauber's Salt).*

By calcining fulphate of lime (gypfum) and muriate of foda (common falt) together, in a brifk heat, with the addition of clay, M. Carendeffez has found that a double decompofition takes place in the dry way. The fulphuric acid joins the foda to form a Glauber's falt, while the muriatic acid connects itfelf with the bafis of gypfum into a muriate of lime. The cheapnefs of *plafter of Paris* and of *fea-falt* feems to render this procefs economical, as from them both fulphuric acid and foda are very conveniently procured. And the clay employed to aid the decompofition adds very little to the expenfe.

BLEACHING OF MYRTLE-WAX.

Travellers in Africa give us particular accounts of the *tallow-tree* of that continent (croton febiferum). The American foil produces a fhrub (myrica cerifera) whence *wax* can be derived in confiderable quantity, without the collecting and elaborating powers of the bee. Dr. Jofeph Browne, of the city of New-York, has difcovered a method of deftroying the *green* colour of this fubftance, and of whitening it, without the aid of the oxygenated muriatic acid. The procefs is cheap and eafy, and the candles made of it burn as well as thofe of fpermaceti. The American woods afford great numbers of thefe wax-bearing fhrubs, and the wax, when brought to market, fells for fixteen cents per pound, little more than the fum which tallow fells for. The lownefs of its price prevents the exertions of the people of the country to collect the berries and extract their wax; in confequence of which many tons of this valuable natural production are annually loft. Should the ingenious inventor of this new procefs eftablifh a manufactory for bleaching myrtle-wax, there would be a great ſaving to the country, and the article, when purified and refined, would be as fit for plaſters and ointments as for candles.

FOSSIL COAL ON THE RIVER LEHIGH.

A mine, affording coal of an excellent quality, has been opened, latterly, on the waters of the river Lehigh, in Pennſylvania. The place is ſaid to be a little north of the gap in the Blue Mountains. This is a fortunate diſcovery, and it is to be hoped that future reſearches will detect that invaluable inflammable ſubſtance not only in Pennſylvania, but on the upper branches of the Suſquehannah, in New-York.

LOCUSTS.

The following obſervations on locuſts, made, in the year 1715, by the Rev. Andrew Sandel,* then rector of the Swediſh church in Philadelphia, are left on the records of the ſaid church, in the Swediſh language, being, in exact tranſlation, theſe:—"In the month of May a peculiar kind of graſshoppers or flies, called by the Engliſh *locuſts*, iſſued from the earth. They came up every where, even on the hard roads. They were enabled to pierce the earth by means of a ſhell that covered the whole body, even the mouth and feet. Having iſſued from the earth, they crept out of their ſhells, flew about, placed themſelves every where on the trees, and made a peculiar noiſe. As they were in great numbers over the whole country, their noiſe was ſo loud that the people could hardly hear the bells in the woods. They ripped the bark of the trees, and put worms therein. Many expected that the trees would be dried by this; but we found, next year, that it did not happen. Swine and fowls fed on theſe inſects. The Indians did alſo eat them, eſpecially on the firſt arrival, after a previous ſlight roaſting: from this it is probable that they are of the ſame kind with thoſe eaten by John the Baptiſt. They were of ſhort continuance, dying in June."

*Remarks.* The worms mentioned were, no doubt, thoſe white worm-like eggs which the preſent locuſts depoſit in the bark. All the other circumſtances correſpond with thoſe that now take place.

That the locuſts were not deſtructive, appears by the account given by the ſame author, on the extraordinary fertility of that year, in wheat, rye, Indian corn, oats, and apples.

* This is the man whom Linnæus quotes (1 Amænitat. Academ.) in his hypotheſis of fever, as affirming the co-exiſtence of *intermitting fevers* and *argillaceous ſoils* in Pennſylvania.

That year was alfo remarkably healthy among the Swedes, as appears from the fmall number of deaths on the funeral records, which included a diftrict at leaft fifteen miles north, weft, and fouth from Philadelphia.

A great part of the little which is recorded on the natural hiftory, feafons, difeafes, &c. in the earlier times of Pennfylvania, New-Jerfey, and the now Delaware State, we owe to the Swedifh miffionaries.

The Swedifh congregation in Pennfylvania, owe alfo the principal part of their eftate to the zeal and wifdom of the faid Mr. Sandel.

NICHOLAS COLLIN,
*Rector of the Swedifh Churches, Pennfylvania.*

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### HISTORY OF THE TEA-PLANT.

We have received from Dr. Lettfom, of London, his *Natural Hiftory of the Tea-Tree.* It is a thin quarto, embellifhed with four moft elegant reprefentations of the *green* and *bohea* tea-plants; and of the *olea fragrans* and *camellia fefanqua*, which are fometimes employed to fcent the teas; all coloured from nature.—The fame liberal encourager and promoter of natural knowledge has likewife fent us the third edition of his *Naturalift's and Traveller's Companion*, a moderate octavo volume, full of excellent practical directions to the young inquirer.

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### AMERICAN GEOGRAPHY.

C. D. Ebeling, Profeffor of Hiftory, and Keeper of the Public Library in Hamburgh, whofe fourth volume of American Geography, in the German tongue, we mentioned in Med. Rep. vol. ii. p. 439, has publifhed a fifth. It is a large octavo of more than eight hundred pages, and comprehends his account of the States of Delaware and Maryland. We cannot difcover any diminution of the induftry and talents difplayed in the former parts of this laborious and interefting work. Convinced of the utility of communicating to European writers a true ftate of things as they exift in America, we again exprefs our hope, that the gentlemen of the United States who have leifure and opportunities, will aid Mr. Ebeling in his laudable undertaking, fo that the accounts printed in the eaftern hemifphere, concerning the prefent condition of the weftern, may be correct and authentic.

### CHURCHMAN'S MAGNETIC ATLAS.

We underſtand that a third edition of *The Magnetic Atlas*, with important improvements, is now preparing for the preſs, and propoſed ſoon to be publiſhed.

It ſeems this new work is much ſimplified, and intended to ſhow, by inſpection, at a ſingle view, the magnetic variation, on the different parts of the globe, for the commencement of the new century, ſo neceſſary to be known and allowed for by every navigator and land-ſurveyor, demonſtrated on the ſame projection as the former edition, with the addition of curve lines drawn through the different places where the variation is equal, thereby avoiding the trouble and difficulty of meaſuring angles. To render it as perfect as poſſible, Mr. Churchman, the author, has been engaged in making obſervations of the magnetic variation at different places on our coaſt, in order that the ſame may be applied to the purpoſe of aſcertaining the longitude at ſea; and the recent experiments prove the poſſibility of making obſervations with more accuracy than was apprehended, even by ſome eminent navigators.

### FATAL EFFECTS OF PUTRID EFFLUVIA.

A gentleman from the weſtern parts of the State of New-York, informs that a fever appeared in the townſhip of Franklin, near the Pennſylvania line, in the month of March laſt year, which carried off thirty-eight perſons, many of whom, Dr. Brett, who is one of the judges of the common pleas court of Delaware county, in the State of New-York, and was the phyſician who attended them, ſays, died with hæmorrhages and the black vomiting. He ſays the other ſymptoms of this fever agreed with the deſcriptions which have been given of the autumnal malignant fever of our ſea-ports. The ſame gentleman informs us, that a ſimilar fever appeared in Luzerne county, in the family of John Hawley, in June laſt, and that five of that family died with it. After the death of thoſe perſons a quantity of putrid potatoes were diſcovered in the cellar of Mr. Hawley, and to the effluvia emitted by them the fever was aſcribed. During the exiſtence of this fever, a fatal diſeaſe prevailed among the wild pigeons and ſwine in Luzerne county. Upon examining the bodies of the pigeons after death, a ſwelling was diſcovered in their throats, ſo great as to obſtruct their ſwallowing. In the gullets of ſome of them beech nuts were found ſticking between the ſtomach and the mouth.

## YELLOW FEVER IN THE WESTERN COUNTRY.

*The following Extract from Mr. Andrew Ellicott's Voyage down the River Ohio, in the Month of November,* 1796, *is calculated to throw much Light upon the Origin of the Yellow Fever.*

" *November* 15*th.*

" Arrived at Galliopolis about 11 o'clock in the morning. —This village is a few miles below the mouth of the Great Kanhaway, on the weft fide of the Ohio river, and fituated on a high bank; it is inhabited by a number of miferable French families. Many of the inhabitants, this feafon, fell victims to the yellow fever. The mortal cafes were generally attended with the black vomiting. This diforder certainly originated in the town, and, in all probability, from the filthinefs of the inhabitants, added to an unufual quantity of animal and vegetable putrefaction in a number of fmall ponds and marfhes within the village.

" The fever could not have been taken there from the Atlantic States, as my boat was the firft that defcended the river after the fall of the waters in the fpring: neither could it have been taken from New-Orleans, as there is no communication, at that feafon of the year, up the river, from the latter to the former of thofe places: moreover, the diftance is fo great, that a boat would not have time to afcend the river, after the diforder appeared that year in New-Orleans, before the winter would fet in."

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*The following Fact is communicated by Dr. Watkins, from his perfonal Knowledge.*

There is a village called New-Defign, about fifteen miles from the Miffiffippi, and twenty miles from St. Louis, containing about forty houfes and two hundred fouls. It is on high ground, but furrounded by ponds. In 1797 the yellow fever carried off fifty-feven of the inhabitants, or more than a fourth. No perfon had arrived at that village from any part of the country where this fever had prevailed, for more than twelve months preceding. Our informant refided in the village at the time; and, having feen the difeafe in Philadelphia, he declares it to be the fame that prevailed at New-Defign. He alfo mentions an Indian village depopulated by the fame difeafe two or three years before.

*Fever, with black vomiting, in the Middle Part of Pennfylvania, weft of the Sufquehannah. From a Communication of Dr. W. Harris to Dr. Mitchill.*

" *June* 23, 1800.

" The fever which prevailed, in the autumn and winter of 1799, in Nittany and Bald-Eagle Valley, in Mifflin county, Pennfylvania, proved, in a number of cafes, mortal. Bald-Eagle Valley, fituated about 200 miles N. N. W. of Philadelphia, is low, abounding with much ftagnated water in ponds, which, from the drynefs of the feafon, became very putrid and offenfive to the fmell. Near to thefe waters the fever prevailed with great malignity. It was ufhered in by chills, with pains in the back, limbs and head, which, in 48 or 60 hours, carried off the patients. They difcharged vaft quantities of filth from the ftomach, of the confiftence and appearance of coffee-grounds, fo offenfive in fmell as to produce naufea, and even vomiting, in the attendants. The fæces alfo had the fame appearance. In many the difeafe terminated by profufe difcharges of blood from the anus and vagina. Bleeding, in thefe cafes, appeared to afford no relief. The bark and tonics, with the liberal ufe of alkalies, were of the utmoft fervice."

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## CHEMICAL EXPERIMENTS ON THE MATTER OF BLACK VOMIT.

A memoir on the analyfis of black vomit, by Dr. Cathrall, was read before the American Philofophical Society at Philadelphia, on June 20th, 1800. This is a very interefting and inftructive paper. The experienced and intrepid author has given a defcription of the black vomit; has analyzed the fluids ejected a few hours before the commencement of black vomiting, and exhibited a fet of experiments on the matter of black vomit itfelf: to which he has added, experiments to afcertain the effects of black vomit on the living fyftem of man and other animals, and a fynopfis of the opinions of authors concerning its formation and qualities. The experiments fhow that this fingular morbid excretion contains an *acid*, which is neither *carbonic*, *phofphoric*, nor *fulphuric*; and, what our readers will hardly expect, that the black vomit may be *fmelled*, *tafted*, and *fwallowed*, without inducing yellow fever, or even any ficknefs at all—fo little infection or contagion does it feem to contain! He concludes it to be an altered ſecretion from the liver. Of theſe memorable experiments, which do great honour to Dr. Cathrall, we ſhall give a particular account in our next number.

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*A Caſe of Tetanus cured by the Cold Bath: In a Letter to Dr. R. H. Archer, of Baltimore, by Dr. William Harris, of Pennſylvania.*

SIR,

In the autumn of 1799, I viſited a labourer, about thirty years of age, of a ſlender make, but healthy, who was ſuddenly ſeized, whilſt in bed, with ſpaſms in his lower extremities, which ſhortly after affected his whole ſyſtem, but particularly his ſtomach, which was drawn in a hard lump, and protruded to a conſiderable diſtance. His pains were excruciating. He had a violent vomiting and purging, which came on an hour after ſeizure, and continued about two hours. At one time he had emproſthotonos, at another opiſthotonos, to the greateſt degree, and ſometimes complete tetanus. The muſcles of his face were drawn in every direction, and deglutition entirely impeded. His pulſe varied much, but was generally feeble. He could aſſign no cauſe for the attack. I bled him, put him in the warm bath, and uſed all the remedies laid down by medical writers, but without any mitigation of his pains, or relief to his ſpaſms.

At this time, which was twenty hours after the attack, when the cold ſweat of death appeared to be upon him, his tongue had refuſed its office, his eyes ſunk, having a glaſſy appearance, and his exit was every moment expected, it occurred to me that the cold bath might have a good effect; and, after conſulting his friends, who readily acquieſced, I had him, in this ſtate, carried in a blanket to a forge dam which was at hand, and plunged in. He was then inſenſible. His ſpaſms immediately abated, and, in twenty minutes, totally ceaſed. The debility induced by muſcular exertion was ſuch that it required ſeveral days before he could be removed; after which he rapidly recovered, and is at this time perfectly well.

This was a complete tetanus; and, I think, tetanus from wounds, &c. would yield to the ſame mode of treatment.

*Belle-Font, June* 12, 1800.

## CASE OF HYDROPHOBIA.

Died at Scarborough, on the 20th of June, of canine madnefs, a fon of Mr. Enoch Berry, aged ten years. This boy was bitten in April laft by a cat, which, at the time, was fuppofed to be affected with canine madnefs, and was immediately killed on that account.—The wound was perfectly healed in a few days, and the boy was apparently well till laft Tuefday, when he complained of the wounded hand's paining him. The fymptoms of madnefs foon after began. He refufed all food except apples, which he bit at and ate without touching them with his hands. Water was then offered him, and the phyfician ordered it poured out before him; but he turned from it with difguft, and was greatly agitated when he faw it. He tried to bite every thing which came in his way, and once faftened his teeth on his father's arm, took out a piece of the fleeve of his coat and fhirt, but fortunately did not touch the flefh. He had his fenfes perfectly at intervals, knew his friends, but was all the time in the greateft agonies. There were no great variations in the fymptoms, excepting that they grew ftronger, and his horror became more extreme until Friday evening, when he expired in the moft excruciating tortures.

## TREATMENT OF LOCKED-JAW BY ELECTRICITY.

Dr. Samuel Perry, of New-Bedford, has communicated to the public the fuccefsful refult of two experiments, in curing the locked-jaw by means of electricity. Previous to the application of the electrical fluid, recourfe had been had to bleeding, cathartics, antifpafmodics, the warm bath, and opium applied internally and externally, without the leaft effect in either cafe. But a fmall receiver being filled, and difcharged through the jaws of the perfons affected, they flew open inftantaneoufly. In one cafe the complaint was entirely removed by three fhocks, in the other by an occafional fhock for a few days. Both the patients were ftrong and healthy perfons, the one a man and the other a woman, and the mode of treating them had been fimilar.

## INFORMATION FOR AMERICAN BOTANISTS.

Profeffor Wildenow, of Berlin, in a letter to Dr. Mitchill, of March 1, 1800, offers to exchange the *feeds* and *dried plants* of Europe for thofe of America. To the botanifts of the United States, an overture of this kind, from a perfon of fo much reputation and experience, promifes numerous advantages. This learned gentleman is now engaged in editing a new edition of Linnè's Species Plantarum, to include the newly-diſcovered plants.

## MINERALOGICAL SOCIETY OF JENA.

The Mineralogical Society of Jena, in Saxony, have lately elected an inhabitant of New-York, Mr. Charles Loſs, a member of their aſſociation. Its preſident is the Count Von Seck, and its director Profeſſor Lenz. The number of members, in its catalogue, is two hundred and ſeventy-five.

## MEDICAL COMMENCEMENT IN PHILADELPHIA.

At the medical commencement, held in the city of Philadelphia, on the 31ſt of May, 1800, the Univerſity of Pennſylvania conferred the degree of Doctor of Medicine on ten candidates. Their names, with the titles of their inaugural diſſertations, were as follow: to wit,

Joſeph Trent, of Richmond, in Virginia—An Inquiry into the Effects of Light in Reſpiration.

Robert Berkeley, of Virginia—An Inquiry into the Modus Operandi of that Claſs of Medicines called Sedatives.

Edward Darrell Smith, of Charleſton, South-Carolina—An Attempt to prove that certain Subſtances are conveyed, unchanged, into the Circulation; or, if changed, that they are recompoſed, and regain their active Properties.

James Agnew, of Princeton, New-Jerſey—On Perſpiration.

John Parker Gough, of Charleſton, South-Carolina—Eſſay on Cantharides.

Alexander May, of Pennſylvania—On the Unity of Diſeaſe, as oppoſed to Noſology.

John Baptiſte Clement Rouſſeau, of Hiſpaniola—On Abſorption.

Joſeph Glover, of Charleſton, South-Carolina—An Attempt to prove that Digeſtion in Man depends on the united Cauſes of Solution and Fermentation.

John Moore, of Pennſylvania—On Digitalis Purpurea, or Fox-Glove.

Frederick Seip, of Philadelphia—On Cataract.

## MEDICAL LECTURES IN COLUMBIA COLLEGE.

The annual courſes of medical lectures in Columbia College, and in the New-York Hoſpital, will commence, as uſual, on the ſecond Monday of November.

COW-POX.

Dr. Pearſon, of London, has obligingly tranſmitted, in a letter to Dr. Miller, another thread impregnated with the matter of the vaccine pock, for the purpoſe of making trial of this ſubſtitute for the ſmall-pox in the United States. Dr. Pearſon alſo communicates the following articles of intelligence:

1. Mr. Carliſle's diſcovery of the ſingular arterial ſtructure of the tardigradus animals, or ſloth.

2. Herſchel's beautiful experiments on the diſtinction between ſolar light and ſolar heat, and terreſtrial heat and terreſtrial light.

3. Mr. Howard's fulminating mercury.

4. The uſe of plaſter of Paris three parts, and one part of ſtarch or flour, made into paſte, to be uſed in calico-printing, book-binding, &c. inſtead of common ſtarch.

5. The uſe of muriate of lime with ice, by the confectioners, to produce much firmer and colder frozen cream than with common ſalt and ice.

6. Citric acid is now manufactured, in a concrete ſtate, by Coxwell, and is as cheap as acid of tartar.

7. Carbonate of vegetable alkali is now manufactured in a cryſtallized ſtate, and it is permanent in the air becauſe it is alkali ſaturated with carbonic acid.

8. Volta's galvanic battery, by which ſhocks can be given, and even water be decompounded.

In a letter to Dr. Hoſack, communicated to Dr. Miller, Dr. Pearſon more particularly deſcribes this diſcovery of Signor Volta as follows:

"Volta has demonſtrated the galvanic influence by the following experiment:—Take a number of plates of zinc and ſilver of the ſame figure—ſay crown pieces—place them alternately on one another, with wetted paſte-board between each, ſo as to form a column. Then touch the bottom with a piece of iron or other metal well wetted, and the hand wetted—and the top of the column muſt be touched at the ſame time in like manner, by which you will feel a ſhock of electricity. Another proof is beautiful. Place on the ſide of the column a tube half an inch wide, filled with water, and ſtopt at each end with a cork—thruſt a wire through the upper cork to the middle of the tube, and another wire, in like manner, through the under cork, within half an inch of the point of the upper wire—and place the tube of water ſo armed on the ſide of the column of metal plates, to communicate by wire with the top and bottom. Thus you will ſee preſently a ſtream of air-bubbles riſing from the ends of the wire in the water, and aſcending to the top, which will be found to be hydrogen gas, if iron be uſed, and which will be oxydated at the point from which the gas riſes—but if gold, or platina, or ſilver be uſed for wire, the gas will be a mixture of hydrogen and oxygen gas, the water being decompounded. This you will underſtand from the nature of the metals uſed."

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### BURNS AND SCALDS.

We find ſome difference of opinion now exiſts among Britiſh ſurgeons, concerning the beſt mode of treating burns and ſcalds. Mr. Earle, of London, has juſt publiſhed an eſſay upon this ſubject, in which he recommends the immediate application of cold water, or water made colder by ice, which is to be renewed as often as it becomes warm. The cuticle of the burnt or ſcalded part is not to be removed, and all ſtimulant and oily applications are to be avoided. By theſe means, he aſſerts, the cure will be accompliſhed, without leaving ſcars or lameneſs of the part. The ſooner the ice is applied, after the accident has happened, the better.—Mr. Earle's eminent character will, doubtleſs, operate powerfully, with many, in favour of his plan of treatment.

On the other hand, Mr. Kentiſh, of New-Caſtle upon Tyne, ſtrongly adviſes the application of ſpirit of turpentine to burns and ſcalds as ſoon as poſſible; which he thinks the beſt adapted to promote a rapid ſuppuration, and to prevent the irregular marks and ſeams commonly following other modes of treatment. Many reſpectable ſurgeons adopt this remedy.—A caſe of ſevere ſcald is ſtated by Mr. Bell, of the Britiſh navy, in which the affected parts were copiouſly bathed with *ol. terebinth.* previouſly warmed by putting the phial into hot water; afterwards ſlips of linen, ſpread with *ungt. ceræ*, were applied. The pain was removed very ſpeedily, and the patient fell aſleep. The dreſſings of *ungt. ceræ* were only continued for a ſhort time: the affected parts were then duſted with hair-powder, which formed a ſcab that fell off in the courſe of a few days, leaving the ſkin underneath perfectly ſound.

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### DIGITALIS PURPUREA.

It appears, by the late medical publications in Great-Britain, that the inquiries concerning the powers and effects of digitalis in pulmonary conſumption, and in many other diſeaſes, continue to be proſecuted with great zeal in that iſland. Though unanimity is far from prevailing, almoſt all practitioners allow that it is one of the moſt active of medicinal agents, and that the cautious uſe of it may be ſafely adopted. So many inſtances of its complete efficacy in the early ſtages of conſumption are adduced, and ſuch proof, likewiſe, of its alleviating, for a time, the diſtreſsful ſymptoms incident to the laſt and fatal ſtage, that we ſhould hold ourſelves culpable in neglecting the notice of them. It muſt be confeſſed, alſo, that examples of the deleterious qualities of digitalis are not wanting; eſpecially where it is exhibited at firſt in too large doſes, where they are advanced too rapidly, and where the uſe of it is continued after the appearance of violent effects. Much diſquiſition has ariſen concerning the beſt mode of preparing this ſubſtance for uſe. A general preference of the recent herb ſeems to prevail; and the tincture, decoction and infuſion, particularly the firſt, are choſen rather than the powder. The nauſeating effects of it, inſtead of being ſought after as the ſource of benefit, are avoided, by many of the experienced employers of it, as the harbingers of ill. The retardation of the pulſe is not always conſidered as eſſential to its efficacy; but the change from hard, weak and ſmall, to ſoft, firm and full, is conſtantly conducive to recovery. Together with the uſe of digitalis, it is commonly enjoined to abſtain, as far as poſſible, from liquids, and to take ſmall quantities of ſolid animal food, at ſhort intervals. It is aſſerted that portions of beef, mutton or pork, not exceeding one ounce at a time, rather under dreſſed, well maſticated, and repeated about every two hours until ſix o'clock in the evening, then diſcontinuing the courſe, and reſuming it at about eight the following morning, will prove, in every ſtage of pulmonary conſumption, more ſtrengthening and ſalutary than the modes of nouriſhment commonly preſcribed. It has been alſo plauſibly propoſed to confine conſumptive patients to a diet of *animal food* and *cream* excluſively.

It appears, alſo, that the uſe of digitalis has been ſucceſsfully extended to the treatment of inſanity, ſtrangulated hernia, hydrocephalus internus, &c.

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IMMUNITY OF HOLLAND FROM THE PLAGUE.

The learned Dr. Blane, in a letter addreſſed to Sir John Hippiſley, member of the committee of quarantine of the Turkey Company, and in anſwer to certain queries propounded by the Turkey Company, informs us that the Dutch, the moſt commercial and cleanly nation in Europe, for a long time paſt, have been ſingularly careleſs of the means of excluding peſtilential diſeaſes; and yet they have been exempt from the plague for upwards of an hundred and thirty years. They were accuſtomed to import from the Levant, for the Britiſh market and their own, cargoes of unpurified raw materials, particularly cotton; and all this was done without contagion. They have no kind of lazarettoes: they make little, if any, diſtinction, between clean and foul bills: and their pretenſions of quarantine are mere empty forms, nugatory and inſufficient to deſtroy contagion, if contagion had adhered to their merchandize.

See Blane's Obſervations on the Diſeaſes of Seamen, 3d edit. p. 616 and 621. See alſo the remarks upon the means of cleanſing ſhips, and thereby preventing the generation of peſtilential poiſon, in the anſwer of the general committee of the citizens of New-York to the citizens of Philadelphia, in our vol. ii. p. 360 and 361, firſt edit.

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FRENCH INSTITUTE AT CAIRO.

A tranſlation of the memoirs relative to Egypt, written in that country, during the campaigns of Gen. Bonaparte, in the years 1798 and 1799, by the learned and ſcientific men who accompanied the French expedition, has been publiſhed in London by Mr. Phillips, in an octavo of more than four hundred and fifty pages, and juſt received in this city. The pieces are miſcellaneous. Among others we remark, in Gen. Andreoſſi's report upon the ſalt-petre and gun-powder of the country, that the ſeptite of pot-aſh is *found ready formed in the earth*, on the road from New to Old Cairo; while in France they are uſually obliged to obtain the nitre with an earthy baſis, by means of a ley, which is afterwards converted into ſalt-petre by means of pot-aſh, imported from foreign countries, and bought at a high price (p. 39).—Bruant, phyſician in ordinary to the army, mentions, as Proſper Alpinus had done before, the ſore *opthalmia* of Egypt (p. 111), and aſcribes it to a concurrence of external and internal cauſes: among the former is the ſcorching *nitrous duſt*, which the winds are conſtantly raiſing in clouds into the atmoſphere; among the latter, as Deſgenettes, the Phyſician-General obſerves (p. 62) it is ſymptomatic of diarrhœas and dyſenteries.—Berthollet, who viſited the ſix lakes of natron or ſoda to the weſtward of the Nile, is convinced that the mineral alkali found in them is produced by a decompoſition of the *muriate of ſoda, or common ſalt*, with which the waters are naturally impregnated: that this decompoſition is effected by the *carbonate of lime, or common calcareous rock*, which forms the ſtrata of ſubjacent ſoil in thoſe places, in the moiſt way; and that, by a double elective attraction, the muriate of foda and carbonate of lime are changed to a muriate of lime and a carbonate of foda (p. 308).—Berthollet alfo, in a valuable paper on eudiometry (p. 317), delivers it as the refult of his experiments, made both at Cairo and Paris, that the portion of oxygenous gas in the atmofphere is about the fame at both places, and that this is fomewhat lefs than *twenty-two* parts in the hundred, a confiderably fmaller proportion than moft experimenters had hitherto calculated.—Regnault has made an analyfis of the *flime of the Nile* (p. 388), which he finds to confift of eleven parts of water, nine of carbon, fix of oxyd of iron, four of filex, four of carbonate of magnefia, eighteen of carbonate of lime, and forty-eight of alumine, in the hundred. It is an excellent manure.—There is a piece, too, by Desgenettes (p. 358), on the *ufe of oil in the plague*, confirming its falutary operation, and fhowing, contrary to the moft current opinions *a priori*, that friction with it does not *obftruct*, but *open* the cutaneous pores, and thereby increafes perfpiration prodigioufly. But for further information we muft refer to the book itfelf.

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LETTERS FROM IRELAND.

Dr. William Patterfon, of Londonderry, in a letter to Dr. Miller, has been fo obliging as to enclofe a printed copy of two letters, one from Dr. William Drennan, of Dublin, the other from himfelf, addreffed to Jofeph Wilfon, Efq. American Conful, on the fubject of yellow fever. We are forry our limits do not allow us to re-publifh thefe letters in the prefent number. Thefe eftimable gentlemen certainly manifeft the moft benevolent wifhes for the deliverance of America from peftilential difeafes, and a warm and active fpirit of philanthropy. But they do not feem to have taken the requifite pains to obtain information on a fubject which calls forth all the fervour of their zeal, and all the tendernefs of their commiferation.

The opinions of Dr. Drennan are evidently predicated on the *fpecific and permanent contagioufnefs*, and thofe of Dr. Patterfon on the *importation* of the yellow fever. Thefe opinions reciprocally depend upon each other, and, of confequence, muft ftand or fall together. This is neither the proper time nor place to enter fully into fuch a difcuffion. If medical gentlemen are determined to confider a difeafe as fpecifically contagious, merely becaufe it affects many people at the fame time, they may find examples of fuch contagion in the intermittents of a marſh, in the pneumonia and phthiſis of winter, or in the gaſtritis of a convivial circle, whoſe viands are converted into poiſon by the admixture of arſenic. It gives us pain to ſee ſuch reſpectable phyſicians precipitately ruſhing into concluſions altogether unwarranted by the premiſes. If they read the lateſt and beſt performances of Britiſh phyſicians on the diſeaſes of the Weſt-Indies, they will find that the yellow fever is not a contagious diſtemper. Every merchant and planter in thoſe iſlands knows this fact. We aſſert that it is as little contagious in the United States. It only prevails within certain local ranges of air contaminated by the effluvia of animal and vegetable putrefaction; and, beyond theſe limits, is incapable of propagation.* Multitudes take the diſeaſe in our cities who never approach the ſick, the ſuſpected veſſels, or any fomites ſuppoſed to be imbued with contagion. The only poſſible mode of accounting for theſe caſes, is to aſcribe the illneſs to the patient's immerſion in an atmoſphere greatly vitiated throughout certain definite portions. Our preſent number affords ſeveral authentic inſtances of the ſame peſtilential diſtemper in the interior of our country, where importation was impoſſible, and where local circumſtances completely ſolve the difficulty. Dr. Drennan's plan of extinguiſhing the diſeaſe by high artificial heat would not ſucceed unleſs applied to a whole city, which he will grant to be impracticable; and Dr. Patterſon's doctrine of importation is inſufficient to explain the ravages of yellow fever at Galliopolis, and at Bald-Eagle Valley, in Pennſylvania, and at many other places.

Theſe gentlemen ſeem to be ſurpriſed that ſo little has been attempted by public authority, and ſo little accompliſhed by the medical profeſſion in the United States. But to infer imbecility in the government, or incapacity among phyſicians, becauſe the havock of yellow fever has not been arreſted, is, in our judgment, to take a narrow view of the ſubject. The devaſtation of peſtilence forms a mournful page in the hiſ-

* In aſſerting that the yellow fever is not contagious, let us be explicitly underſtood. We do not deny that the excretions of the ſick, in this diſeaſe, where cleanlineſs is not duly obſerved, may aſſiſt, like any other kind of animal putridity, in the formation of peſtilential matter. But we contend that this is not more likely to happen from the effluvia of a patient in yellow fever, than from the effluvia of one labouring under any other fever, or from the putrid vapours emitted by a gangrenous ulcer, or by a heap of dead and putrefying animal and vegetable ſubſtances, under ſimilar conditions of a hot, moiſt, and otherwiſe inſalubrious atmoſphere. How far this differs from the conſtitution of ſpecific contagion, ſuch as that of ſmall-pox and meaſles, every reader will be able to judge.

tory of every age and nation. It is to be lamented that American ſkill ſhould be in any degree baffled; but ſurely it is not without accumulated precedents. The energies of government, aided by all the wiſdom of the illuſtrious Sydenham and Morton, were inſufficient to ſtay the deſtruction of the plague in London in 1665. All the learning, diligence and zeal of the phyſicians of his Britannic Majeſty's forces in the Weſt-Indies, have not prevented thoſe iſlands from continuing to be the grave of Europeans. And, if we are not miſinformed, the mortality of ſcarlatina anginoſa, in ſome parts of England, has lately extended to nearly one-fourth of thoſe who were attacked, notwithſtanding all the ſplendid improvements of medical ſcience in Great-Britain.

While we thus freely animadvert upon the opinions of theſe gentlemen, we cannot forbear to repeat our high reſpect for their talents, as well as their motives on this occaſion; and we ſhall be extremely happy to receive their further communications on the ſubject.

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## FOREIGN.

### USE OF POT-ASH IN PUERPERAL FEVERS.

CITIZEN GUINOT, in a memoir inſerted in the xxxvii. number of the "Recueil Periodique de la Societé de Medecine de Paris," recommends, in ſtrong terms, from his own experience, as well as that of others, the uſe of the carbonate of pot-aſh (fixed vegetable alkali) in puerperal fevers. This medicine is employed as a preſervative againſt the invaſion of theſe fevers, as well as in the treatment of them, from ten to thirty-ſix grains in the courſe of a day. He alſo recommends the prudent uſe of ammonia for the purification of the air.

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### USE OF POT-ASH IN FISTULA LACHRYMALIS.

Citizen Pajot des Charmes read an eſſay on the effect of alkaline ſubſtances employed in the treatment of *fiſtulæ lachrymales*. He was induced to report his experiments on this ſubject, in conſequence of his having obſerved, that the uſe of a piece of linen, newly waſhed, and thus ſaturated with an alkaline ley, after ſeveral applications, effectually relieved the ſymptoms of that diſeaſe. This ſimple method, according to his experience, uniformly and perfectly removed the complaint.

*See Medical and Phyſical Journal.*

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NITROUS, NITRIC, AND OTHER ACIDS, IN SYPHILIS.

Mr. Blair, ſurgeon of the Lock-Hoſpital and Aſylum, &c. in a late work, entitled "Eſſays on the Venereal Diſeaſe and its Concomitant Affections," &c. ſecond part, delivers the following opinions concerning the powers of the acid remedies in that diſeaſe.

His general inference is, that the new remedies cannot be relied upon for the *radical* cure of the *ſecondary* ſymptoms of ſyphilis; but that the nitrous or nitric acid, given in conjunction, or alternately with mercury, may be highly uſeful in promoting the cure. He cloſes his work with the following concluſions:

1. Dyſpeptic and debilitated venereal patients, if they be not hectical, almoſt certainly receive benefit from the daily uſe of the acids, in conjunction, or given alternately with mercury, They not only have their general ſtrength and appetite improved, but are alſo enabled to bear the proper quantity of mercury much better than when it is adminiſtered alone.

2. In eryſipelatous, phagedenic, languid, fiſtulous, and irritable ulcers, where no venereal infection exiſts, and where mercury would probably do harm, the diluted acids are ſometimes aſtoniſhingly efficacious, employed externally as well as internally.

3. Old chronic pains and tumors in the bones, ligaments, and membranous parts, have been alleviated by the internal uſe of the new remedies; eſpecially when theſe ſymptoms aroſe from the mal-adminiſtration of mercury.

4. The nitric lotion is often ſerviceable in caſes of excoriated glans or prepuce, &c. accompanied with a puriform diſcharge, where the degree of ſwelling, pain, and inflammation is inconſiderable; but the common ſaturnine waſh appears to be equally beneficial, and has the advantage of never increaſing the inflammatory ſymptoms.

5. Gonorrhœa and leucorrhœa may now and then be removed by the acids, employed internally, or by injection; but they often will produce a troubleſome dyſuria, and are not ſo certain in arreſting thoſe diſcharges as the common means of cure.

6. Buboes tending to fuppuration, and indurated lymphatic glands, have fometimes been difperfed by thefe medicines; but in this refpect likewife they are inferior to other modes of treatment.

7. Although the refult of my own experience has not encouraged me to perfift in the ufe of M. Alyon's "oxygenated lard," feveral practitioners in London have compofed an ointment (impregnated with nitrous acid) which is highly ferviceable in herpetic, impetiginous, and itchy eruptions. In fuch cafes I have repeatedly feen good effects from the nitric mixture and lotion.

8. Moft of the local inconveniences which arife from an incautious ufe of mercury, fuch as ulcerated cheeks, fwelled tongue, fpongy gums, loofe teeth, fœtid breath and profufe falivation, however paradoxical it may feem, have been more fpeedily and effectually relieved by the internal exhibition of the acids, than by any other medical treatment hitherto employed; fo that, for thefe purpofes, I now truft to them confidently, and almoft exclufively.

9. Under no circumftances of difeafe, or peculiarity of conftitution, has the oxygenated muriate of pot-afh appeared to me preferable to the acids: but, on the contrary, the latter have proved much more beneficial, and lefs injurious to the fyftem, than the former. This remark, perhaps, will hold equally true of the oxygen gas; refpecting which, however, the evidence is at prefent too defective to ground any folid conclufions upon. I think, alfo, that very little reliance can be placed on the nitric acid bath, except for fome cutaneous affections.

10. I have never derived any manifeft advantage from increafing the daily quantity of the acids to more than two drachms; and, in common, I find *one meafured drachm* fufficient—either diluted in plain water, or qualified with fyrup, opium, or ardent fpirits. For a lotion or injection, I mix from twenty to fixty drops of the concentrated acid with a pint of pure water.

11. Of all the different acids, I have feen moft benefit from the nitrous or nitric. The latter is more palatable, though not more efficacious, than the former: but, in certain conftitutions, none of the acids will agree; and, in fome cafes, efpecially where confiderable inflammation exifts, it is highly improper to exhibit them. When they did not fpeedily improve the appetite, and afford an increafe of vigour, I have

ſeldom ſeen any future benefit to the general health from their continued exhibition.

12. Where the "ſaline anti-ſyphilitics," as they are called, have diſagreed, ſome of the following unpleaſant conſequences enſued: viz. violent nauſea, vomiting, flatulency, cardialgia, eroding pains in the ſtomach, diarrhœa, dyſentery, obſtinate conſtipation, heat in the bowels, conſtant itching of the ſkin, miliary eruptions, univerſal tremor, frequent cold ſhivering, extreme giddineſs, throbbing in the head, diſordered intellect, erethiſmus, irregular palpitation of the heart, intermitting and quick pulſe, dyſpnœa, ardor urinæ, forcing pain of the uterus, diminiſhed or ſuppreſſed ſecretion of bile, ſpitting of blood, hæmorrhage from the noſe, opthalmia, and phlogiſtic diatheſis; to which may be added (in ſome few examples) an injurious effect on the enamel of the teeth, inflamed lips, ſwelled cheeks, deep ulcers of the tongue, and copious ptyaliſm.

13. I regard the chemical explanation which has generally been given of the *modus operandi* of the new remedies, and of mercury in the venereal diſeaſe, as entirely hypothetical. But whatever be their reſpective mode of action, their ſenſible effects are not ſtrictly analogous to each other: for the ſalivation now and then ariſing from the free uſe of the acids, is very different from a mercurial ptyaliſm, being unaccompanied with looſeneſs of the teeth, ſpongy gums, or fœtid breath: and their conſtitutional effects, in many particulars, ſeem of an oppoſite nature from thoſe which are experienced by a long continued courſe of mercury.

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### INOCULATION OF THE VACCINE POCK.

The progreſs of the vaccine diſeaſe in Great-Britain, for ſome time paſt, has been ſuch as to afford ground for the expectation of its univerſal adoption. An inſtitution for the inoculation of it was founded in London, on the 2d December, 1799. It does not appear that the vaccine pock can be propagated, like the ſmall-pox, by effluvia from perſons labouring under it, nor indirectly from diſeaſed perſons, by adhering to clothes, furniture, bedding, letters, &c. Perſons who have undergone the vaccine diſeaſe are found to be thereafter unſuſceptible of the ſame diſorder; and ſuch as have already gone through the ſmall-pox are not ſuſceptible of the vaccine diſorder, as was believed ſome time ago. The ſlightneſs and ſafety of the vaccine pock are now aſcertained from the reports of many practitioners; and, as it does not appear that more than one out of 6000 has died under the new practice, it feems not unreafonable to infer, that the chance of life is, perhaps, greater during the inoculation than under the ordinary circumftances to which human beings are expofed.

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### CURE OF OPHTHALMIA BY SPIRITS OF TURPENTINE.

Dr. Matthew Guthrie, of St. Peterfburgh, in Ruffia, in a letter to Dr. Duncan, mentions the remarkable efficacy of the effluvia of fpirits of turpentine in the cure of an old and obftinate cafe of ophthalmia, which had refifted all the common remedies. It was difcovered by accident. The patient, an eminent artift, whofe difeafe had arifen from a too affiduous employment of his eyes on minute objects, in the purfuit of his bufinefs, aggravated likewife by the painful affiftance of glaffes, firft obtained relief of the inflammation of his eyes by the effluvia of this fubftance alone; and afterwards, of the remaining affection of the eye-lids, by the application of the fpirit itfelf. The pain and inflammation following this application were extremely fevere, but foon terminated in his complete cure.

*Duncan's Annals of Medicine for* 1799, *p.* 474.

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### HYDROPHOBIA.

Dr. A. Fothergill has lately publifhed an effay on "*The Nature of the Difeafe occafioned by the Bite of a Mad Dog*," in which there is much good fenfe and confolatory information.—This is one of the moft terrific and afflicting maladies to which human nature is fubject: but inquiries of this nature will ferve, we hope, to make it better underftood, and may lead to the application of an effectual remedy. Dr. F.'s examination is truly philofophic; and the maxim which he takes for his motto, *Principiis obfta, fero medicina paratur*, fhould be well confidered in the prevention of the malady attendant on the bite of a mad dog. Many curious facts are contained in this paper, which our limits prevent us from noticing: but the ingenious author has clearly fhown why the boafted medicines hitherto employed have proved ineffectual, and he has fuggefted a more probable method of prevention and cure. He confiders "hydrophobia as a fpecies of fpafmodic *angina*, produced by a fpecific contagion, which exerts its influence firft on the injured part, and afterward on the organ of deglutition." The indications of cure he ftates to be, 1ft, to diffolve the fatal connection between the injured part and the organ of deglutition; 2dly, to calm the violent fpafms, and ſoothe the nervous ſyſtem; and, 3dly, to ſupport the ſtrength and invigorate the whole frame."

Dr. F. recommends that the part bitten ſhould be ſucked; which method is as ſafe as it is ſimple. If the poiſon be ſuppoſed to have taken any effect, he adviſes (in agreement with moſt other medical men) that the part affected ſhould be cut out, and the wound cauterized, to prevent the irritation being propagated to the throat; applying alſo a ſharp bliſter to the throat, from ear to ear. In the ſecond place, he would diſſolve, in a pint of olive oil, half an ounce of camphor, and have the whole body diligently rubbed with it before a gentle fire: or he would plunge the patient in an entire bath of warm olive oil, if it could be procured, as a means of exciting a copious perſpiration: after this, in the third place, he would give the patient the moſt nutritious aliment.

*Monthly Review, April,* 1800.

# APPENDIX.

## ARTICLE I.

## PLANS FOR EXTINGUISHING PESTILENTIAL FLUIDS.

### No. I.

*Excellence of Calcareous Materials for building and paving Cities, particularly as reſpects their Power to overcome the exciting Cauſe of Fevers. In a Letter to the Hon.* RICHARD VARICK, *Eſq. Mayor of the City of New-York.*

*Eaſt-Rutger's-ſtreet, June* 18, 1800.

SIR,

I CRAVE the indulgence of the Chief Magiſtrate of the city in which I reſide, while, in a few ſentences, I ſtate ſome facts which ſeem to me capable of conducing to the good of the community. They refer to the *quality* of the materials which ought to be ſelected for the conſtruction of houſes, and for pavements of ſtreets, in cities. It will, I doubt not, become evident to you, that of all the incombuſtible ſubſtances of which houſes and pavements have been formed, calcareous earth, in the forms of *lime-ſtone* and *marble*, is the beſt.

The wholeſome operation of *lime* is ſo well eſtabliſhed, that nobody pretends to doubt it. In buildings it anſwers *two* purpoſes; the firſt as a *cement*, enabling the architect to make his pieces of ſolid materials ſtick together; and the ſecond as a *neutralizer of the noxious fluids* commonly produced where human beings dwell thick together. For the former of theſe purpoſes it is neceſſary that *crude* lime-ſtone ſhould be calcined; for, by that operation its carbonic acid is driven off, and the remaining earth rendered fit to be ſlacked, and turned to plaſter and mortar; but for the latter intention, this expoſure to fire in a kiln is not neceſſary, ſince the acid of peſtilence, by virtue of its ſtrong and corroſive qualities, is attracted by the earthy baſis, and overcome by it completely, without that proceſs.

A *marble* differs from a lime-ſtone not in its internal characters, but only in its external qualities, particularly as they affect the ſight. Strictly ſpeaking, all *marbles* are *lime-ſtones*, and ſo, indeed, are *chalks*. And lime-ſtones are dignified with the appellation of marbles when they receive a high poliſh, and poſſeſs a luſtre and colours agreeable to the eye. In all their forms, lime-ſtones and marbles conſiſt chiefly of lime united to "carbonic acid," called alſo "fixed air." And theſe two ſubſtances commonly form rocks and ſtones of great compactneſs and durability. Lime-ſtone, then, though it will not anſwer the purpoſes of BEAUTY ſo well as marble, is quite as good for the uſes of architecture and of HEALTH. When intended to conſtitute the chief and ſolid material of a building, it muſt be uſed in its *crude* ſtate; when wanted as a cement, it muſt be *burned*.

*Crude* lime-ſtone and marble being thus capable of attracting and deſtroying infectious fluids, it became a ſerious matter of inquiry with me, more than a twelve-month ago, whether large tracts of country, underlaid by ſtrata of theſe ſubſtances, were in any degree exempted from febrile diſtempers? The immunity of ſuch regions from intermittents, remittents, dyſenteries, and the more malignant forms of fever, is moſt remarkable in many parts of the earth.

Struck with the comfortable reſult of this part of the inquiry, it immediately occurred to me, that if a city was built of theſe materials, it ought to be very healthful, as reſpected the cauſes and exiſtence of *fevers* at leaſt. I had not ruminated on the ſubject long, before Mr. Da Coſta, an intelligent Portugueſe gentleman, gave me a deſcription, in writing, of the city of LISBON, built of theſe very materials, and at once one of the moſt *naſty* and moſt *healthy* places in Europe.

Finding thus a great city ready built to our hands, my ſpeculations no more appeared in the light of a project. The experiment had long been made, and their truth was manifeſt. I then recollected to have admired very much the chalky ſoil of Oxfordſhire, in England, when I was there, ſurrounding, to great extent, the city and univerſity of OXFORD. Chalk is but a ſofter kind of lime-ſtone; and this celebrated ſeat of learning is remarkably healthful.

Immediately it came to my remembrance, that the handſome ſtructures with which I had been pleaſed ſo much at BATH, upon the Avon, were compoſed of lime-ſtone too. Here was another coincidence between great healthfulneſs and calcareous materials for buildings.

In the collection of mineralogy I had made for Columbia College, I knew there was a piece of the rock which constitutes the SOMERS ISLANDS, and of which the houses at St. George's, in BERMUDAS, are composed. By experiments made on this specimen I became convinced of its calcareous nature. And this place is proverbial for its salubrity.

Soon afterwards Major Imrie's description of the mountain of GIBRALTAR fell into my hands. That discerning officer calls this famous promontory "a mountain of marble." I procured a piece of this rock, and am satisfied, by experiment, of its calcareous composition. Gibraltar also is famed for its friendship to the health of man.

In short, having been lately on a journey to Pennsylvania, I observed that EASTON, NAZARETH, and BETHLEHEM, in the county of Northampton, were built of lime-stone. These, and particularly THE LATTER of these villages, after more than fifty years experience of the Moravian brethren, has a remarkable correspondence with the places already mentioned in point of health. Febrile distempers are very rare.

It now appears to me, the efficacy of *lime-stone*, *marble* and *chalk*, in their ordinary, natural, or crude forms, to prevent febrile diseases by absorbing and destroying their exciting causes, is thus most amply verified. What have the citizens of such places as New-York and Philadelphia to do but to introduce it into use? Fortunately for our city, the Hudson runs through a lime-stone country for miles between Poughkeepsie and Newburgh; and, even on this side of the Highlands, it is found at the base of the Donderberg, and is plentiful at Verplanck's Point. It is submitted to your consideration, whether, as it may be so easily procured by water-carriage, it would not be wisest and best to require the inhabitants, by public authority, to have their buildings made of it? And whether it would not be worth the while to introduce it, as soon as possible, for paving side-walks and streets, as well as for flagging cellars, alleys and yards?

Providence has furnished calcareous earth with a liberality equal to its extensive utility. And, under the conviction of the great benefits to be derived to society from a plentiful and proper use of it, I have ventured to suggest these few considerations to you, with the hope, that if they should seem to you worthy of that honour, they may be laid before the Common Council of the city, as matter for reflection.

With sentiments of high respect,

I remain sincerely yours,

SAMUEL L. MITCHILL.

*City of New-York*, ſs.

AT a Common Council held on Monday, the twenty-third day of June, 1800, Mr. Mayor laid before the board a letter he had received from Samuel Latham Mitchill, Profeſſor of Natural Hiſtory, Chemiſtry and Agriculture in Columbia College, in which he recommends the uſe of lime-ſtone in the erection of buildings and paving ſtreets in this city, to promote the health thereof; which was read and conſidered by the Board; and thereupon it was

*Reſolved*, That the ſaid letter be publiſhed for the information of the public; and that Mr. Mayor be requeſted, on behalf of this Board, to thank Dr. Mitchill for his zeal and attention evidenced in the communications contained in his ſaid letter; and that they will be happy to receive ſuch further communications as he ſhall think proper to offer on the ſubject of the health of this city.

Extract from the minutes,
ROBERT BENSON, *Clk.*

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## ARTICLE II.

### No. II.

*Methods of counteracting the Miſchief occaſionally ariſing from the Interment of the Dead in Cities, by* BARILLA *and* CHALK. *In a Letter from* SAMUEL L. MITCHILL *to* JACOB DE LA MONTAGNIE, *Eſq. Alderman and Juſtice of the Police for the City of New-York; dated July* 16, 1800.

DEAR SIR,

THE printed copy of your report to the Common Council, concerning an improved plan of PROVIDING FOR THE POOR, I return to you, with the few remarks which occurred to me ſince yeſterday, written on the margin. Now we are on the ſubject of reforms, I ſhall, in reply to your letter of the 15th, communicate to you a few obſervations on what I believe to be a deſirable method of DISPOSING OF THE DEAD.

The evils experienced from long-continued and frequent interment of human bodies within the precincts of cities, have been ſo well foreſeen by the Common Council, that the diſpofal of the dead is conducted already in a much better manner than it ufed to be.

In ftrictnefs of conduct, the bodies of thofe who are dead ought to be carried quite out of town, and not be fuffered to putrefy near the habitations of the living. There are, however, *two* objections, in the prefent ftate of fociety and manners among us, to the execution of this in its full extent.

The *firft* is, the diminution of the revenue of fome of the religious affociations among us, by prohibiting interments near the places of public worfhip. It is ftated, that if the practice fhould be totally and fuddenly prevented, before other fources of income are opened, confiderable inconvenience would be experienced in confequence of it.

The *fecond* objection arifes from the habits of thinking and acting, in regard to funereal matters, indulged by many profeffors of chriftianity, that it is better to be buried in confecrated land, or—within, or, at all events, near a houfe of public worfhip, than any where elfe; and alfo that there is a fort of fociety in death, influencing families to wifh to lie together, and inclining the wife to be inhumed near her hufband, children near their parents, and, generally, relations in the fame vicinity. It is conceived, the feelings of many perfons would be deeply affected by a regulation peremptorily forbidding their remains to be laid in the church-yard or family vault.

Reforms of thefe kinds are commonly beft brought about by degrees; and, until the one contemplated in this cafe can be thoroughly effected, it will be our duty to prevent the mifchief refulting from the corruption of thofe human bodies which are committed to the earth in the central parts of populous places. The horrible effects of the vapours iffuing from thefe maffes of putrefaction, in many parts of Chriftendom, are fully detailed in an inftructive little volume, publifhed fome years ago in Paris, by Mr. VICQ. D'AZYR.

This prevention can be effected by furrounding the body with ALKALINE SUBSTANCES. Thofe which are entitled to a preference for the prefent purpofe are BARILLA and CHALK.

Barilla, or the SODA of modern commerce, is the fubftance ufed anciently in Egypt to prepare human bodies for embalming. Herodotus, the Greek hiftorian, has mentioned it as being employed for that purpofe. And the elder Pliny has written of its power to preferve dead bodies. There can be no doubt, by a found expofitor of the fiftieth chapter of Geneſis, that the bodies, both of JACOB and his eminent ſon JOSEPH, were kept ſweet and harmleſs by the barilla, which, according to the rites of the Egyptians, the phyſicians or embalmers applied plentifully to every part. Thus the corpſe of the aged patriarch was rendered capable of being tranſported to the cave of Machpelah.—The *ruler* of Egypt, under Pharaoh, being about to die, took an oath of the by-ſtanders, his countrymen, that they ſhould carry up his bones from thence. His death happened in the year 1635 before the Chriſtian Æra, and he was not, *at that time*, carried into the land of Canaan, to be depoſited with his father; but, one hundred and forty-four years after, Moſes, on departing with the Iſraelites, took the bones of Joſeph with him. And this affords a tolerable proof of the antiſeptic power of the barilla; for, without ſuch a preſervative, they would, probably, in a much ſhorter time, have crumbled to duſt. It is well worth the while to examine the learned and inſtructive commentary of CALMET* on theſe ſubjects.

This ſalt is produced *naturally* in Egypt, and dug out of the earth. But it is produced *artificially* in Sicily and Spain, from the aſhes of certain plants. There is great conſumption of it in the manufactories of ſoap and glaſs, for which purpoſes it is preferable to pot-aſh. Barilla, or ſoda, is better than pot-aſh to preſerve bodies from decay, and, at the ſame time, to render them innoxious. *Pot-aſh* attracts moiſture from the air, and runs to a liquid; *ſoda* parts with its water very readily, and turns to a powder. The *former* is highly corroſive; the *latter* very feebly cauſtic. Hence the ſuperior excellence of ſoda; for while it reſiſts the humidity of the atmoſphere, it attracts the acid of putrefaction, and thus guards

* On le met (le corps) dans le ſel (le *nitre* des anciens au la ſoude) pendant environ quarante jours, &c.—*they put the body in natron, or ſoda, for about forty days, after which they wrap it in bandages with myrrh, gum, &c.*—Ceux qui n'ont pas le moyen de faire cette depenſe ſe contentent de ſeringuer dans les inteſtins du mort, par le fondement, une liqueur tireè du cedre, et l'y laiſſant, enferment les corps dans le ſel du nitre. Ce ſel a la vertu de deſſeicher les chairs ſolides, et de les exempter de la pourriture, &c.—If the perſons are too poor to go to any conſiderable expenſe, the embalmers cleanſe the inteſtines by ſyringing, and put the body afterwards in ſoda, for ſeventy days, to dry it; and this is the ſubſtitute for the more coſtly mode of embalming. CALMET, *Commentaire Litteral ſur la Geneſe*, ch. L. p. 839.—Why have not phyſicians and philoſophers diſcerned that ſoda, which is ſo wonderfully preventative of putrefaction and its conſequences in the caſes related, could anſwer juſt as good a purpoſe in preventing the bad effects of corrupted beef, mutton, pork and fiſh, in barrels, in the holds of ſhips, and in the ſtomach and inteſtines of men?

the body from fpeedy decay, while it keeps it from degenerating to ftench and poifon. At the fame time it difcharges its carbonic acid or fixed air.

On account of the plenty of pot-afh and pearl-afh in the American market, barilla is rarely brought to New-York. It, at prefent, has no place in the price-current. In London, barilla from Carthagena fells for about one-fifth lefs than pearl-afh from America; and that from Sicily for about one-third lefs. There would be no difficulty in procuring it if wanted. It might be imported as ballaft, or *even manufactured at home.* The method of ufing it would fimply be to furround the dead body with this neat and white falt, by filling up the coffin with it.

Or, if foda could not be procured, or if prejudices were entertained againft it, POWDERED CHALK would fully anfwer the purpofe. *Chalk* is a fort of lime-ftone; for, in many places where it naturally abounds, it is burned to a calx, and ufed for mortar.—A notion has prevailed, that *quick*-lime is neceffary to overcome the dangerous effluvia of bodies. This is not the fact. *Quick*-lime, indeed, by its corroding quality, will diforganize, to a certain extent, the body to which it is applied. For this reafon, I fuppofe it is, that it has not been more generally ufed; as moft perfons have felt a degree of reluctance to fubject the bodies of their lately deceafed friends and relatives *immediately* to the action of that fierce and violent deftroyer. There is no need of applying lime in its *quick* or *cauftic* ftate. *Mild* powdered lime-ftone will do juft as well. PULVERIZED CHALK is powdered *lime-ftone*, and in a condition exactly fit for the purpófe. And if it is wanted in a ftill nicer form, *whiting*, well dried in an oven, will be found to poffefs the requifite anti-peftilential qualities. To furround a dead body, then, with *powdered chalk* or *whiting*, is a fafe, economical, and, as far I can judge, an unexceptionable practice. And if there is any thing confoling in the reflection, the furvivors may be affured that CHALK, as well as SODA, while it provides againft their noxious effects, will operate in preferving the mortal remains of their friends the longer from complete diforganization. And I refer thofe who defire proofs of this, to the innumerable relicks of animals, in beds of chalk and other forms of calcareous earth, all over the world.

With fentiments of friendfhip and much regard,
I remain cordially yours,
SAMUEL L. MITCHILL.

## ARTICLE III.

*Extracts from an Addrefs delivered before the Medical Society of South-Carolina, on the 24th December, 1799.*

*By* David Ramsay, *M. D.*

Gentlemen,

IN reviewing the medical hiftory of the year now drawing to a clofe, we obferve an unufual phenomenon. On the 11th of April, about three o'clock A. M. a fhock of an earthquake was obferved throughout Charlefton. Several of the inhabitants were alarmed by the rattling of windows and furniture, and were fenfible of a tremulous motion in every part of their houfes. It continued from fix to ten feconds. It was alfo felt in Beaufort, Chrift-Church Parifh, Georgetown, Statefburgh, and Camden, at or about the fame time. It was more violent in the two laft places, and was faid to have lafted more than a minute.

Some of our old citizens recollect, that on the 19th of May, 1754, a fimilar convulfion of the earth was obferved in Charlefton. With the exception of thefe two inftances, neither hiftory nor tradition inform us of any event of this kind, either before or fince the Europeans fettled in this place.

The late earthquake probably originated far to the weftward, and was only communicated to the fea-coaft by convulfion. Such events are more natural to hilly, mountainous regions, abounding with minerals, and are not much to be dreaded in our low, humid foil. The laft fummer has been moderate. There were no more than three days in the whole of it, in which the mercury rofe above 88. The 19th of July was the hotteft day, when the mercury rofe to 91. It reached to 89 only on two other days, viz. June 14th and July 15th. The coldeft day in the prefent year was January 7th, when the mercury fell to 23; but in thofe months which followed the fummer, it has not been lower than 30, which was its ftation on the 30th of November.

The earlieft froft in Charlefton was on the 13th of November. In the year 1798 there were not more than four months between the lateft and earlieft frofts; but in the prefent there have been more than fix. Dr. Rittenhoufe has obferved froft in Pennfylvania every month of the year, except

July. The circumſtance of our long exemption from this enemy of vegetation, gives us great advantages in the cultivation of ſuch articles as are of ſlow growth, and incapable of bearing cold. This is remarkably the caſe in our new ſtaple, cotton.

There have fallen, in the courſe of this year, rather more than 75 inches of rain. The laſt months of it have been uncommonly wet. In one day (the 25th of September) there fell upwards of eight inches of rain. In the months of Auguſt, September and October, there fell upwards of 35 inches. This is but little ſhort of what was obſerved by Bruce, in the countries near the ſource of the Nile, which furniſh the means of the annual inundation of that celebrated river. The long continuance of this damp weather has produced an uncommon number of rheumatic caſes, and has materially injured the cotton crops. The ſmall-pox was, early in the year, introduced in the natural way, and ſpread very generally by inoculation. It was remarkably mild. This diſeaſe has been, for ſome years paſt, much leſs formidable than it was thirty or forty years ago. It is a matter of conſolation, that while we are invaded by new diſeaſes, ſome of the old ones have moderated.

Till the month of Auguſt, the year has been healthy to all deſcriptions of people. The old permanent inhabitants have not ſuffered more, perhaps I might ſay not ſo much, even in the moſt ſickly ſeaſon, as had been uſual.

One ſolitary caſe occurred, in the month of May, of a perſon, thirty days from the Havannah, who died in this port of the yellow fever. In the month of June, ſome ſailors from a Spaniſh veſſel, and in the month of July, ſome other ſea-faring perſons, were ſeized with the ſame diſorder: about the middle of Auguſt it became epidemic, and continued till about the middle of October. Six or ſeven perſons fell victims to it in the month of October and the firſt half of November; ſince which it has diſappeared. The mortality from this diſeaſe, though conſiderable, was much ſhort of what common fame ſtated it to be. From the accurate inquiry made by your committee, it appears that the number of white perſons interred in the different burial grounds of this city, between the firſt of Auguſt and the firſt of December, was 362, and of that number 239 were ſtrangers. From the report of Mr. Brown, city-marſhal, made to the intendant, it appears that the whole number of perſons (incluſive of both white and black) interred in the different burial grounds of this city, in the months of July, Auguſt, September and October, was 544, and of theſe 123 were negroes. If we add twelve for the probable amount of the number of perſons who died in the city, and were carried into the country for interment, we have the extent of the mortality in Charleſton in the four moſt ſickly months of the year 1799, which comprehended the period in which the yellow fever was epidemic, and ſome time before and after.

Perſons coming from the higher northern latitudes of Europe and America, were moſt ſubject to this diſeaſe, and moſt rarely ſurvived it. The inhabitants of the country parts of South-Carolina had little better chance of eſcaping it altogether, or of recovering when attacked. Some inſtances occurred of perſons being ſeized with it, who had reſided one or two years in Charleſton; but of theſe ſeveral recovered. In general, the danger ſeemed to diminiſh with the length of time they had reſided, and their greater aſſimilation to the conſtitution of the inhabitants. Five or ſix children, from two to ſeven years of age, who had been born and uſually reſided in Charleſton, were carried off with this diſeaſe. There were few, or rather no inſtances clearly marked, of its attacking and proving fatal to adults who had been long uſed to the air of the city, though ſome of its ſymptoms uſually attended common fevers.

We have no reaſon to believe that the yellow fever was either imported among us, or communicated by contagion. It raged moſt in the north end of King-ſtreet, where the greateſt number of perſons from the country reſided, and in thoſe ſtreets where ſea-faring perſons uſually fixed themſelves.

No phyſician nor nurſe took the diſeaſe. Strangers who left the city, and afterwards ſickened and died in the country, were not the occaſion of death, or even of diſeaſe, to thoſe who attended them in their laſt illneſs.

Our knowledge of this fever is very limited. It appears that there is a certain ſomething in the air of Charleſton, that is comparatively harmleſs to the inhabitant, but the ſource of diſeaſe and death to the ſtranger. What is that ſomething? Whoſoever ſhall ſatisfactorily anſwer this queſtion, "*erit mihi magnus Apollo.*" Whatever it is, it is not neceſſarily deſtroyed by rain, for the diſeaſe prevailed moſt in Auguſt and September, which were the wetteſt months in the whole year. In the former it rained ſeventeen days, in the latter ten; in the two together there fell upwards of twenty-five inches of rain.

The yellow fever is eminently the diſeaſe of cities. Is it not, therefore, reaſonable to infer, that the more we aſſimilate our city to the country, the greater will be the probability of eſcaping it, or diminiſhing its violence? Would it not be wiſe in us, in addition to an unremitted attention to cleanlineſs, to plant ſuch trees as maintain their verdure throughout the ſickly ſeaſon, in our ſtreets, church-yards, and other open places? to cover our gardens, yards, and every vacant ſpot, with vegetables of large ſize and quick growth?

I need not mention before this learned ſociety, that we would thereby create an antidote to that deleterious quality of the air which is generated by paſſing through the lungs of animals, and from the accumulation of filth. In cities, where multitudes are crowded together, the diſſolution and putrefaction of every animal that dies, and the breath of every animal that lives, tend to contaminate the air; but the growing vegetables inhale, and are nouriſhed by this poiſon; and, in lieu thereof, emit and impregnate the atmoſphere with what is pure and wholeſome. By habit we may accuſtom ourſelves to take poiſon in ſmall doſes, without any deleterious effects. From the ſame principle, the inhabitants of a city may, without particular injury, inhale a tainted atmoſphere, that would, in certain ſeaſons, be fatal to a ſtranger uſed to the purer air of the ſea or country, eſpecially of a colder latitude.

To this ſociety the police look up for advice reſpecting the means of preventing diſeaſes. Let us, therefore, co-operate with the city-council, in keeping the city as clean as poſſible. Much has been done, but more remains to do. Our ſtreets and our drains ſhould be conſtructed on new principles, and the low grounds filled up with dry and wholeſome materials. I need not recapitulate our former recommendations to the intendant and the governor; but I beg leave to point out a few inſtances, in which they have not been carried into execution. It is ſeveral years ſince we adviſed, that cellars in which rain water uſually ſettled, ſhould be filled up, ſo as to ſecure their conſtant dryneſs. This has not been done; and the inhabitants, during the late ſickly ſeaſon, have ſuffered in conſequence thereof. It is true, orders were iſſued to empty the cellars, after they were filled with water. That is, when the nuiſance became intolerable to the inhabitant, he was directed to diſperſe it among his neighbours.

This ſociety alſo recommended, that health committees ſhould be appointed to viſit, weekly, every family, to inculcate cleanlineſs, and to report the names of defaulters. This duty has been ſo careleſſly performed as not to anſwer the end. The time is paft, when men ufed to work for the public without fee or reward. This bufinefs, though of the firft confequence to the health of the city, will never be performed as it ought to be, till one or more refponfible officers are appointed, with fuitable falaries, and adequate powers, to compel houfe-keepers, in a fummary way, to keep their cellars, their ftables, their privies, and their yards, wholefome and clean.

This fociety alfo recommended, that in future ftreets fhould be laid out 100 feet wide. The firft fettlers, in planning Charlefton, had no idea of its future growth. Little did they think that in one century it would be the metropolis of an independent ftate, extending from the Atlantic 300 miles to the weftward. Little did they think, that before the end of the year 1800, fuch would be the increafe of population and wealth in South-Carolina, that one hundred and feven of its citizens would complete a canal that opened a water communication between Charlefton and the Allegheny mountains, at an expence five times greater than the fum the whole province fold for about 80 years before. The original plan of Charlefton was, therefore, more fuited for a country village, than for the capital of fuch a State as South-Carolina foon will be, or even now is. It was wife in this fociety, to recommend a more enlarged plan in the extenfion of the city into the country.

I had anticipated, in imagination, that, at no very diftant day, a new Charlefton would have been erected to the weftward of Boundary-ftreet, in which we, or, at fartheft, our children, enjoying a free, pure, and wholefome air, would forget the narrow ftreets, the confined lanes, and the dirty alleys of the prefent city. Sorry I am to add, that in the courfe of the laft week, there have been advertifed lands for leafe, on a plan that contemplates the laying off 137 acres, very little more than a mile from the State-Houfe, in fmall lots, and with narrow ftreets. I call upon you, gentlemen, in your intercourfe with the citizens, to difcourage the prefent rage for making the moft of land, by fubdividing lots and crowding houfes fo clofe together, as to prevent a free ventilation. To the narrow confined ftreets of the prefent city, we muft fubmit: but let all plans for its enlargement be moft pointedly difcouraged, that are not fuited to our extended profpects, and calculated for the health and comfort of our growing numbers. The citizens fhould be warned, that by a contrary policy, they are fowing the feeds of a yearly vifitation from the yellow and other fevers. Let us carefully avoid entailing thefe evils on pofterity.

The events of the laſt ſummer ſhould rouſe all our activity. That fever which before was confined to ſtrangers, has, within the laſt three months, attacked a few of our children. One grade more of malignity in the exciting cauſe, and the diſtinction in favour of inhabitants which has heretofore prevailed, will probably be done away. Let the months that precede the next ſummer, be faithfully employed in opening and cleaning the preſent drains, and increaſing their number—in removing every accumulation of filth. I wiſh not to alarm, but to excite induſtry, while I declare it to be my opinion, that unleſs an active, energetic police pervades every part of our city, the inhabitants as well as ſtrangers have reaſon to fear the ſummer and autumn of the year 1800.

DAVID RAMSAY.

*Charleſton, Dec.* 24, 1799.

## CORRESPONDENCE.

*To the Editors of the Medical Repoſitory.*

I THINK myſelf obliged to the writer of your review of books for his candour and impartiality with reſpect to my late tract on phlogiſton; but I hope I may be allowed to obſerve, that he has miſtated my opinion, when he ſays (p. 385) that I make inflammable air, phlogiſticated air, and fixed air, to be only different modifications of phlogiſton: whereas, I uniformly ſuppoſe that phlogiſton is only a conſtituent part of them all, as he himſelf acknowledges (p. 383). And where is the difficulty of conceiving that the ſame principle may be an ingredient in theſe different ſubſtances?

At the ſame time I have no objection to ſaying, with this writer, that phlogiſton may be defined to be *the baſe of inflammable air*, provided that the ſame thing be allowed to be a neceſſary part of all the metals, and alſo of ſulphur, phoſphorus, &c. That phlogiſton cannot be exhibited alone is nothing extraordinary. Indeed, few things in nature can be ſo exhibited. Certainly not the principle of *acidity* or *alkalinity*. Theſe are always found combined with ſome other ſubſtance. But do we, therefore, ſay that ſuch principles do not exiſt, or that their exiſtence cannot be demonſtrated?

I am, with much reſpect, Gentlemen,

Yours ſincerely,

*Northumberland, July* 6, 1800. J. PRIESTLEY.

### ON THE DECORTICATION OF APPLE-TREES.

*To the Editors of the Medical Repoſitory.*

THE manner in which you have related the experiments upon apple-trees (Med. Rep. vol. iii. p. 420), has induced a conjecture that you conſider it as a novel diſcovery, that removing the bark from their trunks does not deſtroy their exiſtence. The following article, copied from the Miſcellanea Berolinenſia, will, therefore, probably be new to you: and as it contains ſome uſeful obſervations upon the ſubject, it is preſumed it will not be altogether unacceptable. Yours, &c.

*July* 12, 1800. CANTABRIGIENSIS.

*De Cortice Arborum circumcirca sine Damno de toto stipite detracto et renascente.* J. L. Frisch.

VIR generosiss. de Huneken, Dominus de Carpzow Decus Nobilium Marchiæ, et fautor omnis generis utilium studiorum, monstravit mihi modum renovandi corticem arborum fructiferarum, quarum magnam copiam Carpzovii in egregio pomerario prope sedem suam habet. Siquam pomorum aut pirorum videt cortice asperiore, aut cerasum resinam exudantem et tuberibus deformem, vel alia quacunque ratione suspectam, qua fœcunditas arboris propter corticis defectus impeditur, aut sequentibus annis impediri, vel stipitis pulchritudo maculari possit, non vulgari modo de sanitate harum solicitus est; non abradit asperiora ; non partem aliquam exterioris corticis solvit et aufert; non rescindit nodulos et emplastris vulnus curat; non venas secat; sed, quod mireris, totius stipitis corticem a primo sive inferiori ramo, vel a corona primorum ramorum, quam inferiores scienter cultarum arborum rami formant, usque ad terram detrahit. Et quidem non tantum exteriorem et duriorem, sed et interiorem et subtiliorem librum, ita ut album lignum, ablatis etiam tenuissimis et viridioribus fibris, ubique æque appareat. Cum hanc methodum curandi arbores primum audirem et magnæ auctoritatis vir mihi affirmaret eam innocentem esse, non potui dubia mea occultare, quia contra communem experientiam est. Moriuntur enim arbores in quibus vel in linea fit, quod hic toti stipiti fieri posse dicebant. Sed postquam singulari Dom. de Huneken favore occasio mihi data fuit videndi complures arbores hac ratione recenter nudatas, et alias novo cortice tectas, experientia nunc edoctus fateor me id vidisse, quod nunquam vidi, et quod forsan nemo apud nos scivit, aut, si scivit non ausus est tam egregias et fœcunditate sua utilissimas arbores omni cortice in stipite privare. Ad incrementum igitur studii physici, et imprimis Δενδρολογιας, historiæ naturalis egregiæ partis, pauca illa, quæ de hac methodo annotavi, bona cum venia generosiss. Dom. de Huneken, experimenti hujus apud nos Auctoris Lectori B. communicare volui.

1. *Tempus solstitii æstivi observetur.*

Quo tempore succus arboris liquidior & copiosior fluit; habita simul ratione situs horti vel loci arborum, quia in versus meridiem sitis citius fluere incipit succus alibi tardius.

2. *Cortex omnis in stipite detrahatur.*

Inæqualitas enim manentis & renascentis partis arborem valde deformem redderet.

3. *Succus exsudans penna anserina æquetur, ubicunque stagnat, & ad spatia nondum tecta trahatur.*

4. *Ne solis æstus hæc succi effluvia impediat, umbra stipiti nudato fiat.*

Potissimum in parte meridionali, expansis linteis vel connexis et erectis arundinibus vel quocunque alio modo pro loci commoditate. Eodem modo etiam ventorum impetus arceatur, ne pulvere vel arena noceant.

5. *Absint denique omnia quæ tactu quocunque novum et adhuc mollem corticem maculare possint. cujus teneritas tanta est, ut vel minima frictione lædatur.*

Artibus, quæ arborum corticibus utuntur, et possessoribus talium arborum hoc experimentum imprimis utile esse potest.

*Miscellanea Berolinensia, tom.* 3. *p.* 26, 27, 28. *Edit. Berolin.* 4*to.* 1727.

MEDICAL REPOSITORY.

Vol. IV.—No. II.

## ARTICLE I.

Facts *relative to the* Black-vomit, Dysentery, *&c. as they occurred in Mifflin County, Pennſylvania, during the hot Weather of* 1797, 1798, *and* 1799, *and to the Efficacy of Strata of Calcareous Earth (Carbonate of Lime) in counteracting the exciting Cauſes of thoſe Diſtempers. From a Letter of Dr.* William Harris *to Dr.* Mitchill, *dated June* 24, 1800.

FIRST, I preſume, a brief deſcription of this country may be neceſſary. It lies to the north-weſt of Philadelphia nearly 200 miles: the ſoil is very fertile, and the country, in general, abounds in lime-ſtone, particularly the valleys. It is very mountainous. From within half or three-fourths of a mile from the foot of each mountain, the ſoil is chiefly underlaid with lime-ſtone, which, in many places, appears to be a ſolid rock. The valleys, viz. Nittany and Penn's Valley, are from four to ſix miles in breadth, within the lime-ſtone tracts. Bald-Eagle Valley lies to the north of theſe, in which is but very little lime-ſtone, if any. The valley is low, and generally flat. Near to the Bald-Eagle Creek, which runs through the valley from weſt to eaſt, are many ponds of ſtagnant water, filled with trees, rubbiſh, and putrid ſubſtances; which, in the months of Auguſt and September, become ſo offenſive, in many places, that the ſmell can ſcarcely be ſupported. This ſtench has only been ſo great ſince the clearing of the land.

It is now 25 or 30 years ſince the firſt ſettling of the country. Notwithſtanding the ponds of water which, during the whole ſummer, have been kept full, the inhabitants have enjoyed good health till within theſe three years. The water is now expofed to the rays of the fun, and becomes nearly dried up towards the latter end of fummer. It is, in many places, covered over with a greenifh fcum, from whence arifes a very unpleafant fmell. The confequence is dyfentery, intermittents, and highly malignant febrile complaints, which, in fome inftances, prove mortal in 48 hours, and three days, having every fymptom, as defcribed by medical writers, of the peftilential difeafe, or "yellow fever," of New-York and Philadelphia. In the year 1797, it was as fatal in Milefborough, which lies upon the Bald-Eagle Creek, according to the number of inhabitants, as it was in Philadelphia in 1793. —A large pond of water ftood within the neighbourhood of the town. The feafon being very dry and warm, the water, which before was fhaded by trees, was now expofed to the fun, and was, in a great meafure, dried up. The pond abounded with putrefying vegetables, the ftench of which proved very difagreeable. Few in the town efcaped ficknefs of the moft malignant kind, which continued through the months of Auguft and September. The pond has fince been drained off, and the inhabitants are as healthy as ufual.

The difeafe was ufhered in by chills, pain in the head, back and limbs, often with vomiting. In fome the complexion was very florid. Many difcharged from the ftomach a dark fubftance, firft refembling tar, and afterwards coffee-grounds. The difeafe, in feveral inftances, was lengthened out to four and five weeks, which, in fome, at that period, terminated favourably by profufe hæmorrhages from the anus, and, in two inftances, from the vagina. They were deftitute, in a great meafure, of medical aid, relying chiefly upon domeftic prefcriptions.—The above fketch of the difeafe I had from the moft refpectable inhabitants of the town.

In the year 1798 I removed to this country, when the fame difeafe prevailed. The fymptoms were, firft, chills, pains in different parts of the body, particularly the head and back, fucceeded by febrile commotions; the pulfe fometimes tenfe, hard and full, often weak and frequent, always varying; the tongue, in moft inftances, was, from the commencement of febrile action, covered over with a thick brown or blackifh fur. After the firft 24 hours the fick feldom ever complained of pain. They were often in a ftate of ftupor, with great inclination to fleep. Delirium attended in almoft every inftance. Strangury was no unfrequent fymptom. Singultus and hiccup were moft commonly the fore-runners of diffolution. Many, when afked how they were, would fay they felt no pain nor ficknefs, and would converfe freely, even a few minutes before death. Many vomited a dark, filthy, brown fubftance, and fometimes nearly as dark as ink, which was fo offenfive as to caufe naufea, and even vomiting, in the attendants. The fæces were, in fome inftances, of a very dark colour, and as offenfive to the fmell. The nervous fyftem was much agitated. The limbs of fome were in motion, as if performing feats of gefture; fo violent was the fubfultus tendinum. The fkin was often very yellow. The linen was frequently ftained with an orange tinge. In this year, emetics of tartarized antimony, cathartics of jalap and calomel, had a good effect. Bleeding was alfo very effential. The bark anfwered a good purpofe; but, above all, alkalies were more congenial and ferviceable.

The year 1799 was very dry, and the complaint more mortal, in general, than the two preceding feafons. Within the neighbourhood of the fame water, the inhabitants were vifited with the fame difeafe, in its higheft degree of malignancy. Dyfentery and intermittents alfo prevailed; but, as far as I recollect, none were affected with them except thofe who lived in the neighbourhood of, or near to, the fource of the miafma. Several who vifited the fick inhaled the poifon; and, after returning home, fickened and died. It was in no one inftance contagious. The mercury in the thermometer ftood often as high as 95 deg. and, indeed, one day, in the fhade, at 99 deg. The degree of heat was very variable.—This feafon the fymptoms were much the fame as the preceding, only more violent. The black-vomiting was characteriftic.

One circumftance I think worthy of attention, which plainly evinces the unhealthinefs of putrid vegetables, &c. when expofed to the fun.—A large fpring iffued from the bottom of a fand-ftone hill, fufficiently large to turn a faw-mill, which had always, from the firft tillage of the country, been a conftant and uniform ftream, until the prefent autumn, when, after a very dry fummer, it ftopt running. A houfe was built clofe upon the bank of the fpring, which contained feveral families, who always, heretofore, had been very healthy. The ftream from it was full of filthy rubbifh, which, when dried up, had a very difagreeable fmell. The families which lived in the houfe were taken fick with a difeafe refembling that of 1797, of which, after a few days ficknefs, three died: the remainder continued fickly and confined till the water returned: they then recovered. Several of their friends, who came 20 and 30 miles to vifit them, took fick, and died upon their return, without fpreading the complaint.

Several, this ſeaſon, had dyſentery and intermittents at the ſame time: the one always yielding to its ſuperior in the courſe of a few days.

*In the lime-ſtone tract, I do not know of an inſtance of the diſeaſe occurring, but what could be traced to ſome unhealthy part, near to the foot of the mountains.* In Nittany Valley, between the borders of the lime-ſtone and that of the mountain, cynanche trachealis and dyſentery were frequent, and ſome intermittents. It puzzled me to know the reaſon of the remainder of the valley being ſo healthy, and thoſe narrow confines ſo unhealthy, though it is true there is more moiſture in the latter. Rheumatiſms and pneumonic affections are the moſt prevailing complaints in the middle of this valley. Emetics, ſucceeded by alkaline ſubſtances, I found to do better than the lancet, and other uſual remedies. Cathartics of calomel were very beneficial, and bark anſwered alſo this ſeaſon a good end. The lancet, though my uſual friend in fever, was, in this inſtance, undoubtedly a foe to health. I laid it aſide, and depended chiefly upon the above for deſtroying the poiſon of the prevailing diſeaſe. When timely adminiſtered, it ſucceeded.

I am, with ſentiments of reſpect,
Yours, &c.

WILLIAM HARRIS.

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## ARTICLE II.

### *On the* EFFICACY *of the* DIGITALIS PURPUREA *in* ALLAYING EXCESSIVE ACTION *of the* SANGUIFEROUS SYSTEM: *Communicated to Dr.* MITCHILL *by* JAMES S. STRINGHAM, *M. D. of New-York.*

THE latter end of the month of April laſt I was called upon to viſit a gentleman in this city, who was labouring under a ſevere attack of pneumonia. When I ſaw him (which was on the third day of the diſeaſe), his face was highly fluſhed, the tunica albuginea extremely turgid. About two hours before I came he had been ſeized with delirium; complained of great pain, particularly on the right ſide, ſhooting from thence to the ſcapula; his ſkin was hot and dry; pulſe about 120; reſpiration laborious, attended with a ſhort dry cough. The ufual remedies had been applied by the phyfician who firft attended him; but they had contributed little to his relief. The obftinacy and violence of the fever made me determine, if poffible, to adminifter fome remedy which might, by its firft and immediate operation, diminifh the action of the arterial fyftem. Of thofe contained in the materia medica, I formed the moft favourable expectations from the digitalis, as I thought that in one cafe, where it had been taken by miftake to the quantity of three grains, it had, in this way, greatly affifted in the cure of an incipient enteritis, though I, at that time, attributed its good effects not to any action peculiar to the digitalis, but to the great naufea and vomiting it occafioned, which terminated in a profufe fweat. I, confequently, thought that it might properly be adminiftered with a twofold view. Firft, I hoped that by giving it in fmall dofes, and at fhort intervals, my patient might be able to retain a fufficient quantity of it on his ftomach to act quickly and generally on the fyftem. If I was difappointed here, and fhould naufea or vomiting be produced, I hoped that thefe might be fucceeded by that evacuation which had proved fo falutary in the cafe juft alluded to. Accordingly, at ten o'clock on the fame morning in which I was firft called, I began by ordering him to take half a grain every three hours, unlefs he found his ftomach or head affected by it. At feven in the evening I vifited him again, and found the quicknefs of pulfe greatly diminifhed; and his nurfe remarked to me, that he had voided more urine that day than on any other during his illnefs. He had had no delirium during the laft fix hours; nor was that turgidity of the countenance by any means fo remarkable as in the morning.

He had now taken two grains of the digitalis. Encouraged by a change fo flattering (as the man was of a ftrong and robuft conftitution), I determined, by pufhing my medicine, to give it a fair trial. I therefore ordered a continuance of it, with the fame provifo as formerly. Feeling fome anxiety as to the event of my experiment, and not placing the greateft confidence in the attention and punctuality of the nurfe, I vifited him again at nine. He had had another profufe difcharge of urine fince I faw him laft; and every appearance was fo much changed for the better, that I did not hefitate to pronounce him out of danger. His pulfe now did not exceed ninety ftrokes in a minute. I was prefent at his taking the fifth dofe, which, fhortly after it was received into the ftomach, produced what he termed an infupportable naufea. This was fucceeded by vomiting, which not being very fevere, I encouraged by diluents. After this the medicine operated brifkly as a cathartic. I continued with him for fome time; and, after ordering a difcontinuance of the digitalis, I left him compofed, and with an incipient moifture upon the fkin. The next morning I found that he ftill continued convalefcent. On inquiring whether he had fince felt any difagreeable effects from his medicine during the night, he affured me that he had not, except an uncomfortable degree of fweating. On the third day of my vifiting him, I obferved that with his cough he had fome expectoration. I now gave him the oxymel fcilliticum, at the fame time paying attention to the ftate of his bowels. Upon this plan of treatment, in a fhort time, he fo far recovered as to render my further attendance unneceffary.

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Shortly after the above trial, a fchool-mafter in this city confulted me about a fixed and obftinate pain in his breaft, which he had experienced at intervals during feveral years, firft occafioned, as he fuppofed, by a too intenfe application to writing. It may be proper to remark, by the way, that in this cafe there was no cough. After taking fome blood from him, and opening his bowels, I applied blifters fucceffively to the painful part. To thefe was alfo added the ufe of diaphoretics, and an antiphlogiftic regimen, but all without any evidently good effect. I determined, in this cafe alfo, to try the virtues of the digitalis. He began with half a grain night and morning, which, after a few days, was increafed to a grain. He continued perfevering in this plan about a fortnight, when he affured me that he found himfelf greatly better, and wifhed to know whether it was neceffary to continue the medicine. This I ftrongly recommended; notwithftanding which, his neglect of remedies (as commonly happens) increafing in proportion as his complaint diminifhed, the pain again returned with its former feverity. I again put him on the fame plan, with the fame fuccefs—as he now affures me that it does not prevent him from profecuting the duties of his ftation with eafe and fatisfaction.

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I have often thought, that a medicine which would diminifh the action of the vafcular fyftem, without previoufly occafioning an increafed excitement, was a great defideratum amongft phyficians. The cafes juft now related induce me to hope that this want may be, at leaft in fome degree, fupplied by the digitalis, as its firft effect (fo far as I could obferve) after its exhibition, was that of rendering the pulse slower. With this circumstance, I also apprehend, are intimately connected that increase in the quantity of urine and subsequent perspiration, which seemed, in so short a time, to place my first patient entirely out of danger. I have ever considered a too rapid circulation of the fluids equally unfavourable to perspiration and secretion with that which is too tardy and languid. When the blood is thus precipitately hurried away, a sufficient time is not given for the separation of its thinner parts, destined to enter either the small and delicate excretories which open on the surface, or those still more minute ramifications which constitute the glands.

I have been particular in remarking the diuretic effects of the digitalis on my first patient, and that the first favourable change in his disease was preceded by an increased flow of urine. In febrile complaints, the state of the urinary secretions is, in my opinion, at present, too little regarded by practitioners. If (as is generally taught) fevers are produced and continued by an obstruction or spasmodic contraction of the extreme vessels, by which fluids are pent up in the body, which prove noxious both by their quantity and acrimony, does it not appear rational to suppose, that a discharge of such fluid from the system, by means of any other organ, must greatly aid in the cure of the disease—*Cessante causa cessat effectus.* Urine, and the matter of perspiration, as to their properties, appear to have considerable similitude; and we all know how much the state of the one is affected by that of the other. Thus, in winter, to prevent the bad effects of diminished perspiration, the urine becomes more copious and aqueous. In summer, again, when the first is increased in quantity, the latter is more sparingly discharged. Those who use much exercise, by increasing perspiration, pass much less urine than the sedentary; whereas, diminished perspiration always produces a greater secretion from the urinary organs: hence the bladders of old men are much more frequently distended than those of youth. From these, and many more instances that might be adduced, we perceive that there is an intimate connection between these two excretions, and that nature prevents the bad consequences that might arise from a diminution of the one, by an augmentation of the other. Ought not she, in this respect, to be imitated by physicians? I must confess, for my own part, that I am willing to attribute much of the good effects produced by the digitalis, in the cure of my patient, to its diuretic properties; and this opinion is corroborated by what has been juſt obſerved as to natural proceſſes for the ſame purpoſe. Hence I am induced to hope, that in this way alſo the digitalis may prove a valuable remedy in the cure of fevers. It may, at firſt ſight, appear ſomewhat ſingular, that one of theſe patients ſhould be able, in the courſe of a day, to take two and a half grains of this medicine, without ſuffering from its effects. But thoſe who are accuſtomed to the exhibition of powerful remedies in violent diſeaſes, well know that the conſtitution will then bear, without inconvenience, medicines which, in a natural and healthy ſtate, would produce the moſt pernicious conſequences. Mania and fevers, in particular, afford numerous proofs of the truth of this remark. This, perhaps, may be owing to that determination of fluids towards the cerebrum, by which the nerves become, in ſome degree, compreſſed at their origin: hence a diminiſhed ſenſibility of the ſyſtem.

I have ventured to propoſe to your conſideration the foregoing remarks, with a view to excite the attention of others on a ſubject which I deem highly intereſting. I regret that (being but a young practitioner) my opportunities for obſervation have been too contracted to form any deciſive opinion; I ſhall, however, make uſe of every mean for a further inveſtigation of the ſubject; and the reſult of theſe inquiries I ſhall candidly tranſmit to you.

*New-York, July* 11, 1800.

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## ARTICLE III.

OBSERVATIONS *on* CERTAIN OBJECTIONS *of Dr.* JOSEPH PRIESTLEY *to the* ANTIPHLOGISTIC SYSTEM *of* CHEMISTRY. *By* JAMES WOODHOUSE, *M. D. Profeſſor of Chemiſtry in the Univerſity of Pennſylvania.*

No. II.

*To the Editors of the Medical Repoſitory.*

GENTLEMEN,

IN my defence of the antiphlogiſtic theory of chemiſtry, publiſhed in the Medical Repoſitory, vol. iv. p. 25, I decidedly pronounced, that the ſcales which the blackſmiths ſtrike off from red-hot iron, called by Dr. Prieſtley finery cinder, were compoſed partly of water, which is contrary to the belief of the French chemiſts, who conſider them as a combination of iron and oxygen, though I have attempted to reconcile my opinion with their theory.

Having lately performed a variety of intereſting experiments, I have obtained reſults which are as much, or rather more, in favour of Dr. Prieſtley than his opponents.

In inveſtigating a ſubject which requires the attention to be kept conſtantly awake, it is not improbable but that ſome miſtakes may be committed. Should any be made by myſelf, I ſhall always acknowledge them, for nothing is more deſirable than truth in ſcience. Following the laudable example of Dr. Prieſtley, I ſhall endeavour to imitate his well-known candour, and ſtrict adherence to matter of fact—

> " Non ita certandi cupidus, quam propter amorem
> " Quod eum imitari aveo." LUCRET.

FIRST. *Of the Calces of Metals and Coal expoſed to a red Heat, &c.*

The ſubſtance produced by tranſmitting the ſteam of water over red-hot iron, appears to conſiſt of the ſame principles as the ſcales of iron; for, when mixed with coal which has ceaſed to give air, it yields large quantities of carbonated inflammable and fixed air. The celebrated Lavoiſier, the founder of the new ſyſtem of chemiſtry, who is erroneouſly ſuppoſed to have experimented with more accuracy than any other perſon, was of opinion, that the oxygen of the water united to the iron, and that the increaſed weight of the metal was owing purely to oxygen, and to no other cauſe. In this he has been followed by all who have embraced the new doctrine, and the quantity of oxygen contained in water has been deduced from the increaſed weight of the iron.

Now, if it can be proved that part of the weight of finery cinder is owing to water, it will follow, that the calculation of the quantity of oxygen in water, from the increaſed weight of the iron, muſt have been groſſly erroneous.

The proofs that finery cinder contains water are two.

1ſt. If it was compoſed merely of oxygen and iron, it would yield nothing but fixed air when ſubjected to heat with pure coal, as red precipitate does, which is not the caſe.

2dly. When added to coal which has ceaſed to yield air, it affords inflammable and fixed air in the ſame manner as if the ſteam of water was paſſed over hot coal, or if it was united to water, or any ſubſtance containing water.

Eight ounces of the ſcales of iron, and half an ounce of coal, yielded ſix hundred and two ounce meaſures of carbonated inflammable and fixed air. The iron was completely revived; and, by ſulphuric acid and water, gave common inflammable and hepatic gas. The laſt air conſiſts of ſulphur diſſolved in inflammable air, and ſulphur is probably a compound body, for it appears to have been formed during the experiment. The air changed the water of my hydropneumatic tub to a brown colour, turned ſilver black, and produced this colour on the ſhelf of the tub, which was painted white.

Having eſtabliſhed the proofs that finery cinder contains water, I ſhall endeavour to ſhow that oxygen is one of its component parts, which Dr. Prieſtley will not allow.

If there was nothing but water in the ſcales of iron, as much fixed air could be produced by coal mixed with water, or by paſſing ſteam over red-hot coal, or by adding water to ſome other ſubſtance not containing oxygen, and mixing it with coal, as from finery cinder and coal.

I have never been able to obtain more than thirty parts in the hundred of fixed air, from paſſing ſteam over hot coal, or by mixing it with water, and expoſing it to heat in an earthen retort; but with finery cinder and coal I have obtained fifty parts in the hundred of fixed air. I have paſſed from two to twenty ounce meaſures of water, in the form of ſteam, over half an ounce, and an ounce of red-hot coal, in moderate pieces, in a copper tube, and though I have three times examined the air, for two hours at a time, I never could find more than thirty parts in the hundred of fixed air.

The method of determining the quantity of fixed air in one hundred parts of inflammable and fixed air, is by receiving the airs over water, in the meaſure of an eudiometer, and immediately throwing them up over lime-water. The fixed air unites to the lime, an abſorption of the water takes place, and the proportion is determined by a ſcale accurately graduated.

By relating the experiments, at length, on coal alone, and mixed with finery cinder, the difference in the quantity of inflammable and fixed air will be made manifeſt.

Four ounces of coal, taken promiſcuouſly from a heap, yielded ſix hundred and twenty-two ounce meaſures of inflammable and fixed air.

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|---|---|---|---|---|
| The 1ſt | 10 | ounce meaſures was the air of the veſſel. | | |
| 2d | 4 | contained | 30 fixed air and | 70 inflam. |
| 3d | 4 | | 20 | 80 |
| 4th | 4 | | 15 | 85 |
| 5th | 360 | | 10 | 90 |
| 6th | 70 | | 2 | 98 |
| 7th | 170 | | 0 | 100 |
| | 622 | | | |

The ſame coal, taken from the retort, wetted with water, and committed to it again, gave eighty-one ounce meaſures of inflammable and fixed air.

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| The 1ſt | 10 | ounce meaſures was the air of the veſſel. | | |
| 2d | 12 | contained | 30 fixed air and | 70 inflam. |
| 3d | 40 | | 25 | 75 |
| 4th | 6 | | 20 | 80 |
| 5th | 13 | | 0 | 100 |
| | 81 | | | |

The ſame coal, wetted a third time with water, yielded one hundred and eighty-one ounce meaſures of inflammable and fixed air.

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|---|---|---|---|---|
| The 1ſt | 14 | ounce meaſures was the air of the veſſel. | | |
| 2d | 4 | contained | 30 fixed air and | 70 inflam. |
| 3d | 44 | | 26 | 74 |
| 4th | 37 | | 25 | 75 |
| 5th | 62 | | 20 | 80 |
| 6th | 12 | | 8 | 92 |
| 7th | 4 | | 1 | 99 |
| 8th | 4 | | 0 | 100 |
| | 181 | | | |

I continued to add water to this coal, and expoſed it to heat, until it was conſumed: the proportion of fixed air always gradually diminiſhed—the firſt portions being 30, and the laſt 5, or purely carbonated inflammable air.

When the ſcales of iron were added to the coal, the proportion of fixed air was much greater.

Eight ounces of the ſcales of iron, and half an ounce of coal, which had ceaſed to yield air, expoſed to heat in an earthen retort, in five hours gave ſix hundred and two ounce meaſures of inflammable and fixed air.

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|---|---|---|---|---|
| The 1ſt | 14 | ounce meaſures of atmoſpheric, inflammable, and | 30 fixed air. | |
| 2d | 30 | contained | 50 | 50 inflam. |
| 3d | 8 | | 46 | 54 |
| 4th | 8 | | 45 | 55 |
| 5th | 20 | | 40 | 60 |
| 6th | 18 | | 36 | 64 |
| 7th | 18 | | 30 | 70 |
| 8th | 84 | | 25 | 75 |
| 9th | 128 | | 22 | 78 |
| 10th | 96 | | 22 | 78 |
| 11th | 178 | | 20 | 80 |
| | 602 | | | |

When two ounces of the ſcales of iron, and one drachm of coal, were uſed, the firſt portions of air were 40 in 100 fixed air: when half an ounce was tried, the fixed air was 30 per cent. and when two drachms of that made by throwing ſteam over red-hot iron wire was mixed with one drachm of coal, ſixty ounce meaſures of inflammable and fixed air were procured—the firſt portions of which were 20 per cent. fixed air, and the laſt 25.

The firſt thing which ſtrikes us, in theſe experiments, is the large quantity of pure carbonated inflammable air afforded by coal, taken promiſcuouſly from a heap, as it comes to us from the dealers in that article, compared to the quantity yielded by the ſame coal, wetted with water, and repeatedly expoſed to heat. Four ounces of this kind of coal gave 170 ounce meaſures of inflammable air, entirely free of fixed air; but when firſt wetted with water, the inflammable air was thirteen ounce meaſures, and the ſecond time four ounce meaſures.—One hundred and forty-three ounce meaſures of inflammable air was afforded by two ounces of another ſpecimen of coal; and, when wetted with water, the inflammable air was diminiſhed to two ounce meaſures.

I can only account for the fact by ſuppoſing, that common coal is imperfectly charred, and that the volatile principles of the wood are diſſipated, and conſiſt chiefly of inflammable air.

The gaſes which are procured from coal and water, have been aſcribed to the decompoſition of water. It is ſaid that the oxygen of the water unites to part of the coal, and forms the fixed air; while its hydrogen diſſolves another part of the coal, and forms carbonated inflammable air. But this theory will not account for the gradual increaſe of the inflammable, and diminution of the fixed air, when coal is expoſed to heat. As water, according to the French chemiſts, is compoſed of eighty-five parts, by weight, of oxygen, and fifteen of hydrogen, the eighty-five parts of oxygen ought conſtantly to unite with the coal, and form fixed air, and the proportion of inflammable and fixed air ſhould invariably be the ſame; or where two parts, in bulk, of the inflammable air are found, there ought to be one part of oxygen united to the coal, which is not the caſe; for when the airs are obtained from coal, the firſt portions are generally 70 inflammable, and 30 fixed air; and the laſt are either all inflammable, or 95 inflammable, and 5 fixed air.

The ſame continued increaſe of inflammable air, and diminution of fixed air, takes place upon mixing the oxyds of zinc, iron, copper, lead, manganeſe, tin and biſmuth, with coal, as will be ſhown by the following experiments.

Half an ounce of zinc, precipitated from a ſolution of white vitriol by cauſtic pot-aſh, was waſhed in water until it would not give a milky colour to muriated barytes, and was expoſed to a red heat half an hour, and then mixed with two drachms of coal, which had ceaſed to yield air, in an earthen retort, when it gave eighty-ſix ounce meaſures of inflammable and fixed air.

| | | | |
|---|---|---|---|
| The 1ſt | 10 | ounce meaſures was the air of the veſſel. | |
| 2d | 4 | contained 75 fixed air and | 25 inflam. |
| 3d | 4 | 40 | 60 |
| 4th | 4 | 15 | 85 |
| 5th | 4 | 10 | 90 |
| 6th | 4 | 2 | 98 |
| 7th | 56 | 0 | 100 |
| | 86 | | |

The ſame reſult happened from uſing the flowers of zinc and coal. The metal is completely revived, and is found adhering to the neck of the retort, which muſt be broken to obtain it. In three experiments, however, fifty, forty, and twenty-four ounce meaſures of pure carbonated inflammable air were procured without any perceptible quantity of fixed air.

One ounce of the red oxyd of iron, colcothar of vitriol, made by expoſing green vitriol to an intenſe heat, and one drachm of coal, gave ſeventy ounce meaſures of inflammable and fixed air; the firſt portions being wholly fixed air, then 80, 60, 50, and never leſs than 40 parts in the hundred.

Two drachms of the calx of iron, from a ſolution of green vitriol by cauſtic pot-aſh, which had been half an hour expoſed to a red heat, and one drachm of coal, gave two hundred and ſixty-nine ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 4 | contained | 65 fixed air and | 35 inflam. |
| 3d | 4 | | 60 | 40 |
| 4th | 4 | | 42 | 58 |
| 5th | 4 | | 30 | 70 |
| 6th | 5 | | 25 | 75 |
| 7th | 200 | | 20 | 80 |
| 8th | 44 | | 15 | 85 |
| | 269 | | | |

Half an ounce of the oxyd of copper, from blue vitriol by cauſtic pot-aſh, which was expoſed half an hour to a red heat, and one drachm of coal, yielded one hundred and ſix ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 36 | contained | 100 fixed air and | 0 inflam, |
| 3d | 10 | | 74 | 26 |
| 4th | 10 | | 20 | 80 |
| 5th | 8 | | 12 | 88 |
| 6th | 20 | | 10 | 90 |
| 7th | 18 | | 5 | 95 |
| | 106 | | | |

Half an ounce of red lead, and one drachm of coal, gave twenty-ſix ounce meaſures of inflammable and fixed air.

| | | | |
|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | |
| 2d | 10 | contained | 100 fixed air, |
| 3d | 8 | | 45 |
| 4th | 4 | | 15 |
| | 26 | | |

Half an ounce of white lead, and one drachm of coal, afforded fifty-three ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 4 | contained | 80 fixed air and | 20 inflam. |
| 3d | 18 | | 95 | 5 |
| 4th | 4 | | 85 | 15 |
| 5th | 9 | | 70 | 30 |
| 6th | 8 | | 20 | 80 |
| 7th | 6 | | 10 | 90 |
| | 53 | | | |

Half an ounce of black oxyd of manganeſe, and one drachm of coal, gave fifty-five ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 4 | contained | 80 fixed air and | 20 inflam. |
| 3d | 26 | | 95 | 5 |
| 4th | 8 | | 85 | 15 |
| 5th | 10 | | 30 | 70 |
| 6th | 3 | | 25 | 75 |
| | 55 | | | |

Half an ounce of the white oxyd of tin, and one drachm of coal, gave ſeventy-four ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 12 | contained | 50 fixed air and | 50 inflam. |
| 3d | 10 | | 45 | 55 |
| 4th | 26 | | 20 | 80 |
| 5th | 22 | | 15 | 85 |
| | 74 | | | |

Half an ounce of the white oxyd of biſmuth, precipitated from a ſolution of biſmuth in the nitric acid by water, and one drachm of coal, gave thirty-eight ounce meaſures of inflammable and fixed air.

| | | | | |
|---|---|---|---|---|
| The 1ſt | 4 | ounce meaſures was the air of the veſſel. | | |
| 2d | 10 | contained | 30 fixed air and | 70 inflam. |
| 3d | 9 | | 15 | 85 |
| 4th | 10 | | 8 | 92 |
| 5th | 5 | | 5 | 95 |
| | 38 | | | |

All theſe calces, except biſmuth and zinc, afford more fixed air than can be procured from coal and water, which ſeems to be a proof that they contain oxygen. Water appears to be a principal agent in producing part of the inflammable and fixed air, for theſe airs are procured in proportion to the quantity of this fluid in the metallic calces. That water is one of the agents, may be inferred from the difference in the quantity of the gaſes yielded by the ſame weight of metallic calx and coal. If oxygen was the ſole agent, no inflammable air could be obtained, and the fixed air would be greateſt from thoſe oxyds which contain the moſt oxygen, which is not the truth. Thus half an ounce of red lead, which is ſaid to contain twelve per cent. oxygen, with one drachm of coal, gave but twenty-ſix ounce meaſures of inflammable and fixed air; while the ſame quantity of coal and white lead, which is ſaid to contain five per cent. oxygen, yielded fifty-three ounce meaſures of inflammable and fixed air, and the proportion of this laſt gas is three times as great as from the red lead. The oxyd of biſmuth too, which is ſaid to contain ſixteen per cent. oxygen, gave no more fixed air than could be obtained from coal and water.

The flowers of zinc, yielding no fixed air when ſubjected to heat with coal, or the fixed air which is ſometimes obtained being in proportion to the water which is united to the calx, is agreeable to the theory of Dr. Prieſtley, and cannot be accounted for by the new doctrine; and if the Doctor can prove, that as much fixed air can be procured from coal and water as from this ſubſtance and the metallic calces, a part of the antiphlogiſtic ſyſtem will be completely overturned: but to effect this, it will be neceſſary to ſhow, that from fifty to one hundred parts of fixed air may be made from coal and water, which has not yet been done.

### Secondly. *Of a Solution of Copper in Volatile Alkali.*

Dr. Prieſtley ſays, a ſolution of copper in volatile alkali gave phlogiſticated air, and it will not be very eaſy to ſay where this azote exiſted before the proceſs.*

Copper was precipitated from a ſolution of blue vitriol by cauſtic pot-aſh, waſhed well with diſtilled water, and ammoniac was added to it: heat being applied, a part of it was diſſolved. The muriatic acid was then boiled upon it fifteen minutes, and no air except that of the veſſel was obtained.

One ounce meaſure of marine acid was alſo added to two ounce meaſures of a ſaturated ſolution of cuprum ammoniacum, and boiled with it one quarter of an hour, when nothing but the air of the veſſel was procured.

If Dr. Prieſtley obtained phlogiſticated air, it muſt have come from the volatile alkali, as it is one of its component parts.

* Medical Repoſitory, vol. ii. p. 386, firſt edition.

# ARTICLE IV.

## OBSERVATIONS *on the* YELLOW FEVER. *By Dr.* FELIX PASCALIS, *of Philadelphia.*

[Continued from page 17, and concluded.]

### *Section* II.

I NOW come, Gentlemen, to the controverfy on falivation as a mode of treatment for the yellow fever.

Ptyalifm, falivation, inflammation and fuppuration of the parotid glands, with all the like, conftitute various degrees of the fame affection, which has often afforded to practitioners many phyfiological difcuffions, both for crifes and cure of difeafes: yet it never was well afcertained what is the real proximate caufe of that affection. It has appeared, indeed, that remedies as well as difeafes might excite a falivation. Its feat may be in all, or in many glands of the mouth, of the fauces, and in the falivary glands. Thefe are always affected, and fometimes alfo the fmall labial, and the glandulous body of the palate, with the falival miliary. All thefe glands becoming fwelled, the membranes which cover them are inflamed, and frequently ulcerated. The progrefs of inflammation, in fome of thofe parts, is fometimes fo great as to check entirely the power of deglutition, and to caufe the tongue to protrude and hang out of the mouth. The gums likewife participate of the affection: they are foon ulcerated and corroded, to the detriment of the teeth, which are frequently fhaken out of their fockets, or irreparably decayed. It is obvious that fo great ravages, extended over various organs, and many delicate parts, make it very difficult to ftop their progrefs by effectual remedies. Hence it happens that fatal effects often attend a falivation—fuch as a mutilating gangrene of fome part of the face, or of the internal membranes of the mouth, and even of the mufcles of the lower jaw: likewife a fudden revulfion of the inflammation and fluids may take place from thefe glands into other vifcera, and caufe a certain death.

In the various periods of this aftonifhing affection, whether produced by difeafe or promoted by medicines, we obferve the fame effects as in any local inflammation. There is a confiderable influx of fluids, and a great heat; a refolution afterwards is to be expected (unlefs induration or mortification terminates the hiftory of the cafe), which is ferous or purulent. The firft is frequently attended with hæmorrhage, and, confequently, is very dangerous. The latter is defirable; but it is remarkably offenfive, and feldom terminates without fome confiderable erofions.—Thefe may utterly deftroy the motions of the lower jaw.

It appears that the confluent fmall-pox and malignant fevers are often attended with falivation. I have feen it myfelf in a cafe of tuberculous pulmonic confumption.

Of all the medicines, mercury is the moft powerful to promote falivation. It has been alfo afcertained, that nitric acid, and other chemical preparations and acid fubftances, may excite a ptyalifm with flight inflammation. It is obvious that thefe fubftances operate as ftimulants immediately, applied to certain parts; but mercury excites falivation by being applied to any external part, or taken internally. Phyfiologifts formerly thought, that a metaftafis of *morbific matter* was produced by mercury applied to the falivary glands, from which it was evacuated. This error was foon rejected, when it was found that, without any pre-exifting difeafe or morbific matter, falivation might be completely effected; or that, after profufe falivation, difeafe and morbific matter could exift the fame. None of the modern theorifts have been, I believe, very fuccefsful in explaining the proximate caufes of falivation. Whatever they think, it is now ufelefs to repeat: I only obferve, that, with oppofite fyftems, many phyficians have, in America, introduced the falivating method in almoft every acute difeafe, and chiefly in the yellow fever. There muft be fome general reafons why the fame practical means are reforted to, although with different theories; and of thefe motives I will hereafter mention thofe which appear to be the principal and moft plaufible.

All the arguments which have been held out by practitioners of different defcriptions, in favour of the falivating method in the yellow fever, may be reduced, I believe, to three principal ones, reforting to all kinds of theories. The firft is, that it evacuates the poifonous and fpecific contagion of the yellow fever: the fecond, that it overcomes the excitement, or deftroys the *morbid action* of the blood-veffels, produced by the prefence of the contagion: and the laft, that it is juftified by fuccefs and obfervation in practice. We will now controvert thefe arguments, one after the other.

I do not fuppofe that there is any *fpecific contagion* in the yellow fever to be evacuated by any extraordinary means;

yet, admitting this to be the caſe, I ſay that this contagious or ſpecific poiſon cannot be more eaſily ſubdued by ſalivation than that of the lues venerea; and it has been minutely aſcertained that the latter is not at all removed by the means of ſalivation. The opinion of the famous John Hunter on this ſubject is known, and I might mention alſo many celebrated French phyſiologiſts. Theſe have carried ſo far their opinion of the inefficacy of ſalivation, that they have highly recommended the mercurial treatment, called *par extinction*; in which the leaſt affection of the mouth is ſucceſsfully counteracted and avoided. Indeed, it is a doctrine generally allowed by all French practitioners, that the ſyphilis equally yields to mercury with or without ſalivation. In it they ſee nothing but a peculiar operation of the ſpecific on the ſyſtem, to which we ſhould not attend but to avoid its ravages. Fabre and Petit have ſatisfactorily proved, that if any evacuation is promoted by mercury, it muſt be either inſenſibly through the ſkin, or by the bowels. We adhere to the fact, that a regular mercurial treatment cauſes, before twenty days, a diſcharge from the bowels, which ſeems critical, and is generally attended with an effectual cure: and theſe medical conjectures ſtill more invalidate the utility of a ſalivating method. The ſame effects are obſerved in other diſeaſes of ſpecific contagion, and of obſtructed viſcera. We exhibit mercury with ſucceſs, if ſalivation has not taken place. This affection, therefore, cannot be called an effectual means for evacuating the poiſonous miaſmata that excite the yellow fever.

As for ſubduing the excitement or the morbid action of the blood-veſſels by ſalivation, this effect, if admitted, would prove the truth of what I have already ſtated of the loſs of animal irritability, cauſed by the preſence of deleterious gaſes: for the exceſſive increaſe of *excitement* ſuppoſes at leaſt a proportionate exhauſtion of *excitability* or irritability. Is it not a deluſion to think that a greater excitement pervades the ſyſtem, becauſe we ſee an exceſs of agitation in it, which has taken the place of the calm functions of a healthy ſtate? No, no—a perturbation of animal functions cannot be an increaſe of excitement. In the very meaning of our modern theories, excitement does not imply any thing inimical to the action of life, but what is favourable to it.

I know that they diſtinguiſh another ſort of excitement, which they call a *morbid action*, produced in blood-veſſels by hurtful powers. Good God! what is then that morbid action? Could it not be defined by ſome intelligible and phyſiological words, in order that we could underſtand how it can be ſubdued by another hurtful power and morbid action in the mouth and ſalivary glands? Notwithſtanding we ſee but one natural effect in ſalivation, which is a new excitement added to excitement or morbid action: ſuch would be that of inflaming, by friction, the ſkin of a man intoxicated or highly *excited* by ardent ſpirits: therefore ſalivation has no excitement to ſubdue; or, if there is any, it will and muſt increaſe it, and give to it a ſtill greater character of morbid action.

But our theoriſts ſay, that as ſoon as ſalivation begins to operate, a favourable change of the malignant ſymptoms takes place. Indeed, the pulſe expands itſelf, and becomes more natural; the ſecretions recover their regularity; heat is equally diffuſed through the body; the *mador* of the ſkin promiſes a relief, and marks a happy and certain cure: to conclude, ſuch reſult is a proof that all the morbid action or excitement of blood-veſſels is abſtracted or ſubdued by ſalivation. We have ſeen ſome of thoſe effects, and we will examine hereafter with what reſult they can be compared to contrary effects. But this alteration of malignant ſymptoms, when it is effectually beneficial, does not more ſatisfactorily prove the abſtraction of excitement or morbid action, than it would prove, with other theoriſts, the tranſport or metaſtaſis, in the ſalivary glands, of the *morbific matter*—that is to ſay, of the ſpecific contagion or poiſon of the fever received into the blood. Even this latter ſuppoſition would be more rational, becauſe it means an immediate operation on the cauſe of the diſeaſe, whilſt the other relates only to its effect. It reſts with us, therefore, to point out what is to be thought of that alteration of ſymptoms produced by ſalivation, and how deluſive it is in many inſtances.

If I would contend further for the truth of my opinions reſpecting the loſs of animal irritability, which conſtitutes the yellow fever, and of the neceſſity of exciting it by artificial and ſtimulating means, I could, with as much conſiſtency as poſſible, exhibit the operation of ſalivation concurring effectually to that purpoſe, whether it is in itſelf a continued ſtimulating operation, or a peculiar operation of mercurial medicines, which indicates that the remedy has at laſt reſtored to the ſyſtem as much irritability as it formerly poſſeſſed. But in this controverſy let us renounce every kind of ſyſtematic theory, and reaſon only on facts univerſally obſerved.—Whatever may be the cauſe of fevers, and of malignant fevers too, there are none that cannot be cured by a local affection, or by an evacuation. This is the origin of the doctrine of the crises, which, since the days of Hippocrates, has been held out as the great subject of inquiries, for the safety of prognostics, and of clinical precepts. The science of medicine has divided, as it seems, with nature, the task, or the *grand-oeuvre*, of producing those curative *crises* of local affections, and of evacuations.—The most ancient practice among the Chinese and Japanese, was that of puncturing and burning the skin.* They still adhere to it.—The Arabians and Egyptians are known to be the inventors of the *Moxa*. It is known, also, how much the celebrated Pouteau, of France, prevailed, in his time, to bring into credit the application of fire. The Dutch and the Germans still continue the practice of cupping and scarifying. We are more improved in modern researches. We cannot do without cantharides, purges and emetics, because local affections, by fire or by caustics, and evacuations, are necessary. It would involve me in too long a discussion, if I should prove, besides, what kind of local affections and spontaneous evacuations belong to every kind of fever; but it is a fact that they have their crises, either by eruption, or local affection, or evacuation; and if one is unsuccessful the patient must die.†

Among those crises, spontaneous salivation has been observed in some acute diseases, in the confluent small-pox, and in malignant fevers. It is true, that if conducted with regularity, it is the means of cure. Those spontaneous salivations in malignant fevers, particularly in the yellow fever, have been observed and mentioned by eminent physicians: they have been accurately described by two French authors.‡ But we repeat it, that in order to prove beneficial, a salivation must be as spontaneous and laudable as an exanthematous eruption, or an abscess. Nature alone must direct its relieving operations. If these are artificially promoted, they become perilous or abortive in proportion as they are considerable, and attended with too many circumstances of inflammation, &c. As for the apparent number of those patients who seem efficaciously and easily relieved of their symptoms by a moderate salivation,

* Very interesting and curious essays on these operations, as used among many ancient and oriental nations, may be found in the French Encyclopædia methodized, tom. i. art. Medicine, words *acupuncture* and *adustion*.

† Si cui ex febre ardente venit parotis quæ purulenta non fiat, haud facilè superstes evadit. Hipp. Coac. 138.

‡ Vide Maladies de St. Domingue, sur la Fievre de Siam, by Pouppé Desportes; and Maladies des Negres, sur la Fievre de Siam, by Dazille.

it may be proved, that the flightnefs of their cafe accounts for that fuccefs, which fimpler remedies would have effected: for there are patients in whom no degree of falivary affection can be produced, and they invariably die. Again, there are patients who, with a profufe falivation, do not curtail even the ufual periods of the difeafe, and a great number of thofe will die. The proportion of victims is as great among falivating phyficians as among thofe who do not prefcribe it. During four feafons of the prevalence of the epidemic, when I carefully avoided an artificial falivation, although I adminiftered mercury as a difcutient, and as a draftic medicine, I never perceived that I was lefs fortunate with my method than other phyficians. If I muft fay it, the only difference which ftruck my obfervation was, that many more patients, on one fide, recovered within a fhort period of time, and without tedious convalefcence, compared to thofe who, by the long and painful effects of a falivation, are longer kept under the action of difeafe, and fometimes linger under more ferious effects.

Finally, if the method of falivation would be productive of a fmall advantage, its application fhould ftill be made liable to a great many exceptions of cafes in which the remedy becomes worfe than the difeafe. The irritability or fenfibility of women and children renders them unfit for its violent operation. In fuch fubjects, it foon overcomes their natural powers, produces convulfive effects, aggravates all fymptoms, and moft furely removes the opportunity of adminiftering more fafe remedies. People advanced in years, whofe teeth and gums are in a perifhing condition, cannot bear fuch morbid affection without a great addition to their fufferings and dangers. Scorbutic patients, and thofe previoufly affected with indurations of falivary glands, or any other fcrophulous affections, fhould, without exception, be forbidden a falivating courfe; becaufe, in fuch fubjects, pre-exifting difeafes would be aggravated to an alarming degree. The proportion of all thofe different defcriptions of people leaves but a fmall number to whom this remedy may prove perfectly indifferent; and, with refpect to thefe, we are led to doubt, whether mercury, adminiftered internally, as a difcutient or as a purging remedy, would not more readily contribute to their recovery; and, if fo, let the method of falivation be expunged from our lift of remedies for the yellow fever. It will be objected, that even without promoting the affection of the mouth by fufficient dofes of calomel, the leaft quantity of mercury, adminiftered as a purge, may, in many inftances, excite a complete falivation. I anfwer, that, provided a fmall mercurial mixture be made with nitre and jalap, and fometimes with opium and certain oxyds of antimony—provided alfo thofe dofes be not repeated unlefs the preceding has operated through the alimentary canal, falivation will feldom, if ever, take place. If it does, when the promoting caufe is very inordinate, it will then be judged as a fpontaneous crifis, and, for that reafon, much more to be depended on as ufeful and beneficial.

## *Section* III.

Another important queftion has greatly divided the American faculty, while it was confidered, by all parties, as clofely connected with the fafety of the inhabitants and neighbours of the places where the epidemic has been known to rage. I muft confefs, however, that I never heard nor read that fuch queftion had been treated in its true meaning, viz. If the yellow fever is imported, will it, or not, pervade a whole population, and a whole country, by its contagious power?

It is obvious that the believers in the domeftic origin are not required to anfwer this queftion; but the others are, and they have faid nothing yet that is perfectly confiftent with facts and doctrine. It has, however, been faid, that the difeafe was contagious, and that, if aided by local circumftances of climate and exhalations, it muft pervade inhabited places. This mode of reafoning has been *officially* tranfmitted to legiflative bodies! and while it has been made the leading principle of legiflative meafures, the believers of the domeftic origin have feen, with pleafure, that the occurrence of fome domeftic cafes was acknowledged; and they have remained fomewhat indifferent as to the queftion of the contagious power of the yellow fever. Dr. Rufh has lately pronounced, *that it is rarely and feebly fo.* Others deny that, in any manner, it can be fo. One thing, therefore, remains abfolutely undecided among the learned, which is, whether the yellow fever is or is not contagious: and as, in the affirmative of the queftion, it is not underftood that, by its contagious power, the epidemic could pervade a whole population; and, in the negative, no arguments are exhibited againft ftriking facts of contagion, we may fairly conclude that we do not underftand each other, and that fome other grounds of the theory of contagious ficknefs muft be found, to be applied to this fubject, and to conciliate parties.

I confeſs, Gentlemen, that as I have been myſelf an active witneſs of the epidemic, during many years of its prevalence, I was long perplexed in my mind to conciliate facts with ſome conſiſtent theories—and in that I never was ſatisfied until lately. Without regard to any ſyſtem, or to conteſted doctrines, it has appeared to me, as well as to many practitioners, that a conſiderable number of the caſes could not be traced but to a *contagious power* of the fever itſelf. Such were the caſes of whole families, who ſeemed preſerved as long as they had no patient in their houſe, and who all periſhed or were ſick, without exception, as ſoon as they admitted among them ſomebody affected with the diſeaſe. This deplorable effect has been ſeen in the moſt wholeſome parts of the town, and at any period of the ſeaſon; ſo that, in many inſtances, when the diſeaſe ſeemed moſt univerſal, by care, precaution and deſertion, people were preſerved; while, in the country, they fell victims to their unreſerved intercourſe with patients, when the epidemic was faſt decreaſing in every part of the town. On the other ſide, to attentive obſervers a quite oppoſite reſult has been aſcertained, beyond any kind of doubt. Not one experiment has favoured even the probability of a ſpecific contagion being, in the yellow fever, communicable by inoculation.

We do not know any ſymptom, *ſui generis*, by which, in the yellow fever, as in any *poiſonous diſeaſe*, the abſorbed virus is thought to lay in certain parts, or be diffuſed in the whole ſyſtem.

Such are a few grounds, among many others, for contradictory doctrine: and to the honour of medical ſcience, I think it right to ſay, that, without a new theory, we do not know any thing of the contagious power of the yellow fever.

Behold, Gentlemen, and pleaſe to compare with ſo many opſite facts the views which I humbly propoſe to the American faculty on that ever intereſting ſubject, for the preſervation of their fellow-citizens, and they will be reconciled—they will all appear concluſive and neceſſary. Admit that the remote cauſe of our epidemic is a floating gas in the atmoſphere, diſengaged from putrefiable and fermented ſubſtances—admit that theſe gaſes are a *negative contagion*; that is to ſay, operating by depriving animated matter of its *irritability*, and it will be evident that they affect bodies by throwing them into a putrefiable ſtate; and the yellow fever appears to be a diſeaſe in which putrefaction begins before death. Thence we may de-give a ſtill more neceſſary reſult, that of ammoniacal* and deleterious effluvia ariſing from ſick perſons, even when they are not in a ſtate of perſpiration, which, in its ſed-tive operation on thoſe who receive it, will be expanded and envenomed by heat, as the exhalations ariſing from the ground: and this incontrovertible law will explain the phenomena of contagion, which we are acquainted with, but which we cannot comprehend and define in any other manner than that of *negative contagion*; yet ſuch noxious power will be underſtood, and limited within certain bounds: thus it will not be ſufficient to pervade a whole population, and will be ſtill leſs fatal than that of the general impurity of the atmoſphere, which we know may be varied by ſo many rapid cauſes.—Finally, let us admit theſe facts, and we will be ſatisfied that thoſe who attend the ſick, in open, airy and clean places, like our hoſpitals, will ſeldom be affected with the prevailing epidemic; but in confined and unclean places the danger will be greater, as we have already experienced: therefore there cannot be any *ſpecific* poiſon, or *contagious* virus, affixed to perſons, nor to their clothes, nor ſwimming in their fluids, nor impregnating their fleſh. The ſick mother may, to the laſt, ſuckle her innocent babe, who ſhall not have been infected with the fatal gas, and all attempts in diſſecting, mangling, and inoculating, will prove, that in the yellow fever there is no *ſpecific contagion.*

Thoſe who attend patients in confined places are in danger of being affected with the ſame malignant fever, by the hepatic or deleterious gas ariſing from their body. This negative contagion may be effectually checked by all thoſe means which have a tendency to purify or renew the air of the ſick chambers. For this purpoſe, it may be recommended to keep conſtantly a burning fire on the hearth; to place a certain quantity of ice (which muſt be inceſſantly renewed when melted), in any veſſel, near to the beds of the diſeaſed; to have a few vaſes or pots with living vegetables; and, laſtly, to keep,

* This gas muſt be more dangerous than thoſe formed and diſengaged from other vegetable or animal matter, which are, in general, more ſimple in their principles, and very ſoon diluted or neutralized in the atmoſphere. But the gas ariſing from living putrefaction, and ſaturated with caloric, when emitted in bed-rooms, is a compound of hydrogen, carbon, and phoſphorus, and, with them, muſt form every ſpecies of deleterious *azurets.*

in proper vessels, metallic oxyds of mercury, lead, or manganese, in solution with concentrated sulphuric acid, which, as is known, will produce and diffuse a new oxygen.

I have the honour to be, respectfully,
Gentlemen,
Your most obedient, humble servant,
FELIX PASCALIS.

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## ARTICLE V.

*A* SKETCH *of the* HISTORY *of the* DISEASES *of the* STATE *of* DELAWARE: *Communicated in a Letter from Dr.* JOHN VAUGHAN, *of Wilmington, to Dr.* MILLER.

### No. III.

DEAR SIR, *Wilmington, June* 10, 1800.

HAVING concluded the list of autumnal fevers in No. II. we must enumerate their successors in the morbid catalogue.

The month of November is usually healthy, except it be from the remains of febrile diseases—as *œdematous* and *anasarcous* swellings, anorexia and muscular debility, with occasional feverish attacks, usually denominated *inward fevers.* Those affections being dependant on the same cause, are easily removed by the same process, *i. e.* a restorative regimen, exercise, tonics, friction, &c. But if anasarca be attended with schirrosities of the spleen and liver, they are frequently troublesome and fatal. If they are not neglected, a course of mercurial gummous alteratives, with friction, is generally successful; but if *ascites* be added to the list, and the patient's strength is much exhausted, a lingering death pretty certainly ensues.

If there be much wet weather attending the transition from heat to cold, as is not unfrequently the case, a series of troublesome affections is induced—as catarrhs, mucilaginous diarrhœas, erysipelas, &c. the particular treatment of which cannot be detailed in the limits of an essay of this kind. Flannel shirts are the most effectual preservatives, and the common resort of valetudinarians.

December and January are alſo healthy, if the weather be dry and uniform; but if the weather prove variable, accompanied with rain or ſnow, without ſevere froſt, pneumonic diſeaſes and catarrhs become epidemic. February, however, is the *proverbially morbid* month of winter. The miaſmata of autumn are effectually deſtroyed by froſt—a reſpite has been obtained from the attacks of *ague*, and a ſufficient quantity of oxygen inhaled to give riſe to a new order of diſeaſes, whoſe remote cauſe is ſudden tranſitions in the temperature of the weather. Thus, unfortunately for the late ſubjects of the *ague*, &c. they are not ſufficiently *oxygenated* to endure expoſure to the viciſſitudes of the elements. The impreſſion of cold produces irregular excitement, or convulſive arterial action—the famous *vis medicatrix naturæ* is deſtroyed by a ſingle north-weſtern blaſt, or a wetting of the feet, and the trembling victim hurried to his irkſome bed: or the mode of attack may be varied by incidental circumſtances. The diſeaſe generally commences with the uſual ſymptoms of febrile diſeaſes. If the attacks be ſudden and ſevere, the violence of the caſe is announced; but, in moſt caſes, irregular feveriſh heats and chills, with the ordinary ſymptoms of catarrh, form an inauſpicious prelude of three or four days duration. The affection of the breaſt now becomes inſupportable—cough inceſſant, but attended with an expectoration of frothy mucus—great oppreſſion at the præcordia, with a ſenſe of ſoreneſs, but ſeldom acute pain. On the ſecond or third day the cough becomes more violent—expectoration ſuppreſſed—the head attacked with pain and confuſion—the tongue furred and parched—the ſkin dry and hot—the pulſe frequent and ſoft. On the fourth or fifth day thoſe ſymptoms are aggravated—the patient becomes iraſcible, with ſudden ſtartings from apparent ſleep, and great anxiety; and, as his ſtrength is exhauſted, the pulſe becomes more frequent and irregular—the delirium is a typhomania—the eyes aſſume a glaſſy appearance—the extremities gradually loſe their heat—the reſpiration reſembles uninterrupted ſighing—and, from twenty-four to forty-eight hours, cloſe the diſtreſſing ſcene. A jaundice frequently pervades the body, ſhortly before, or immediately after death, and often petechiæ. The bowels are either conſtipated or affected with diarrhœa.

In the more violent or active forms of this diſeaſe the ſymptoms are varied, approaching towards ordinary pneumonia—the pulſe is full, but not tenſe—the expectoration copious, and ſtreaked with blood on the third or fourth day—pain of the breaft more acute, and the oppreffion lefs: yet, in many cafes, the fcene is reverfed, and the difeafe terminates in twenty-four or forty-eight hours.

The general character of this difeafe is a *peripneumonia notha*, which, doubtlefs, is juft in a majority of cafes; yet I am rather apprehenfive that the denomination is delufive: for, in numerous inftances, the general ftate of the fyftem is difregarded—the local affection is the only object of concern, as the fever is often fo irregular as to efcape attention. It is not an uncommon thing to be informed by the patient, that his only complaint is an uneafinefs in the breaft, or an affection of the head, when the extremities are becoming cold, the tongue fiffured, ftupor gliding on, and Protean Death affuming his feat. I, however, hope not to be mifunderftood. To fay that thofe local affections do not merit regard, would be an abfurdity indeed: to fay that a congeftion of the *lungs* or *brain* is an incident of no importance, would be equally novel and ridiculous: but to difregard the unfortunate diathefis of my patient, would be to enfure him a fpeedy death. I have witneffed a number of cafes where the local affections only were confidered—the difeafe termed pleurify, or phrenitis, and depletion commenced *fecundum artem*, in which none of the patients furvived forty-eight hours: and I fhould, probably, have fallen into the fame error, had not the ftate of the pulfe—the frequent fighing in refpiration—the tendency of the fever to affume a tertian type—the early appearance of the Hippocratic countenance, fo called, with other fymptoms more eafily obferved than defcribed, convinced me that it belonged to the genus of autumnal fevers, varied by the cafualties of the atmofphere. It may, perhaps, be faid, that this pofition is rather too far ftrained; that froft deftroys marfh miafmata as a tropical plant. Granted; when the ponds are covered with ice exhalation is overpowered. But if thefe effects fuffer a common fate with their caufes, why do intermittents exift, or occur, in winter? and winter quartans are the moft obftinate of the whole tribe. Why do valetudinarians fuffer relapfes in the frofts of January and February? And why are perfons, on a removal from a marfhy to a high country, attacked with the endemial fevers of the *fens*, if the remote caufe be not dormant in the fyftem, and excited into action by a concurrence of predifpofing caufes? Thefe facts, I prefume, fubftantiate the pofition, that our winter difeafes are but varied forms of the *autumnal* fever. Hence the propriety of the following denominations, agreeably to the fyftem of

Dr. Rufh, to whofe pathological merits every impartial obferver muft bear teftimony; *i. e.* if the head be the feat of topical action, it is a *phrenitic* ftate of fever—if the breaft, it is a *pneumonic* ftate of fever—if the bowels, it is an *inteftinal* ftate of fever, &c. &c.

On this arrangement I proceed to the method of treatment, which every reader muft acknowledge to be ambiguous: and as it is difficult to evince the peculiarities of the difeafe in a general defcription, I fhall narrate the following cafes, to ferve as a fpecimen of *its* nature.

P. C. a female, aged twenty-five years, of a florid complexion, and habituated to laborious exercife, was attacked, on the evening of the 3d of January, 1796, with a chilly fit, fucceeded by fever, cough, oppreffion at the præcordia, &c. I was called at 10 o'clock A. M. of the 4th, when her pulfe was imperceptible, refpiration converted into fighing, the furface cold, and covered with purple fpots. In a few minutes a great quantity of granulated blood burft from her mouth, nofe and ears. I ftood a paffive fpectator of her unceremonious fate!

S. H. an active robuft man, aged 26 years, indifpofed by a flight catarrh, was attacked with a chill at a fox-chafe, on the 10th of March, 1797. During the chill he drank freely of cool water, and vomited inceffantly. Fever fucceeded; and about an hour from its commencement, I faw him. He had a frequent dry cough, oppreffion and pain in the breaft, pain in the head, pulfe full and rather tenfe; and, in fact, the fymptomata of pneumonia complete. I opened a vein, and drew ℥xij. of blood; gave an effervefcent mixture to check the vomiting, and afterwards an antimonial febrifuge to promote perfpiration. At nine o'clock P. M. he was much relieved, and inclined to fleep.

On the 11th, at 7 o'clock A. M. I vifited him; and, to my great aftonifhment, found him quite exhaufted. His pulfe feeble—extremities cold, and of a leaden hue—his lips and tongue covered with a dark fcurf, and fiffured—his eyes of a glaffy appearance, and the pupils fomewhat dilated—with typhomania.

Blifters were applied, and cardiacs given; but to no purpofe. He died comatofe at 4 o'clock P. M. *eodem die.*

"A fudden rufh from life's meridian joys!"

A variety of fimilar cafes occurred this fpring; but moft of them were confined to the centre of the Welfh-Tract Swamps, a few miles below me. A confiderable portion of them were the *phrenitic* ftate of fever, and uniformly fatal. Whereas, the mortality of the ordinary grade of the *pneumonic* ftate of fever, on my regifter, is about one in ten. And it muft be obferved, that the fubjects of this difeafe are generally the debilitated, perfons advanced in years, and the difciples of antifogmatifm.*

A difeafe thus varied, fubject to fuch fudden tranfitions, and anomalous in its nature, is not lefs difficult to cure, than to detail a fyftem of its treatment to others. It is much like comparing the complaints of a patient with the diagnofis of nofology, and felecting a prefcription from fome good old book, whofe author is grown hoary in forming recipes, or fled from earth an age before. It is fo much varied by the habit of the patient, ftate of the weather, and other incidental circumftances, that it is almoft impoffible to defcribe a general method of treatment. However, I fhall give fuch detail as the nature of the circumftances will admit.

If there were any fulnefs of the pulfe, with confiderable pain of the breaft or fide, and breathing difficult, without fighing, I bled more or lefs, *ex rei neceffitate*, evacuated the bowels, and gave the ufual antimonial diaphoretics, with calomel. If the pain of the breaft were not relieved by the blood-letting, blifters were applied to the cheft and ankles, and to the neck, if the head were difturbed. Cathartics were feldom repeated, and coftivenefs was obviated by injections. If there were any affections of the liver, a blifter was applied to the hypochondrium. If typhous fymptoms came on, and the expectoration partial, the blifters were renewed—opium, with camphor, or a folution of volatile alkali, was given—or the neutral mixture, with a decoction of fnake-root.

Demulcents were given to allay the cough—as linfeed-tea, liquorice, &c.

A favourable crifis moftly happened on the third, fifth, or feventh day—announced by a copious expectoration, ftreaked with blood—a diaphorefis, and fubfequent relief of all the urgent fymptoms.

In fome cafes, the inhalation of the vapour of linfeed-tea, or warm water with honey, contributed much towards relieving the cough.

In fatal terminations, the fkin remains dry and parched—expectoration partial—blifters to the extremities do not re-

* In fome of the middle and fouthern States drams are called antifogmatics.

ſtore their heat—the tongue is furred and fiſſured—and ſighing and coma cloſe the cataſtrophe!

It will be readily obſerved, that this fever belongs to the ſynochoid genus, and that its tranſition to typhus is often uncommonly rapid; and, in fact, it was ſometimes typhus in the commencement. The ſuddenneſs of the tranſitions made me extremely cautious in the uſe of the lancet, unleſs it was ſtrongly indicated by the acuteneſs of the ſymptoms. The mixed nature of this diſeaſe—the apparent inflammation of the brain or lungs—with ſubſultus tendinum, frequent pulſe, and great proſtration of ſtrength, have cauſed me many an anxious day's reflection on the uſe of the lancet: the patient apparently ſuffering from omiſſion, and general debility portending death, even without its uſe.

Dr. Moore, in his Medical Sketches, mentions there being *grey diſeaſes*, as well as *grey cauſes* in law; and we may, doubtleſs, annex *this genus* to his liſt.

This haſty ſketch will conclude my propoſed hiſtory of the diſeaſes of Delaware, in an annual form; and, I hope, the deſign will ſerve as an apology for the defects it may contain. The object of ſuch communications is a reciprocation of information reſpecting endemial diſeaſes—their forms—periods of occurrence—influence of the ſenſible qualities of the atmoſphere—and ſuch articles in the treatment as depend on the local nature of the diſeaſes.

Theſe have been my objects; and how far I have ſucceeded you and the public muſt decide; and, at leaſt, accept the will for the deed. If exceptions be made, my reſponſe is, "Come thou and do likewiſe!" With ſincere eſteem,

I am your friend and humble ſervant,

JOHN VAUGHAN.

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## ARTICLE VI.

### EXPERIMENTS *on* HEATING MANGANESE *in* INFLAMMABLE AIR: *In a Letter from the Rev. Dr.* PRIESTLEY *to Dr.* MITCHILL.

DEAR SIR,

I DID not intend to trouble you, or the public, with any more obſervations on the *new theory of chemiſtry*, after my former communications on the ſubject; but having lately made fome experiments on heating manganefe in inflammable air, which, though they authorife the fame general conclufion with thofe on heating red precipitate in that air, are confiderably different from them, I think them deferving of attention.

Manganefe and the red precipitate of mercury are fubftances of a fimilar nature, as they are both calces of metals, and both contain dephlogifticated air; and, like all other calces of metals, they imbibe the inflammable air in which they are heated. But, whereas the dephlogifticated air expelled from the precipitate, frequently at leaft, remains mixed with the remainder of the inflammable air, which is fometimes the caufe of dangerous explofions, this has never happened to me in confequence of heating manganefe in the fame circumftances; fo that it may be operated upon without any apprehenfion.

Though, in thefe experiments, the inflammable air difappears, and dephlogifticated air is expelled from both the fubftances, no *water* is formed by means of either of them, as the new theory abfolutely requires, and which is pretended to be the cafe when finery cinder is heated in the fame circumftances. But, fince the fame quantity of inflammable air difappears in all thefe cafes alike, the fame quantity of water, if inflammable air be really a conftituent part of it, ought to be produced. It is evident, therefore, that the water procured by means of finery cinder was actually contained in that fubftance, and only expelled by the heat, to make room for the phlogifton, which then enters into it by the abforption of the inflammable air; while the precipitate and the manganefe, containing no water, imbibe the inflammable air without any appearance of water, except the little that is the bafis of the inflammable air, or that may be concealed in fuch powdery fubftances as manganefe and the precipitate are.

The principal difference, however, in the refult of thefe two fimilar proceffes, is, that after the experiment with the manganefe a quantity of *phlogifticated air* appears to be generated, which is not the cafe with the precipitate. The particulars of the experiments were as follow:

Fifteen ounce meafures of inflammable air were reduced to feven by heating in it twenty-four grains of manganefe. In the refiduum, which was not affected by nitrous air, there was no fixed air; but when a certain portion of it was fired together with a certain quantity of dephlogifticated air, the diminution was only to 0.95; whereas, when the fame quantity of the original inflammable air was exploded in the fame circumftances, the diminution was to 0.52. In another fimilar experiment, in which the inflammable air was confined by mercury, and in which feven ounce meafures were reduced to one and a quarter, the diminution with the refiduum was to 0.93, when that with the original inflammable air was to 0.33. The manganefe I ufed in thefe experiments yielded dephogifticated air only, without any mixture of fixed air.

I repeated this experiment with manganefe, out of which air had been expelled by a ftrong heat, and the refult was the fame as with the frefh manganefe, except that much more heat was neceffary to make it imbibe the air; whereas the manganefe, from which the dephlogifticated air has not been expelled, imbibes inflammable air very rapidly, and with a very moderate degree of heat. Twenty grains of it imbibed eight ounce meafures of inflammable air, and then weighed nineteen grains. In both the kinds of manganefe, the central part, on which the focus of the lens fell, was of a beautiful green colour; but the next day this had difappeared, and the whole of the fubftance that had been heated was brown.

As, no doubt, dephlogifticated air is expelled from the manganefe in thefe experiments, and neither fixed air nor water is produced, the dephlogifticated air feems to enter into the phlogifticated air that is found in the refiduum; and yet it appears, from feveral of my late experiments, an account of which I have fent to the Philofophical Society at Philadelphia, that phlogifticated air is fometimes formed without dephlogifticated air, which is a difficulty that I am not able to folve.

In order to make a more exact comparifon between the experiments in which *manganefe* and *finery cinder* were made to imbibe inflammable air, I repeated them both, in fimilar veffels, with equal quantities of inflammable air, confined by mercury; and I obferved that, though fome water appeared during the procefs with the manganefe, it wholly difappeared the next morning; whereas the infide of the veffel in which the finery cinder had been revived was wholly covered with innumerable drops of water, contiguous to one another.

# ARTICLE VII.

*An* Account *of a* Dissection, *with* Remarks *thereon: By* George Lee, *A. M. addreſſed to Profeſſor* Mitchill.

JAMES TARNEY, a labourer, aged 65, was admitted into the Pennſylvania Hoſpital on the 2d of December, 1797, for a large tumour on the right ſide of the cheſt, which had made its appearance about fifteen months before. He could aſſign no cauſe for it, except that he had received, many years ago, a ſmall wound upon the upper bone of the ſternum.

The tumour being ſituated upon the right ſide of the thorax, extended from the ſecond to the ſeventh rib, and from the cartilages of the ribs to within a ſmall diſtance from their angles. The tumour was opened twice by Dr. Phyſick, and diſcharged, at both times, five pints of glare. He expectorated this glary matter, mixed with mucus, ſeveral days previous to his death; and could not lie in a horizontal poſition, during that time, on account of the matter riſing up into the trachea in ſuch quantity as to threaten ſtrangulation.—He finally died in a very eaſy manner, and at an unexpected time.—After death, the following were the appearances upon diſſection.

The integuments which covered the tumour being removed, we found the pectoralis major entire; and, upon making a crucial inciſion into it, the cavity of the tumour was brought into view, which diſcovered to us a beautiful net-work of cellular membrane, paſſing from one ſide to the other, with a ſmall number of blood-veſſels ramifying through it. Theſe cells were undoubtedly the cavities which contained the glare diſcharged by the operation before death. But the matter we found in them was of the conſiſtence of tallow, and of a white appearance. In the centre of the tumour a ſmall quantity of bloody puriform matter was found, and ſome of the originating ſlips of the ſerratus magnus anticus muſcle were conſiderably deranged. No ribs were found within the tumour, except at its circumference, where ſmall remains of them were to be ſeen, apparently in a half corroded ſtate. The ribs which ſuffered the greateſt obliteration were the third, fourth and fifth. The ſixth was partially deſtroyed.

The tumour was ſemi-ſpherical, reſting on the pleura, which, in this place, inſtead of being convex externally, as it naturally is, was concave. No direct communication could be diſcovered between the cavity of the tumour and that of the thorax; for the pleura appeared entire and natural, except being a little indurated and puriform on its external ſurface. But that there had been a communication was evident from three circumſtances: 1ſt. He threw up from the lungs, before death, the ſame kind of matter which was diſcharged from the tumour by the puncture. 2d. The matter flowed more freely during ſudden reſpiration than in any other act of breathing: and, 3d. The matter contained in the tumour, after death, very much reſembled that found in the lungs, as will be mentioned preſently.

The lungs ſeemed to be compoſed, as it were, of an immenſe number of tubercles, generally ſpeaking, about three lines in diameter. They were white, or, perhaps more ſtrictly, grey; firmer than tallow, and a little puriform in the middle. The left lung appeared as tuberculous as the right, and they both adhered very firmly to the pleura in every place (except to the pericardium), as much to the diaphragm and mediaſtinum as to the ſides of the thorax. No trace from the wound he had received upon the ſternum could be found.

Upon opening the abdomen, the firſt thing which attracted notice was the ſtomach. This viſcus, which was very large, inſtead of being in its natural oblique ſituation, was found lying lengthwiſe on the left ſide, anterior to the ſpleen, and contiguous to the peritoneum, to which it adhered. The pylorus was curved up in conſequence of its attachment to the duodenum, which inteſtine was in ſome meaſure diſplaced; probably by the weight of the ſtomach, when full, dragging it downwards. I once heard of the ſtomach being ſituated nearly in the ſame manner, but I believe ſuch an appearance is ſeldom met with. A few remains only of the omentum were ſeen, which was to be expected from the emaciated ſtate of the ſubject. The liver was much harder than it is found in a natural ſtate, and appeared contracted. It adhered to the peritoneum. This is one, and the moſt common kind of liver, which perſons who are intemperate in the uſe of ardent ſpirit often poſſeſs. I have ſeen many inſtances of it; and, in ſuch caſes, the liver is often whitiſh, and of a granulated texture. I once diſſected an intemperate man, whoſe liver was granulated, or, to uſe a vulgar phraſe, *knotty*, and ſo much contracted and hard that it was with difficulty an inciſion could be made into it; and the noiſe the ſcalpel made in paſſing through it much reſembled the cutting of dry ſoal-leather, the reſiſtance only not being ſo great.* The inteſtines were contracted, thickened, and tough—adhering very ſtrongly to each other, and to the peritoneum, on each ſide of the ſpine, to the diſtance of at leaſt four inches. The urinary bladder ſeemed tied in a preternatural manner to the pubes. This, as well as all the morbid adheſions we met with, were, no doubt, produced by inflammation. Some days after his death, I was informed, from good authority, that he had been very intemperate at different periods of life. No other diſeaſed appearances were found worthy of notice; and I will now make a few remarks upon the caſe, as it has been ſtated.

The diſappearance of ribs is a fact which conſtitutes the moſt intereſting part of the hiſtory of the foregoing caſe; and is one which, I think, does not admit of an eaſy explanation. We can eaſily conceive how nature removes fluid ſubſtances from different parts of the body; but how ſhe carries off the more ſolid materials of which we are compoſed, is a phenomenon which, whilſt it excites aſtoniſhment, and calls forth our admiration, keeps aloof every conjecture concerning the manner in which it is effected. We are all ready to believe that the abſorbents are capable, either by capillary attraction, or by a muſcular power, of taking up effuſed fluids; but it is a difficulty, on the other hand, under which phyſiologiſts labour, to conceive how they abſorb bone and other ſolids. It has been the prerogative of the ingenious, which right they have often exerciſed, to teach us that, before an abſorption of the ſolids takes place, they are made fluid. But this is only creating one difficulty in order to ſolve another: for it is well known we have no proof on which to ground the aſſertion, however anxious we may be to make uſe of it. I do not mean, however, that the fact is not as ſome men would have it. So diſtant is my opinion from this, that I am diſpoſed to admit ſomething of that nature does take place. But until this doctrine is better ſupported by the evidence of truth, drawn from experience, few men of accuracy will give their aſſent to it. Yet, however averſe we may be to reaſon on this intereſting ſubject, on account of its abſtruſeneſs and difficulty, the fact ſtill recurs to our view, and its preſence commands that attention which is due to its importance. You will permit me to call your attention here to a few intereſting facts, relative

* It is curious that in this caſe the ſecretion of bile appeared to be unimpaired.

to the prefent fubject. The difeafe called mollities offium is owing to too great an abforption of calcareous earth from the bones. In proof of this, we have an interefting hiftory, by Mr. Thomfon,* of a James Stevenfon, "whofe urine, during the two firft years of his affliction with this difeafe, generally depofited a whitifh fediment, which, upon evaporation, became like mortar." In this cafe, it is probable, the earthy matter, after having been abforbed from the bones by the lymphatics, was carried out of the fyftem, by the action of the kidneys, in the fecretion of urine. Mr. John Bell† believes that mollities offium is produced by an abforption of bone, and that, during the continuance of the difeafe, earthy matter is difcharged *per urethram*. Meffrs. Cruikfhank‡ and Sheldon§ entertain the fame idea of this difeafe. When a bone exfoliates, the decayed part is thrown off, by an abforption of a portion of the living, in contact with the dead. The alveolar proceffes of the jaws difappear in old people when the teeth fall out. Mr. Cruikfhank‖ mentions a cafe where the fides of the tibia were reduced to the thicknefs of a wafer; and I once attended a woman who fractured the bones of both legs, juft above the ankles, by only ftepping obliquely upon the edges of bricks. Thefe cafes, no doubt, arofe from the abforption of the bones rendering them very weak. All the hollow cylindrical bones, and the cranium, during their growth, undergo an abforption as well as a renewal of their fubftance. Whilft the lymphatics are removing matter from their internal, the arteries are depofiting new particles of bone upon their external furfaces. And, in this particular, the growth of a bone refembles that of wood, only that there is no abforption in the latter.

If there was no abforption during the growth of thefe bones, how could their cavities enlarge? and if new layers of bone were not formed on the external furfaces of them, how could they be extended? It is not only true that this is the courfe of nature during the growth of bones, but it feems very probable that it is continued during life. That this reciprocal action, between the arteries and abforbents, does exift in every part of a bone during life, is rendered fomewhat evident by one fact: If an animal be fed upon madder, the whole fub-

* Medical Obfervations and Inquiries, vol. v. No. 23.
† Anatomy of the Mufcles, Bones, and Joints.
‡ Anatomy of the Abforbing Veffels, p. 111.
§ Hiftory of the Abforbent Syftem, p. 31.
‖ Anat. Abforb. Veffels, p. 104.

ſtances of its bones will be coloured red by it, which tinge, in proceſs of time, will vaniſh. In old people, the bones have loſt a conſiderable ſum of their former weight;* which proves that the abſorbents are more active at this period of life than the arteries. The various changes which the under-jaw ſuffers during life, depend entirely upon the action of its lymphatics. A venereal node, which is owing to a ſwelling or increaſe of bone, will be abſorbed by the lymphatics when ſtimulated by mercury. The ſurpriſing configuration of the bones of different nations has been derived from their peculiar cuſtoms. Thus, the uſe of a turban, according to Veſalius, produces in the Turk a conical ſkull; and the early employment of the chin-ſtay gives a flat head to the Engliſh. I ſome time ſince ſaw an Indian ſkull, found on the banks of the Miſſiſſippi, the top of which was raiſed in the form of a ſpine, running from before backwards, ſuppoſed to be produced by the application of two boards, during infancy, to each ſide of the head. Beſides theſe facts, it is to be recollected, that all the bones of the body yield to, and are impreſſed by, the contraction of a muſcle, the beating of an artery, &c.

Beſides theſe facts relative to the abſorption of bone, I could, were it neceſſary, multiply them, as well as adduce many in proof of the abſorption of the ſoft ſolids, which appears to me equally important and difficult of explanation with the removal of bone by the lymphatics. If the abſorbing veſſels deſtroy glands and other ſoft ſolids, which they certainly do, there is little doubt in my mind, that they are completely adequate to the abſorption of bone: for if it is neceſſary that bone ſhould be previouſly diſſolved by a ſecreted liquor, or any other, for that purpoſe, ſurely a muſcle, &c. muſt undergo the ſame preparatory proceſs. Yet, by the by, why are not the lymphatics as capable of removing or deſtroying bone as the arteries are of forming it? There is as much reaſon in the belief of the one as of the other; and, from the number, variety, and importance of the facts in our poſſeſſion, every perſon muſt, in the end, admit both, although he may not underſtand either.

That bone is a ſecretion from the arteries, is inferred from a variety of circumſtances. This opinion, I believe, is ſaid to have originated from the late Mr. Hunter,† as well as the

* Monro on the Brain, the Eye, and the Ear, p. 51. Cruikſhank, p. 101.
† Anatomy of the Abſorbing Veſſels, by Mr. Cruikſhank, p. 102.

abforption of bone; of which laft, the prefent Dr. Monro has endeavoured to eftablifh himfelf the author. But if you examine a Treatife on Human Ofteogeny, by Dr. Nefbitt, you will find the firft of thefe two opinions advocated in a very able manner. This ingenious man, who wrote and publifhed, in the year 1736, what he had read in the anatomical theatre at London, in 1731, which was before the birth of Mr. Hunter, fays he detected minute particles of bone in the extremities of the arteries, near the place of their deftination. He fuppofes that fmall veffels, peculiarly appropriated for the purpofe of offification, pafs off from arterial branches, and are continued on into the beginning of the veffels "prepared to receive refluent juices," as he expreffes himfelf; by which veffels I fuppofe he means the returning veins. The "bony corpufcles," to ufe his own words, are formed in, and depofited by, thefe peculiar veffels, in parts which are intended to be bone. That bone is not derived from the condenfation of cartilage, as is believed by fome, is evident from the fact, that cartilage does not contain any calcareous earth. The origin of this opinion is probably from the circumftance of bone being oftener formed in cartilage than in other parts. But it is not peculiar to cartilage. I once diffected a man, in company with the late Dr. Cooper, one of whofe teftes was largely offified. Dr. Donald Monro relates* the diffection of a woman, in whom a number of the mefenteric glands were found offified. A number of fimilar obfervations we find in Schenkius.† Mr. Watfon difcovered,‡ in diffection, that part of the heart which lies upon the diaphragm offified; and fays he has in his poffeffion a preparation, in which offeous matter is fcattered over both heart and pericardium. A more ftriking inftance of the offification of the heart is mentioned by Mr. Gueft.§ Inftances of the offification of the arterial fyftem, in old people, are fo familiar that it would be needlefs to mention one. The figure of a bone is defcribed by Mr. Chefelden, which was taken from the falx of the dura mater of a man who died of head-ach.|| A fmall offification was found on the infide of the dura mater, near the falciform procefs, in old Bayles, who was fuppofed to have been 130 years old,

* Tranfact. Lond. College, vol. ii. No. 18.
† De Mefenterio, p. 445.
‡ Medical Communications, vol. i. No. 19.
§ Medical Mufeum, vol. iii. No. 22.
|| Jones' Abridg. of the Philof. Tranfact. vol. v. p. 202.

by Dr. Keil.* A fimilar cafe is mentioned by Mr. Paifley.† Even the brain itfelf has been found offified; a cafe of which is mentioned by Duverney. in Memoires Acad. des Sciences for 1703, as quoted by Whytt.‡ Mr. Henry has recorded§ the cafe of William Carey, part of whole mufcular fyftem took on a furprifing procefs of offification. The offification commenced at his wrifts and ankles, and continued up to his elbows and knees, fo as to put on the appearance of compact maffes of bone. He had no ufe of the parts.— So much difpofed is the animal body to become offified, that we find, in the Philofophical Tranfactions,|| an account, by Dr. E. Tyfon, of the tendons of a fowl, the external membrane of the liver of a human body, as well as the outfide of the fpleen and lungs, having been found in a ftate of offification.

Many deviations of this kind, from the regular courfe of nature, in the formation of bone, might be adduced; but thofe I have mentioned are fufficient to fhow that cartilage is not the exclufive feat of offification. The bones of the cranium are originally formed between membranes. Neither does bone depend upon the prefence of periofteum for its formation, as Du Hamel maintained: for not to mention that all our bones almoft are produced before the periofteum is, they will form a callus, and be renewed where their natural covering is abraded. The fact appears to me to be ftrictly this: When a part undergoes the offific procefs, it only ferves as a bed or matrix for the bony fibres to fhoot in, and be fupported.¶ It is very probable that the cartilage is better fuited to this purpofe than any other fubftance in the body. During the procefs of offification, the parts in which it takes place difappear, in confequence of being abforbed as faft as the bone is formed, and is capable of fupporting itfelf alone. This is proved by cutting an offifying cartilage into pieces, and macerating them in water till the blood-veffels rot, and the portion of bone which has been formed will drop out fpontaneoufly, leaving a vacuity in the cartilage, correfponding exactly to the fize of the bone.

* Jones' Abridg. of the Philof. Tranfact. vol. v. p. 345.
† Med. Effays and Obf. of Edin. Soc. vol. ii. No. 21. 12mo.
‡ Effay on Vital and Invol. Motions. 8vo. p. 8.
§ Medical Mufeum, vol. i. No. 3.
|| Lowthrop's Abridg. vol. iii. p. 15.
¶ As the coagulable lymph of the blood does for the elongation of the arteries.

Another proof that the arteries are the inftruments of offification is, that immediately before bone is formed in a part, that part uniformly becomes very vafcular. This is very remarkable in the cartilage of the patella.—I am fo much convinced of the truth of this doctrine, that I am difpofed to extend it to the production of other parts as well as bone. Indeed, without the arteries are the agents by which all parts of the animal machine are generated, I am ignorant of the manner in which their origin is to be explained. Ever fince the wonderful injections of the celebrated Ruyfch were performed, refpect for this doctrine has been increafing daily; and the arterial fyftem is now confidered the moft eminent in its nature, and the moft important in its function, of any other fyftem in the body. The extreme vafcularity of glands has induced phyfiologifts to believe that the fecretion of fluids is performed by veffels. The chyle does not poffefs the properties of blood until it has been acted upon by the blood-veffels, although it may have been partly animalized by the lacteals; and it is from the conveyance of this blood, when formed by the veffels which contain it, that every part of the body derives nourifhment, regeneration, and an extenfion of life.

There can be no doubt that the filling up of cavities by granulation depends folely upon an elongation of veffels: for, if an injection be thrown dexteroufly, and with fome force, into an artery which paffes to an ulcer, the injection will ooze out upon the furface of the granulations. In the fame manner, I believe, it is that the renewal of every part of the body is effected—bone, integument, tendon, cartilage, &c. as well as the veffels themfelves. But it is a circumftance worthy of remark, that the fame veffels do, fo wifely and difcriminately as it were, fecrete fubftances fo totally different in their nature and ufe as thefe juft mentioned, according to the calls of nature. But we find this is not always the cafe; for inftances have been mentioned, where parts which were not intended to be bone, have become offified.

The laft proof I will mention of the fecretion of bone by arteries, is connected with inflammation, which is a fruitful fource of inftruction to us on this fubject. The proximate caufe of inflammation confifts in an increafed action of the blood-veffels. This action is entirely confined to the arteries, and not to the veins; and, in whatever part of the body it may exift, it is the fame difeafe. This inflammation, unlefs fubdued by art, is always terminated by the effufion of fome kind of matter, which effufion is thrown out from the extremities of the arteries. The nature of the effuſed matter varies according to the nature of the part into which it is thrown. This is particularly evidenced by the regeneration of parts. If a tendon is divided, the ends of it are agglutinated together by the effuſion of tendinous matter from the inflamed arteries. The knitting of broken bones depends upon the ſame principle. In the venereal, and other diſeaſes, the bones are ſometimes attacked with pain, heat, and other ſymptoms of inflammation, which, in the ordinary time, are terminated by the effuſion of bony matter, which conſtitutes nodes and exoſtoſes.

From a view of what has been ſaid, it would ſeem that the arterial and lymphatic ſyſtems act in oppoſition to each other during life, and that, when one takes on action paramount to that of the other, diſeaſe is the conſequence. It is from the irregular action of the arteries, moſt commonly, that diſeaſe ariſes, as it is but ſeldom the lymphatics abſorb an undue quantity of matter. Of the two ſyſtems of veſſels, the abſorbents appear to be the moſt regular in their function. Thus, whilſt we obſerve the arteries evolve the different parts of the body, in an abundant, and ſometimes in an indiſcriminate manner, the lymphatics mould, or give them their proper figures, by carrying off the ſuperfluous and miſplaced arterial productions: and it is to the abſorbents alone that man (in whom elegance of ſtructure is ſo prominent) is indebted for the form of his bones, and for the general configuration of his body.

Mr. Hunter ſuppoſes that the abſorbents have a power ſimilar to that of a caterpillar eating up the leaf of a tree; and believes that they elongate themſelves, or ſhorten themſelves, as their object recedes or approaches nearer. But this opinion is leſs ſatisfactory than ſome others: for who can conceive of a ſoft veſſel, ſuch as an abſorbent, being able to tear away the hard ſubſtance of bones? No: ſuch an opinion as this cannot laſt long; and although I cannot broach a more plauſible and inviting doctrine, I muſt content myſelf, at preſent, with the following remark, which appears to be ſo well grounded, that I ſuſpect it will outlive all the theories to be formed for an age to come: The actions of the abſorbents are as much *forced* as thoſe of any other parts of the animal body. The ſtimulants, which ſupport and keep in action the powers of the abſorbents, are numerous, and may be either of a mechanical or ſpecific nature. Preſſure is the moſt common mechanical ſtimulant to the abſorbents hence we diſcover the traces of it upon the bones. The deſtruction of ribs, in the caſe of James Tarney, was probably owing, in the firſt inſtance, to the preſſure of the tumour upon them. A caſe is mentioned by Dr. Donald Monro,* in which the preſſure from a tumour of the brain made a hole in the os frontis. Mercury, digitalis, ſquills, and even the contents of the abſorbents, are all particular or ſpecific ſtimuli to them: and, unleſs ſome of theſe ſtimulants influence the lymyphatic ſyſtem, it becomes inactive, which ſtate will be uniformly indicated by diſeaſe.

## ARTICLE VIII.

OBSERVATIONS *on the* HAIR-WORM *(Gordius Aquaticus Lin.?) by Mr.* GEORGE CHILTON, *Teacher of Geography, Aſtronomy, &c. in New-York: In a Letter to Dr.* MITCHILL, *dated April* 28, 1800.

DURING my reſidence in the country, towards the latter end of autumn laſt, I met, for the firſt time, with the water-worm, known among the country people by the name of hair-ſnake. Curioſity, together with the common notion of its being produced by the action of the ſun upon a horſe-hair ſteeped in water, induced me to examine it; for which purpoſe I confined it in a baſon of water for the ſpace of a week or more; during which time I was not a little gratified with the activity it diſcovered in ſwimming about, but could perceive no change reſpecting it, except that it grew languid, or leſs lively, which I ſuppoſed to be owing to a want of freſh water.

Shortly after this I procured another from a ſpring-bath, in a field, which I ſecured alſo for the purpoſe of examination, by putting it in a baſon of water. After amuſing myſelf with it a while, I left it. On my return, after being abſent about half an hour, I was ſurpriſed with the ſight of ſomething in the act of proceeding from one of its ends, reſembling a piece of very fine white thread. I immediately began to conjecture that it might be one of its young. It ſeemed in length about half an inch. In the courſe of an hour it made its way about half an inch further. I left it in this ſituation,

* Tranſact. Lond. Col. vol. ii. p. 353.

and returned in about an hour, when I found it wholly expelled, lying coiled up at the bottom of the bafon. Expecting to find fome fymptoms of life about it, I examined it with all the minutenefs I was capable of, but was difappointed. On taking it out of the water, I found it exceedingly tender; but not having a microfcope, could make nothing more of it. Putting it in the water again, I left them for the fpace of an hour, when, on my return, I found another one proceeding in the fame manner as the former, which, in the fpace of an hour, was alfo wholly expelled.

In this gradual manner was the expulfion continued till the next day, when I found the number amounted to about twelve, which were feemingly of an equal length, viz. two and a half inches; for they were fo twirled about each other, and fo very tender, it was not eafy to determine, with accuracy, either their number or their length.

They were fuffered to remain in the bafon about a week, during which there was no perceptible alteration.

Being at the bath fhortly after this, I obferved another of thofe creatures to fwim from a projecting part of its edge. I endeavoured to take it; but the bath being wide, it fheltered itfelf among fome weeds on the oppofite fide, and efcaped. On examining the part from which I had obferved it to fwim, I was pleafingly furprifed with a view of a bunch of thefe young ones (for fuch I took them to be) twifted around the root of a weed, which hung down into the water from a part that jutted over. On a clofe infpection, without difturbing either them or the water, I was able to difcover life in two or three of them, which were a little larger than the reft. They were faftened at one end to the bunch, but with the other moved freely in the water. A fmall black fpot was likewife obfervable on the moveable end; but, in other refpects, they were fimilar to thofe I had in the bafon. Leaving them in this fituation, and returning the next morning, I was not a little aftonifhed to find that the old one had returned, and was twined about the young ones in fuch a manner as feemed to indicate the exiftence of a principle fomewhat fimilar to natural affection.

On looking along the edge of the bath, I found another bunch of young, with the old one, twined about a root in the fame manner. After vifiting them occafionally for a few days, without obferving any material alteration, they became torpid, in confequence of the increafing cold of the feafon, in which ftate I left them to take their winter's repofe.

# ARTICLE IX.

ARRANGEMENT *of* FACTS CONCERNING ULCERS, SORES *and* TETTERS; *showing how agreeably these and similar Affections of the Skin are healed, in many Cases, by* ALKALINE APPLICATIONS: *In a Letter to* THOMAS TROTTER, *M. D. Physician to the British Fleet, &c. dated New-York, September* 20, 1800.

FROM the great benefit derived to mankind by alkalies and soaps, and particularly from the pleasant effects wrought by them upon the skin, it would seem that the whole of their operation, when thus applied, would have been understood ages ago. Yet the facts, plain and obvious as they are, have not, as far as has come to my knowledge, been duly noticed. The *caustic* effects of the simple alkalies have been duly observed. The corrosiveness of ley, made from ashes just taken from the heated hearth, or draining from a leach-tub partly filled with quick-lime, has been a long time familiar to washers and bleachers of linen and other cloths. They knew very well that the ley might be made strong and sharp enough to eat away the skin and flesh of their hands, and to destroy the firmness and cohesion of the goods. And from these accidents surgeons seem to have taken the hint of preparing ALKALINE CAUSTICS, which are generally little more than *naked pot-ash*, or the vegetable fixed alkali deprived of its carbonic acid by quick-lime.

Caustic pot-ash, thus, having been much employed in domestic economy, and sometimes in surgery, was generally looked upon as a fearful and formidable thing. As it was dangerous to be touched or tasted, there was good reason for popular uneasiness whenever it was brought in contact with the living body. In that form it was capable of doing great damage. Hence have proceeded, in all probability, the alarming stories about the corroding, acrimonious, attenuating, dissolving and putrescent qualities of alkalies, found in such writings as those of HUXHAM, and in various other popular books. They seem, in those ways, to have got a bad character, which they have never wholly retrieved.

Acids, when united with alkaline salts, diminish remarkably their keenness and pungency. These neutral compounds are, therefore, by a great difference, more mild and manageable than the naked alkalies. And thus it is that feveral of them poffefs, at the fame time, the virtues of fimple alkalies, without their inconveniences.

It is known among farmers and dealers in horfes in America, that, when the fkin of thefe animals is chafed by the collars, or galled by the faddles, a good application to the parts fo injured is a weak alkaline lixivium, made by putting fome common wood-afhes in water. The wafh difpofes the fore to heal quickly. This application is commonly a carbonate of pot-afh.

The white fine powder remaining after the combuftion of *hickory-coals* (juglans) has been deemed more neat and efficacious than common afhes from other fpecies of wood, and applied, they fay, very advantageoufly to relieve horfes injured as before defcribed.

Tobacco-afhes have been recommended as very efficacious in removing that tetter or eruption called "the ring-worm." This too owes its activity to the alkaline falt with which it abounds.

Obftinate eruptions and fores about the mouths, lips, and chins of children, have been cured, in country places, by being fprinkled by their mothers with the nice and light afhes remaining after the confumption of hickory wood by fire.

Lime-water has long had a place in the materia medica; and, befides its internal ufe for urinary calculus, and diforders of the alimentary canal, has often been employed, with advantage, for ulcers on the legs and other parts of the body.

Indeed, the aqua phagedænica, made by diffolving corrofive fublimate in lime-water, is little elfe than a plain folution of alkaline or calcareous earth in water; for the lime immediately unites with a portion of the muriatic acid, into a muriate of lime, and the quick-filver, turned to a yellowifh oxyd, falls to the bottom in the form of a powder. I confider the chief operative ingredient in this pharmaceutical preparation to be the lime-water.

Pliny mentions (Hift. Nat. lib. xxiii. Procem.) the healing qualities of the *afhes of the vine* (pot-afh), in chaps, fiffures, piles, excoriations and eryfipelas; and relates that (ibid. lib. xxiv. cap. 6.) the afhes of pine and larch-tree bark are good for the places fretted and galled between the thighs, and for healing burns and fcalds. The fame author recommends the afhes of burnt fponge, which confift chiefly of foda with carbonic matter, for difeafes of the eyes and eye-lids, and for feveral other complaints (ibid. cap. 11.); and he affirms (ibid.

lib. xxi. cap. 10.) that foda is good againft the leprofy, and unfeemly fpots and freckles which blemifh the fkin, with other remarkable particulars to the fame point.

I knew that for fpongy and fœtid gums, accompanied with bleedings, and with naftinefs about the teeth, weak alkaline folutions were of fovereign efficacy to cleanfe the mouth, to leffen the fœtor of the breath, and to difpofe the difeafed parts to become found and healthy. I have, for feveral years, been in the habit of prefcribing them to remove the fordes accumulated there in fyphilis, fcurvy, fevers, and, in fhort, in all other cafes where the mouth had collected filth, and ftood in need of being cleaned out.

Taught by fuch facts, I began to think that the purulent fecretion in fores, wounds and ulcers, underwent fome other change than a mere thickening of its confiftence, while expofed on their furface. There was the higheft probability that a portion of oxygenous air underwent decompofition, and that its bafis, attracted by the pus, imparted to it the qualities of an acid. And from the ftimulating, corrofive, or other morbid operation of this acid upon the fubjacent parts, many of the phenomena of ulceration might tolerably well be accounted for.—Chemiftry did not here meddle with *living parts or functions*. Its principles were only applied to explain fome of the phenomena of animal fluids, wherein *no vital energy of any fort was prefumed to inhere*. Fluids, *after fecretion*, have ever been deemed fair fubjects of chemical analyfis.—As I had, long before, been led to believe, that intermitting, remitting, and continued fevers, in all their modifications, were but the effects which oxygenated fepton wrought upon the body, I was naturally led to a perfuafion, that the fevers confequent upon deep and extenfive ulceration, were afcribable to a fimilar caufe. Thus the hectic paroxyfms accompanying vomica of the lungs, confequent upon the admiffion of air into the purulent cavity of pfoas abfcefs, and attendant on broad ulcerated and expofed furfaces of every fort, apparently arofe from an abforption of feptic acid, formed on the denuded fpots, by a combination of a portion of atmofpheric oxygen with the azotic material of the fecreted humour. This, I thought, approached to fomewhat of a rationale of *hectic* chills and heats, by referring them to the fame general law of nature which governed the phenomena of *other* fevers. I have endeavoured to fhow, in other places (particularly in my piece on dyfentery, foon to be publifhed), that the *feptic poifon* which produces febrile action is often formed in the alimentary canal, from the degenerated remains of food: it looked now almoft as likely that *virus, of nearly the fame compofition*, was formed on the furface of ulcers, from the fluids effufed there. I fufpect fome of the phenomena mentioned in your chapter on malignant ulcer, in the fecond volume of your Medicina Nautica, proceed from the feptic acid converted to a gafeous form, and becoming infectious. And I intend this letter as a fequel to that chapter.

This conclufion was ftrengthened by confidering the qualities of the pus in many cafes of ulceration. It feemed to devour the contiguous parts, and fometimes to eat away all before it, conftituting what you have defcribed fo well. The exhalations from this deftructive liquid were oftentimes noxious as well as offenfive; and wherever they were abundant enough, as in the wards of military hofpitals, and on board of fhips, they evidently acted as the exciting caufe of "fevers" among thofe who were confined in the fame apartments. Here the feptic effluvium of putrid ulcers was productive of confequences refembling thofe ordinarily occurring from the operation of fimilar vapours from other fources of corruption.—It was, however, fcarcely to be doubted, though this kind of acidity was the moft common, that, occafionally, *fome other than the feptic acid* was the morbid product.

Under the conviction that ALKALINE REMEDIES were fully indicated as topical applications in the practice of furgery, I ventured to try them in a number of cafes which fell under my care. The firft inftance was the venereal chancre removed by *carbonate of pot-afh*, which is related at large in Med. Rep. vol. ii. p. 217—218, firft edition. Since which it has been in my power to fee many other, and more ferious fyphilitic ulcers, of the primary kind, yield to the fame alkaline treatment. Indeed, in incipient chancres, the deliquefced carbonate of pot-afh (lixivium tartari) is my fteady prefcription. I never knew bubo arife from its application, as frequently follows the ufe of feptite of filver (lunar cauftic). It does not, like that metallic falt, deftroy life and organization, nor caufe the part to mortify and flough away; but it preferves a degree of cleanlinefs unknown under any other dreffing. Some cafes, which afterwards occurred under Dr. Rodgers and myfelf, were extracted from the books of the New-York Hofpital by Mr. Hayes, then the apothecary of that houfe, and publifhed in the third volume of the Med. Rep. p. 302 & feq.

Emboldened by thefe inftances of fuccefs, I directed *fecondary* fyphilitic ulcers to be treated with alkaline applications. When in their very foul ftate, the fluid carbonate of pot-afh was applied by aid of a camel's-hair brufh, and repeated from time to time, until the fore became more clean, which commonly happened in a few days. Afterwards, lint dipped in lime-water, and kept moift with the fame, was the common dreffing; the fore being touched, from time to time, with the carbonate of pot-afh, if deemed neceffary.—In other cafes, I ordered the ulcers, after having been duly alkalized, to be dreffed with an ointment, made by rubbing together, upon a tile, carbonate of foda and the cerate of wax and oil. This was fpread upon lint, and applied in the common manner. Sometimes a poultice was directed, and fometimes not.

In cafes of ulcerated buboes, and of venereal blotches about the fkin, I have caufed dreffings of the fame kind to be made ufe of; and I approve of them, and thofe herein mentioned, upon the whole, more than any others with which I am acquainted.

In one inftance I was agreeably furprifed by a very unexpected occurrence. A girl, whofe conftitution had been confiderably injured by fyphilis, was affected, in addition to difeafe of the genital parts, with an ugly and fcabby eruption over her face and neck, and with an enlargement and inflammation of the lachrymal fack of the right eye. Determining to defer the particular treatment of the fiftula lachrymalis until the general and more urgent difeafe of her conftitution fhould have abated, I prefcribed, befides other things, a weak folution of carbonate of foda in water, as a lotion for her face. This had the ufual effect of difpofing the eruptions to dry away, and difappear in a few days: but, what I had not at all expected at the time, the *fiftula lachrymalis difappeared too*, under the continuance of the alkaline wafh, and returned no more.

I am of opinion that, in old fyphilitic cafes with ulceration, the fick actually fuffer a twofold diftemper; one part of which was brought on by the original virus, and the other proceeds from the oxygenated pus conftantly abforbed from the furface of the fores. By alkaline applications, this latter fource of mifchief is leffened, and the acidity of the pus is overcome; the *local irritation* abates, and the *conftitutional infection* by it ceafes; and thus, as the ulcers heal, the febrile ftimulus which ufed to be produced there is proportionally diminifhed; and when they become cicatrized, they furnifh not a particle of it any longer.—Latterly I became fo convinced of the difpofition to heal induced by alkalies, that I ordered ſeveral deep and ſinuous ulcers to be dreſſed with lint dipped in the fluid carbonate of pot-aſh: and the reſult here was no leſs agreeable than in the other caſes.

Thus far I had proceeded, when, on reading the Medical and Phyſical Journal for December, 1799, I obſerved that a gentleman, diſtinguiſhed for his poetical as well as profeſſional talents, Dr. Drake, had quoted Brugman's Diſſertation on Pus, proving it *to be an acid*. Theſe experiments, which I had never ſeen nor had any knowledge of until then, I ſhould be glad to peruſe. The eſtabliſhment of this one fact fixes a principle of great moment in pathology, and enables us to practiſe upon ulcers, and the fevers which accompany them, upon ſomething like a conſiſtent and rational plan; and, more than this, puts it in our power to compare the phenomena of fever from the abſorbed acid of an ulcer, with fever from the imbibed acid of dyſenteric inteſtines, and the fever from the inhaled acid ariſing from ſubſtances putrefying in the open air; and to refer them to a general law of the animal economy, whereby *oxygenated ſepton*, acting as a poiſon, and known ſometimes under the names of contagion, infection and miaſma, ſtirs up thoſe varieties of commotion in the living frame.

It would be highly worthy of your official character, and wholly accordant to your various and benevolent plans for bettering the condition of ſeamen, to recommend alkaline dreſſings, among other things, for old and offenſive ulcers, as the navy-ſurgeons would have great opportunities of trying them, and of witneſſing their good effects.—Hoping and labouring earneſtly for the improvement of medicine and ſurgery, I am aſſuredly, &c.

SAMUEL L. MITCHILL.

# REVIEW.

## Art. I. *Memoir concerning the Difeafe of Goitre. By* Benjamin Smith Barton, *M. D. &c.*

[Continued from page 53, and concluded.]

WE proceed, according to our promife, to give an account of Fodere's publication on Goitre and Cretinage. Fodere's work, the dedication of which has been accepted by the Royal Academy of Sciences of Turin, is divided into four fections. In the firft, the author defcribes the Goitre, its feat, differences, caufes, and the remedies which phyfic and furgery may ufe for its cure. In the fecond he fpeaks of the complete Cretinage, its differences, propagation, and particular caufes. In the third he inquires into the general caufes of the Goitre and Cretinage, and the reafon why thefe difeafes are endemic in his country (the province of Maurienne). The fourth fection contains the phyfical and moral means by which Goitre and Cretinage may be extirpated from the fubalpine valleys; and it is ended by fome particular and philofophical confiderations on the province of Maurienne.

The defcription of the thyroïd gland, as the feat of the tumour commonly called *bronchocele*, comes, in the firft place, under our confideration. That gland, fays he, contains a humour of the fame nature as thofe deftined to lubricate all the parts of the body, the defication of which might undergo fome alteration. The collection of that humour, in confiderable quantity, in the gland, when choaked up by any caufe, produces the Goitre. He gives a mufcle *azygos* to that organ: he calls it conftrictor; and, as it covers the gland, it exercifes a preffure upon it; fo that he confiders the thyroïd as a conglomerate gland, whofe fecretion moiftens and lubricates the larynx and *trachea arteria*, continually exficcated by the air neceffary to refpiration. His anatomical experiments are not carried fo far as we fhould expect from fo interefting and extenfive a work. On that fcore he does not agree with many anatomifts, who confider that gland only as a mucous one, quite deprived of any excretory duct, and immediately covered by the mufcles called *fterno-hyoideus*, *fterno-thyroi-*

*deus*, and *omoplato-hyoideus*, ſtrongly connected together by a kind of aponeurotical expanſion, without an *azygos* muſcle.

The details he gives of the cauſes are delivered with great preciſion and accuracy. They are to be found neither in the drink of ſnow-waters, nor in ſelenitous nor metallic waters, nor in coarſe, thickening and inſpiſſating food, *but in the warm dampneſs intimately diffuſed in the atmoſphere of the deep valleys (which he calls ſubalpine), by which the inhabitants are conſtantly ſurrounded.*

Living at St. Jean de Maurienne (a town ſituated on the plain, where the Goitres and Idiots are not ſo common), the author has been ſo careful as to go and explore that country, at repeated times, as far as was neceſſary: ſo that, beſides his tables of compariſon between the inhabitants of the valleys, thoſe of the plain, and thoſe living on the declivity of the mountains, his proofs on this head are reinforced and illuſtrated by various reaſoning. It is known that that country exhibits more people with big throats than any other in the world, as all the cauſes act more powerfully, and are more concentered and combined, in the deep valleys of Maurienne, Savoy, Valais, &c.

They whoſe habitations are encompaſſed with trees, furniſhed with large leaves, and eſpecially fruit trees, or ſituated in the neighbourhood of rivers, torrents, lakes, ponds, ſwamps, and expoſed to the currents of ſouth and weſt winds, are more particularly affected with thoſe infirmities and tumours. He has always obſerved the Goitre make its appearance in the ſpring, when the trees are adorned with leaves, and to diminiſh in the beginning of winter, when they caſt them off. It diminiſhes more when the winter ſeaſon is cold and dry, and *vice verſa.*

He believes that there are no miaſmata nor foreign particles diſſeminated in the air ſufficient to give riſe to the Goitre. "If there are any miaſmata, if truly they are exiſting, they muſt be very light, and, of courſe, carried upwards with the columns of the air that we breathe, as the azotic gas is."

The number of big throats diminiſhes as you advance from the low grounds towards the high places, the level of mountains and open plains, and are entirely extinct, except among thoſe who have emigrated, on high and naked places. A great many other illuſtrations are unavoidably paſſed without notice. Our author expatiates pretty lengthily on the relaxation of the ſoft parts, and its effects. From the permanent dampneſs of the atmoſphere, the fibres of the bodies are relaxed by degrees;

the *vis tonica* diminifhed and weakened, the perfpiration checked, an accumulation of mucous humour in the thyroïd gland takes place, and, of courfe, the enlargement of that gland, and the formation of the Goitre.

The author acknowledges that the Goitre is often hereditary, and the *Cretins*, or ideots, are, at firft, more commonly afflicted with a fmall Goitre. "Many writers have confounded the Goitre with fcrophula. *Heifter*, *Riolan*, and *Mittermeyerus*, have fet the Goitre in the fame chapter with it. Yet we fhould be much miftaken if we made no difference, although thefe difeafes have fome common fymptoms—the principal of which are, a weak conftitution, white, fine and delicate fkin, blue eyes," &c. He gives a ftriking difference between the two difeafes, which are fometimes found exifting in the fame individual. "The fcrophula," fays he, "feems to exift in all the folids weakened, and efpecially in the whole glandular fyftem. The infant has a haggard eye, and the upper lip thicker than ufual. It feldom makes its appearance before two years of age, and fcarcely ever after ten or twelve. It difappears fometimes at the age of puberty, and on the approach of the menftrual flux. The Goitre, on the contrary, is a local difeafe of the throat, which often arifes at the birth, or fome time after. The moft common epoch is at feven, eight, nine and ten years; but it may take place at any age; and, when it once comes out, puberty does not diffipate it.—Although nature has cured, now and then, a few perfons affected with true fcrophula, it does not appear that art has yet done it. Art, on the contrary, radically cures Goitre, which nature alone does not perfectly."—Thefe paffages, in our opinion, admitting no abridgement, we have thought proper to tranflate them entire.

Dr. Foderè proceeds, in the next place, to deliver an account of his method of cure. The remedies confift in an electuary, compofed of fponge half calcined, with honey, and powder of cinnamon, to be taken three times a day, to the quantity of a hazel-nut, till the tumour fubfides; or thirty grains of hepar fulphuris (fulphure of pot-afh), diffolved in one quart of water, which fhould be drunk every day.

Whichever may be the method of cure, he recommends a purgative previous to adminiftering the above remedies, and a repetition of it every eight days, till the Goitre be cured. He obferves, alfo, that the remedies fhould be retained awhile in the mouth, and the patient kept warm and covered. Having confidence in the influence of the moon, he advifes to give the remedies towards its decline.

If children refufe to fwallow thefe medicines, frictions ought to be made on the tumours, either with a dry flannel aromatifed, or with foap, or camphorated oil, as Underwood practifed with fuccefs. He recommends, alfo, to wear an oval and elaftic plate of fteel, as large as the Goitre, which being conftantly fixed on it, exercifes a fufficient preffure, and diminifhes its fize.

The author feems to be at a lofs to explain the effect of the remedies on the Goitre. When in the ftomach, he afks whether they operate immediately upon its nerves, or penetrate the fyftem of the circulation, and pervade the veffels of the thyroïd gland? If it be the latter way, they muft alkalize the blood, and the remedy is worfe than the difeafe.—Would it not be much better to recommend, once for all, and without hefitation, in the treatment of every Goitre, not to fwallow any, or very little, of the medicines known to be the moft efficacious—but to keep them, as long as poffible, in the mouth, or to rub its inner parts with a proper and harmlefs powder? This point will be examined afterwards.

The author proceeds thus: "When the Goitre is old, fcirrhous, and very large, it is ufelefs to make ufe of any medicines. The operation alone may fucceed, provided it be formed of a fingle fac, detached and hanging on the middle of the fore part of the neck, and narrower at its bafis than at the top. The fkin muft be divided by a crucial incifion, and feparated from the tumour, which muft be feparated and taken out. If there is an hæmorrhage, ligatures muft be put on the veffels, &c. In certain other cafes, a feton may be paffed through the tumour, and is preferable to cauftic, although the ftring fhould be anointed with fome alkaline or mild cauftic." He confeffes to have been only a witnefs of two cafes in which the firft operation was luckily and fkilfully performed. Such is the whole method of cure that we have deemed neceffary to detail.

In the fecond part of the work, Dr. Foderé gives an hiftorical and philofophical defcription of thofe wretches, fo common in the fame valleys, called *Ideots* or *Cretins*, of whom Mr. *Coxe* and Mr. *De Sauffure* have left us a ftriking and lively picture; and he delivers his doctrine as a perfpicuous phyfician. He follows thofe poor creatures, of whom the greater part are deaf and dumb, from their birth to their death—divides them into Cretins, *perfect* or complete, and *imperfect*—diftinguifhes the perfect into fix different ftages—and, after having premifed his theory, and inquired into the anatomy and phyfiology of their bodies, to fubftantiate it, and explain the immediate caufes, he examines, with great accuracy, the predifpofing and remote caufes of the *Cretinage*. Thefe principal caufes are,

1ft. An atmofphere continually warm and damp, or cold and damp.

2d. A neglected and dirty, or too ftudied and too effeminate a phyfical education.

3d. A moral education grounded on ridiculous and extravagant prejudices, or too elaborate, and beyond the capacity of thofe fubjected to it.

4th. The intercourfe of ignorant and fuperftitious people.

5th. Imitation which countenances an averfion to conftant and regular labour.

6th. Continual gluttony.

7th. The abufe of wine and fpirituous liquors.

The topographical defcription of the valleys, the ftate of their atmofphere, the relative connection of their dampnefs with the Goitre and Cretinage, fill almoft entirely the third part of the work. The opinion of the author feems to derive fome fupport from chemical reafoning and hygrometrical experiments. Previous to examining how far climate influences the mind and character of the inhabitants of the fubalpine valleys, he undertakes to prove how the toughnefs of the brain (which is harder in the ideots than in other men) may be induced by dampnefs; and he begins with the following general propofitions:

1ft. The Cretinage (a few cafes excepted) is always hereditary; that is, a lefion of the brain (known to be the immediate caufe) is already fuppofed in the father and mother. Thus an ideot child, or one who is to be fo, is born with a beginning of preternatural hardnefs in the brain.

2d. It is probable that the Goitre has, at all times, preceded the Cretinage.

3d. The ideot's father and mother had a Goitre.

4th. A father, afflicted with a Goitre of a certain bignefs, feldom begets children without fome degree of Cretinage.

5th. A fubject, affected with an extenfive Goitre from his youth, commonly becomes, after a great while, an ideot in fome degree (the perfect ideot excepted), as related in the fecond fection. Thus, fhould the Goitre give rife to the Cretinage, the humid air being the firſt cauſe of the Goitre, then it is likewiſe the firſt cauſe of the Cretinage.

The theory of the author is illuſtrated by an explanation of the formation of the hardneſs of the brain, from the effects of the atmoſphere on the veſſels, &c. He neglects nothing to ſearch into the cauſes of the diminution of both diſeaſes, in the valleys, for ſome years paſt; and, in order to proceed with more exactneſs, he has availed himſelf of the aſſiſtance of the curates of ſeveral pariſhes. "The travellers," ſays he, "who have paſſed through thoſe valleys twenty years ago, and croſs them again now, perceive a difference. Notwithſtanding this change, which actually exiſts, the number of ideots and big throats is ſtill conſiderable; ſince, in the Val-d'Aoſte alone, the number of perfect *Cretins* amounts to 1740, in a population of 68022 ſouls."

Having taken a haſty ſurvey of the three former parts, we ſhall now proceed to offer a curſory notice of the laſt. Many paſſages contain intereſting reaſonings, which we ſhall be, unwillingly, obliged to paſs over. Among the means propoſed to reduce and diminiſh the dampneſs of the atmoſphere, we ſhall take notice of the following:

1ſt. As the trees furniſhed with large leaves collect and preſerve dampneſs, the author recommends to cut down all the fruit-trees within the ſpace of four hundred paces around the houſes, inaſmuch as the fruits are noxious to the inhabitants of thoſe valleys, who ought alſo to remain unſhaded by any trees. With regard to the power poſſeſſed by the trees, of diffuſing dampneſs, he refers to BONNET's ſyſtem and experiments.

2d. To remove ſtanding waters, and drain the ſwamps annually filled up with the melted ſnows and overflowings of the rivers. Beſides the dampneſs reſulting from them, a prodigious quantity of inſects are bred and die in thoſe marſhes during the hot ſeaſon, and ſundry vegetables are putrified: hence ariſe an infectious air, and a great many intermitting fevers.

3d. It ſeems to him very important to raiſe the roads, which are now too low; to preſerve the greateſt cleanlineſs in the ſtreets of all the villages, and pave them; to erect houſes at a diſtance from rocks or high grounds, ſo as to give a free circulation to the winds. The people ſhould no longer inhabit their ſtables nor low rooms.

After having propoſed ſome means to render the human body leſs ſuſceptible, and abler to reſiſt the atmoſpheric dampnefs, Dr. Fodeiè relates how marriages ought to be regulated and determined by a committee, compofed of the magiftrate, the curate and the phyfician of the place, and what moral education it is requifite to give the children of the valleys. To this laft purpofe, as the cure of the *perfect* Cretinage is impoffible, he propofes to proceed cautioufly to the education of the *imperfect*, by the analytic method, which muft be preferred to the fynthetic—that is, from the moft fimple to the more complex. His means are wife, eafy, and in conformity with his principles; and he quotes the authority of *Tacitus*, *Montefquieu*, *Locke*, the immortal Abbe de *Condillac*, and Mr. *De Pauw*. He laments and deprecates the unheard-of and inconceivable flothfulnefs prevailing among the inhabitants of the towns and hamlets, who, at the fame time, are inceffantly reftlefs and difcontented. " There is a virtue," fays he, " which ought to be early inculcated on the inhabitants of the valleys: it is the love of work. So true it is, that if governments wifh the people to be happy and quiet, they ought to employ and keep them bufy. The man who works is fond of peace, and refpects his duties. If not overwhelmed, he calmly devotes his days to labour, without being acquainted with the metaphyfics of government, and without difquieting himfelf by thofe vain diftinctions which needleffly teaze and weary fo many men."

Finally, the work is concluded by propofing fundry means of improvement for the province of Maurienne: fuch as a better adminiftration concerning agriculture in general; the exploring of fome mines of iron, copper and filver; the eftablifhment of good manufactures; to pay more particular attention to fheep and wool, and to the tanner's art. He recommends the bark of fir-trees to make tan: as they grow in plenty in the mountains, and in the *high Maurienne*, they can get a great quantity of their bark. Thofe trees ftand and live four or five years after their being ftripped. Many other important parts of the book admit neither analyfis nor abridgment: the philofophical and patriotic views of its author cannot fail to reflect much honour upon him, and gain the grateful affection of his fellow-citizens.

However, we cannot take leave of this important fubject without cafting a curfory view upon another and earlier work on Goitre, which was undoubtedly unknown to Dr. Fodeiè. The work we mean was fent to the Academy of Surgery of Paris in the year 1789, which rewarded the author with a gold medal. That author is Louis Valentin, Doctor of Phyfic in the Univerfity of Nancy, and lately chief phyfician of the French hofpitals in Virginia. He feems to be the firft who rejected the commonly-received opinion of attributing the Goitre to the ufe of melted fnow, and felenitous or vitriolic waters; but he brings forward many proofs of the effects of cold and damp air, efpecially during the night, upon a certain clafs of people, and military men fubmitted to his care. We are told that Dr. Villars, of Grenoble, touched upon the fubject of Goitre a little before Dr. Foderè; and he alfo acknowledges that fnow-waters, and other caufes to which the Goitre has been attributed, are unfounded. On that point, it is very fatisfactory to find that Dr. Foderè agrees fo well with the two other writers, without having been at all acquainted with their works. We underftand that Dr. Valentin's memoir is not yet publifhed.* We know, however, that he gives an anatomical and phyfiological defcription of the thyroïd gland, which he confiders only as a mucous and lymphatic one, quite deftitute of excretory ducts. His method of cure is very different from Dr. Foderè's. It is a *fweet* and *alkaline powder*, to be ufed at nights in bed, and fometimes in the morning. It fhould not be fwallowed, but rubbed in the infide of the mouth, and kept underneath the tongue, to be abforbed by degrees, and conveyed by the lymphatics to the difeafed thyroïd gland. This is to be treated with warm and *alkaline* topics, fuch as *warm afhes*, *ammoniacal falts*, and wafhings with *brine*, *weak ley*, or a *folution of pot-afh*, or *hepar fulphuris*, *lime-water*, &c. Sometimes he allows fome alterative means, according to the nature of the Goitre, of which he diftinguifhes *twelve* kinds. But before giving his powder he adminifters one or two emetics, and fome dofes of falts in the courfe of the treatment. He does not agree with Foderè concerning the influence of the moon, which he confiders as quite ineffectual.

We have before us a Latin differtation of Dr. Valentin, on the fame fubject, printed at Nancy, in the year 1789, bearing this title—*De Struma Bronchocele Dicta et de Hemeralopia*. It is far lefs extenfive than the memoir he gave two years after; for, in the former, he divides the Goitre into *ten* fpecies, of which he gives a particular account. It is

* We are apprifed, by a correfpondent, that the Medical Society of Paris, under the title of the *Society of Health*, intends foon to publifh the fequel of works fent to it, and to the Academy of Surgery, both being now united into one.

remarkable, that in this piece too he difapproves the ufe of *ftrong* alkaline fubftances, *when fwallowed*, on account of their bad effects, not only on the ftomach, but alfo on the nervous fyftem, and the ill confequences refulting from their abufe.

We conclude this article by expreffing our hopes that Profeffor Barton may hereafter continue to inveftigate this fubject with the fame caution, warinefs and candour, as well as with the fame comprehenfive and enlightened views, which fo eminently diftinguifh his prefent Memoir.

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ART. II. *Memoir on the Analyfis of the Black-vomit, ejected in the laft Stage of the Yellow Fever. By* Ifaac Cathrall. *Philadelphia.* Folwell. 8vo. pp. 32. 1800.

OFTEN has it been our lot to remark, that there is no affignable proportion between the length or fize of a publication and its merit or value. Readers of books have long lamented that a large amount of the time and toil they beftowed in examining the publications of their day, was expended without either inftruction or entertainment. Doleful is the tafk of the reviewer who is to give an account of long and tedious works, and to glean, from an almoft immeafurable furface of leaves and pages, the few particles of fenfe and beauty which are fcattered over them. Amplification and prolixity are the common faults of writers: and it is a great pity, both for them and their readers, that thefe are fo prevalent. Fortunately, however, it happens, that they who offer their compofitions to the public, do not always fill a folio or a quarto with that which might be comprehended in a pamphlet of moderate fize. In feveral departments of learning, there are fhort works which have fecured extenfive and lafting fame to their authors. The celebrated treatifes of LONGINUS *on the Sublime*, of HORACE *on the Art of Poetry*, and of TACITUS *on the Manners of the Germans*, are none of them remarkable for their length. LITTLETON's luminous tract *on Tenures*, the oracular book of Englifh lawyers, runs but a little way in print. The admirable *Theory of Matter*, propofed by BOSCOVICH, is contained in a volume of fmall bulk. In fhort, two of the moft valuable phyfiological effays; to wit, the one *on the Concoction of Food in the Sto-*

*mach*, by STEVENS; and the other *on the Refpiration of Animals*, by GOODWYN, comprife their important experimental matter within a very moderate compafs.

To this clafs of concife, but pointed and fententious productions, belongs the memoir which now lies before us. Without any preface or circumlocution, Dr. Cathrall proceeds directly to his fubject. To this he has attended patiently and perfeveringly. That the piece may be rightly appreciated, it is proper to obferve, that the author began his obfervations during the rage of the fatal ficknefs at Philadelphia, in 1793; and offered to the Philofophical Society of that city, in the month of June, 1800, this refult of his feven years inveftigation: and that many of the experiments were witneffed by Drs. Samuel Duffield and Adam Seybert. The black-vomit is defcribed thus: (p. 4—7).

" The black matter, or vomit, fo called, appears to be of two kinds. One confifting of a number of black flaky particles, refembling the grounds of coffee; the other of a dark-coloured infpiffated mucus. Of each of thefe I fhall give a feparate defcription.

" This flaky difcharge was always preceded by violent ficknefs and vomiting; and, as a precurfor to the ejection of this matter, in fome cafes, the patients vomited a fluid like whey or muddy water, or one confifting of a brown flaky fubftance, refembling chocolate or fpoiled porter, mixed with brownifh-coloured mucus.* Thefe fubftances were fometimes of a lighter colour, and were fufpended in a glarey yellow-coloured fluid, which became nearly tranfparent when at reft, by the fubfiding of a fmall number of brown particles. This coloured matter was generally vomited in fmall quantities, and with confiderable difficulty; but when the black flaky difcharge commenced, it was frequently ejected in large quantities, and with fimilar force to a fluid from the action of an emetic. As the difeafe advances, this matter affumes a darker colour, and its quantity fometimes becomes fo much augmented, that I have known one gallon vomited in 48 hours, befides a confiderable quantity, which was of a much thicker confiftence, that was difcharged by the bowels. This black-vomit, after ftanding fome hours, depofits a black flaky fubftance, from a

* " The chocolate, or coffee ficknefs, or the black ficknefs, fays Dr. de Monchy, is not taken from the blackifh hue or fhade of the fkin, but it is derived from the fœtid, blackifh matter difcharged from the firft paffages. *See Difeafes in Voyages to the Weft-Indies.*"

glarey yellow-coloured fluid, fimilar, in appearance, to an infufion of green-tea. Thefe depofitions were fometimes in diftinct particles, but frequently in a kind of dark powder. The above particles were various in fize, and of a very irregular figure, not unfrequently mixed with pieces of the villous coat of the ftomach. Thefe may be diftinguifhed by their being longer in fubfiding to the bottom of the veffel than the flaky fubftance. There were fome difproportions between the yellow-coloured fluid and the quantity of flaky fubftance, as in the other appearance of the vomit. The flaky matter was very readily re-incorporated with the yellow-coloured fluid, by the leaft agitation of the veffel; and when kept in a phial, corked for eight or ten days, affumed rather an agreeable, faccharine odour, and was extremely brifk, like fermenting beer. This laft property is not peculiar to this fluid, but common to fome other animal fecretions. When the black-vomit was kept for two years in a ftate of reft, the flaky particles became perfectly feparated. On agitating the veffel, the former was immediately incorporated with the latter; and, after remaining at reft fix months, fhowed fcarce any difpofition to feparate.

"The mucus matter which was fometimes vomited in the yellow fever, and particularly in that which appeared in 1797, was very ropy, and of a black colour. This matter floated on a fluid of a dark colour, which appeared to receive its tinge from the colouring matter of the mucus. When this matter was agitated in a phial, the mucus fhowed no difpofition to mix with the fluid part of the vomit, and when it was repeatedly wafhed in clear water, became nearly of the colour of the mucus fecreted in the alimentary canal. This black matter was difcharged, in large quantities, in the cafes which proved mortal in 1797, and was a very inactive fluid when applied to the moft fenfible parts of the healthy body, and was effentially different from the coffee-ground vomit."

From various and repeated experiments, Dr. Cathrall concludes that the black-vomit, befides a confiderable proportion of *water*, tinctured with *refinous* and *mucilaginous* fubftances, contains a *predominant acid*, which is neither the carbonic, phofphoric, nor fulphuric. This *acidity* he found to be prefent in the *yellow-coloured* fluid, taken from twenty different patients, during feveral feafons of the prevailing yellow fever, and alfo in the *black flaky* fubftance. With thefe were combined muriate of foda, iron, and an unctuous animal fubftance, fomewhat refembling fpermaceti. The exact proportion of the different ſubſtances he had not an opportunity of inveſtigating, for want of a ſufficient quantity of the black flaky matter to make a complete analyſis. An *acid*, which he believes to be of the ſame quality, is contained in the fluids ejected from the ſtomach a few hours *before the commencement* of black vomiting. Of this acid the author has expreſſed himſelf in *negative* rather than *poſitive* terms, faintly hinting, however, that it may be the *muriatic* (p. 9).

On the effects which the matter of black-vomit produces on the living ſyſtem, Dr. C.'s experiments are ſo original, and his concluſions ſo remarkable, that we ſhall inſert the ſection at full length: (p. 19—23).

" From the internal ſurface of the ſtomach and inteſtinal canal appearing, on diſſection, inflamed and ſphacelated, particularly in ſome patients who had vomited black, it has been believed that the black-vomit was corroſive, and had a power of acting on parts it came in contact with.* This power has likewiſe been inferred from ſome patients complaining of a ſoreneſs in their throats, immediately after the ejection of this black matter.

" To determine how far it was capable of acting on the healthy body, it was ſubmitted to the following experiments:

" 1ſt. In October, 1794, immediately after a quantity of black-vomit was taken out of the ſtomach, after death, I applied ſome of it to my tongue and lips: to the latter it gave, a ſhort time after application, the ſenſation of a fluid perceptibly acrid. This experiment was, the next day, ſeveral times repeated, with the ſame reſult.

" 2d. A friend of mine applied it to his lips, and it produced a ſimilar ſenſation, but would not affect his tongue.

" 3d. Finding the effects of this matter ſo different from what was expected, I began to believe that this diſcharge varied materially, in point of activity, in different patients; but on ſubjecting the black-vomit, procured from a number of perſons, to the ſame teſt, it produced the ſame effect.

" 4th. Two ounces of a fluid, reſembling chocolate, was obtained, which was vomited a few hours before death. This was applied in the ſame manner; but there could not be perceived any difference in the reſult.

" 5th. In the beginning of October, 1799, Mr. Joſeph Parker, an active and intrepid member of the Board of Health, obligingly preſented me with five ounces of black-vomit, ob-

* " See Deſportes on Diſeaſes of St. Domingo, p. 203, vol. i."

tained from the phyficians of the City Hofpital. Some of this I applied to my tongue, in his prefence, but could not perceive the leaft corrofive effect. When this fluid was applied to the fkin, on different parts of the body, it produced no other effect than what water did of the fame temperature. I have often immerfed my hand in black-vomit, immediately after it was difcharged from the ftomach, and whilft it was warm, without exciting the leaft uneafy fenfation in the fkin.

" *(a)* October 4th, 1799, three cats were confined in a room, and fed with beef, which had a confiderable quantity of the flaky fubftance of the vomit inferted into it. This manner of feeding was continued until they had ate one drachm and an half of the flaky fubftance, and had drank feveral ounces of the black-vomit. On the 5th, the excretions by the bowels were of a dark colour; yet there could not be difcovered any difference in their health; but, from their being ftangers to each other, they had a conftant propenfity to combat. This malicious fpirit continued until the 20th, when they were difmiffed in good health.

" *(b)* A large dog was confined in a room, and, by an affiftant, his jaws were forced afunder, and he was compelled to fwallow an half-pint of black-vomit. The following day the excretions by the bowels were fluid, and of a black colour; but there could not be obferved the leaft alteration in his health, from the time of making the experiment until he was difmiffed, which was about three weeks after.

" *(c)* Two full grown fowls were confined, and fed with bread, fteeped in black-vomit, for twelve days. This, Mr. Parker, as well as myfelf, obferved, they ate with great avidity; but it had no evident bad effect upon their health; for they continued as well after as they were before the experiment, and feemed to give the preference to that kind of food to every other which was prefented to them, and they appeared to thrive equally as well as if they had been fed upon corn.

" *(d)* On the 3d of October, 1799, in a fmall yard, adjoining the houfe in which I live, feveral ounces of the black-vomit, recently obtained, was [*were*] evaporated over a moderate heat, in order to obtain the flaky fubftance. During this experiment, Mr. Parker held his head over the veffel for fome minutes, fo as to inhale the fteam of black-vomit; after which we continued within two yards of the veffel, without experiencing any unpleafant effect.

" *(e)* The following day I caufed the windows and doors of a room to be clofed, and the fame experiment was repeated on a ſand-bath, conſtructed in the middle of a room. The fluid was evaporated until the atmoſphere was ſo impregnated with the effluvia of the vomit as to render the apartment extremely unpleaſant, not only from the odour of the vomit, but the warmth of the room. In this atmoſphere I remained one hour, during which I had a conſtant propenſity to cough, and had, at times, nauſea and inclination to vomit; but, after walking out in the air, theſe effects gradually ſubſided. I experienced, however, a ſenſe of wearineſs at my cheſt for many hours after.

"From the above experiments, it appears that the black-vomit, when applied to the moſt ſenſible parts of the body, produced little or no effect.

"Secondly. It appears that large quantities of this fluid may paſs through the ſtomach and bowels of quadrupeds and other animals, without apparently diſturbing digeſtion, or affecting their health. This fact inconteſtibly proves the inactivity of this fluid, and renders it probable, that the ſpeedy death which enſues, after this diſcharge in yellow fever, is not from the deſtructive effects of this matter on the ſtomach and bowels, but, moſt likely, from the great degree of direct or indirect debility which had been previouſly induced, on which the black-vomit is ſometimes an attendant, and ſtrongly expreſſes the great danger to be apprehended from the enervated ſtate of the ſyſtem.

"Laſtly. The experiments (*d* and *e*) tend, in ſome meaſure, to prove, that an atmoſphere, highly impregnated with the odour of black-vomit, recently obtained, would not produce fever, apparently under the moſt favourable circumſtances."

Dr. C. next examines the opinions of authors concerning the black-vomit. Theſe he claſſes under four heads. 1. That which conſiders it as conſiſting of putrid bile: 2. As compoſed of a mixture of blood and bile: 3. Of the villous coat of the ſtomach diſſolved in the progreſs of inflammation, terminating in ſphacelus: and, 4. Of bile mingled with the *nitric* (we ſuppoſe he means *ſeptic*) acid contained in the alimentary canal. All theſe are conſidered and diſmiſſed as inadequate or erroneous, and are ſucceeded by the author's own opinion, that black-vomit is *an altered ſecretion from the liver.* Dr. C. grounds this conviction on the following conſiderations: (p. 29—32).

"The colouring matter of the vomit appears, from the authors already quoted, to be generally traced, after death, to the gall-bladder. This poſition being incontrovertibly eſtabliſhed by diſſections, the power of the liver to ſecrete that ſubſtance will be admitted, of courſe, as it could not be ſecreted by the gall-bladder, or tranſmitted into that viſcus through any other paſſage, but by the hepatic duct. If this view of the ſubject be, in any meaſure, juſt, it is a fact, aſcertained beyond the ſhadow of a doubt, that the black flaky ſubſtance of the vomit is an altered ſecretion from the liver. This matter, being ſecreted by the liver, and depoſited by the hepatic duct in the gall-bladder, in the laſt hours of this diſeaſe, is from thence forced, by the contractions of the gall-bladder and cyſtic duct, in conjunction with the violent action of vomiting, into the ſtomach. It there receives the addition of the yellow-coloured fluid, which is almoſt always ejected with the flaky ſubſtance. That this fluid is combined with the flaky matter in the ſtomach, and not in the gall-bladder, every inquiry into the appearances after death fully confirms. This circumſtance renders the yellow-coloured fluid ſubject to ſome difference in its properties, according to the nature of the fluids received into the ſtomach a ſhort time before vomiting; but all that I have had an opportunity of examining, have nearly the appearance we have already deſcribed. That the ſecretory economy of the liver may be ſo far arreſted in its healthy action, by the progreſs of diſeaſe, as to aſſimilate a fluid having not the leaſt analogy to bile, every work on morbid diſſections certainly prove [*proves.*] Lieutaud mentions a caſe from Rivalerius, in conſequence of a diſeaſed liver, where the fluid in the gall-bladder reſembled milk; and Storke relates a caſe of a dropſy ſucceeding an intermitting fever, where the fluid in the gall-bladder reſembled the white of an egg. To theſe I may add one that came under my own obſervation, of a gentleman who died dropſical, in conſequence of an enlarged liver. The gall-bladder contained a fluid, of a dark colour, having not the leaſt reſemblance to bile. Theſe, and many more caſes, could be adduced to prove the power of the liver, under certain circumſtances, to ſecrete a fluid diſſimilar to bile; but it would be needleſs to recite them, as the inſtances already quoted are, no doubt, ſufficient to eſtabliſh the fact. This peculiar condition of the ſecretory veſſels, in the yellow fever, is not confined ſolely to the liver; for we find that other ſecretory functions are ſometimes affected in a ſimilar manner, during the ſame diſeaſe, and nearly at the ſame period of time. In confirmation of theſe obſervations, I believe moſt phyſicians muſt have remarked, that, in fome cafes, the kidneys, during the period of black-vomiting, fecrete a fluid of a dark colour, which has a thick pellicle on its furface, and appears almoft as different from urine as the black-vomit does from bile. This difcharge is generally a precurfor to a fymptom which never fails to predict a fpeedy diffolution, viz. a paralyfis of the fecretory functions of the kidneys.

"The more I confider the material change produced in the different fecreting veffels, during the laft ftage of this difeafe, the more this theory appears to be fupported by reafon and the plaufibility of truth. But, though a morbid condition of the glandular economy of the liver may produce the coffee-ground coloured vomit, it does not feem probable that the black infpiffated mucous matter which was ejected in the cafes that proved mortal in 1797, is derived from the fame fource; for the liver, under no condition of difeafed action that we are acquainted with, is capable of fecreting mucus of fuch an appearance; therefore, we think it moft reafonable to refer it to the furfaces, which are deftined, in a ftate of health, to fecrete mucus. Now, admitting the axiom, 'that fimilar caufes produce fimilar effects, under fimilar circumftances,' why may not the glandular ftructure of the ftomach be affected in a fimilar manner to that of the liver and kidneys, fo as to enable it to fecrete the mucous matter above-mentioned? This opinion, I think, may be affirmed by other analogies, not only in the fthenic, but in the afthenic condition of fecreting furfaces, in which there are equally as great a deviation from healthy fecretion as the one alluded to. This we have clearly exemplified in veffels deftined to fecrete mucus in a ftate of health; but, when labouring under inflammation, evidently fecrete pus."

The obfervations with which we fhall conclude our review of this excellent piece will not be very long. Firft: It appears clearly that the black-vomit is not the *caufe* of yellow fever, but merely a fymptom, or rather an *effect*, of the poifon originally applied. It is poffible, that not a drop or particle of the feptic virus itfelf, which induced the difeafe, is prefent in the *primæ viæ* when black-vomiting begins. It may have been wholly ejected by previous vomitive efforts, and the irritation of inflammation, caufed by its prefence, ftill remain to torture or to kill the fufferer. This may be underftood by comparifon with another poifon; arfenic, for inftance. If the oxyd of arfenic fhould be fwallowed, it is poffible for every atom of it to be expelled by vomiting; but, even then, the injury done by it to the ſtomach would remain, and a dangerous gaſtritis, followed by black-vomiting, might deſtroy life. And neither in this caſe of *arſenical fever*, nor in the *ſeptic* or *yellow fever*, would the matter vomited in the latter ſtages of the diſeaſe neceſſarily contain any oxyd of the metal, or acid of putrefaction. Secondly: The black-vomit, as has been ſhown by Dr. Miller, in his curſory obſervations on yellow fever, publiſhed in Med. Rep. vol. ii. p. 412, is by no means a *pathognomonic* ſign of that diſeaſe. So far is it from being the caſe, that this awful ſymptom frequently follows the ſwallowing of the oxyd of arſenic, muriate of quickſilver, and the acetate of copper. It is alſo a frequent conſequence of the fatal operation of vegetable poiſons taken into the ſtomach. They, therefore, who have conſidered it as a *diagnoſtic* of the yellow fever, have judged erroneouſly, and drawn their concluſions from very partial and limited premiſes: for, inſtead of being confined to this diſtemper, it is now well known to attend or follow the ſevere and deadly operation of moſt poiſons upon the organ of digeſtion. Thirdly: Though we are inclined to think, with the author, that former writers have given but conjectural and imperfect accounts of this dark-coloured fluid, and that he has reaſoned ably on the ſubject, yet we ſhall offer a few ideas on the function of the liver in theſe caſes. This conglomerate gland, during the time of health, prepares a *bitter* and *alkaline* liquid in conſiderable quantity. The uſe or operation of this, as far as we can interpret final cauſes, is to quell and neutralize acids of all kinds in the chyle or alimentary maſs, as it paſſes through the inteſtinal canal. And a wiſe and happy proviſion it is of the Creator, that the animal economy is furniſhed with an ample ſtore of ſuch an antiſeptic and antipeſtilential liquid. But the ſecretory proceſs of the liver, as well as of the other glands of the body, is ſometimes impaired. Thoſe *violent* poiſons, which paralyze the lachrymal gland, dry up the tears, benumb the ſalivary glands, prevent the formation of ſpittle, torpify the kidneys and diminiſh the quantity of urine, and, affecting the cutaneous veſſels with ſpaſm, check the inſenſible perſpiration, ſeem alſo to interrupt the bile-producing function. The ſupplies of wholeſome fluid, which the liver was accuſtomed to prepare, are withheld, and the inteſtines, at length, contain the common *ingeſta* and *excreta*, with all their proneneſs to become ſour and to irritate, without the ſoothing and controuling influence of the gall. The predominant acidity, in Dr. C.'s experiments, may *thus* be accounted for, and, at the fame time, ferve to render it yet doubtful whether the matter of black-vomit proceeds from the liver. We have no proof that the liver fecretes an *acid* liquor. During the prevalence of that fymptom, we are inclined to believe the fickly liver prepares too *little* bile for the wants of the conftitution, and this *little* may be altered fo in its quality as, on meeting with the acidity of the ftomach and duodenum, to exhibit a dark colour, in a manner not materially different from that quoted (p. 24) as Profeffor Mitchill's.

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Art. III. *Recherches fur la Medecine, ou l'Application de la Chimie a la Medecine. Par* François Blanchet. *A New-York.* Parifot. 8vo. pp. 246. 1800.

WITHIN the laft half century the empire of chemiftry has been furprifingly enlarged. From a limited authority over *metals* and *medicines*, fhe has extended her fway to the various kinds of *earths* which enter into the compofition of our planet, to the *waters* which flow on its furface, and the *gafes* which conftitute its atmofphere. Not contented with fublunary power, fhe claims a dominion as extenfive as the folar influence, and gives law to *heat*, *light*, and *fire*, wherefoever they exift in the univerfe. This, one would think, was enough; but all this does not content her. With reftlefs activity, fhe breaks down organic matter after death, refolves it into its priftine elements, or into new compounds, and, according to the temperature of the feafons and the quality of the materials, fertilizes the foil with manure, or contaminates the air with poifon. And here her daring enterprife would ftop; but fome of the leaders moft devoted to her fervice, have flattered her that fhe was miftrefs of the *animated* as well as of the *inanimate* world. "Life," they faid, "was in her gift. By her direction, heterogeneous atoms could arrange themfelves into filaments, and filaments bend to circles; and, as filament placed itfelf befide filament, and circle affociated itfelf to circle, mufcles and veffels, by an eafy procefs, were conftructed. To thefe, by a neceffary confequence, *irritability*, or a *fufceptibility* of *impreffion*, inhered. If, proceeding from this *fimple* form, fhe chofe to be a little more *complicated*, fhe could combine other atoms into brain and nerves, and impart to them *fenfitive* and *voluntary* power: and, by modifying thefe again into *locomotive*, *digeftive*, and *generative* organs, creatures, of various degrees of vital energy, could be produced. For thefe it was only neceffary to affociate iron, carbon, and a few other things, to water, in order to form *blood*—and to connect phofphoric acid with lime, to produce *bone*—and fuddenly their hearts would throb within their breafts, and their weights be fupported on their limbs. Laftly, out of this combination of elements, *mind* would arife as one of their modifications, and intellect, memory and paffion depend thereon for their exiftence."

But thefe fentiments are too enthufiaftic. The proper province of chemiftry is the inorganic or lifelefs part of creation; or, if it is applied to the explanation of vital phenomena, it feems to fucceed beft in thofe parts of the conftitution which poffefs irritability and fenfibility in the loweft degrees. That exquifite organization, on which pleafure and pain, hope and fear, calculation and invention depend, has hitherto defied the laws of chemiftry, and refufed fubmiffion to her power. There is, however, a medium between the two extremes, of thofe who afcribe *every thing*, and fuch as attribute *nothing*, in the vital economy, to chemical agency. DARWIN has endeavoured to purfue this courfe. In his Zoonomia he has employed chemical reafoning as far as it appears to him applicable and proper; and, beyond the reach of this fpecies of philofophy, he has attempted an inveftigation of the *laws of organic life*. The extravagance of Girtanner, and fome others, ought to be carefully avoided.

The author of the treatife now under confideration, ardent in the purfuit of fcience, and zealous to interpret the phenomena of animated nature, has undertaken to explore fome of the darker receffes, with the torch of chemiftry in his hand. In the courfe of his refearches, which are comprehended in twelve chapters, he treats concerning the effects of oxygen and caloric on the animal body; of the infenfible perfpiration; of the conftitution of acids; of the operation of poifons; of electricity; of the effects of cold; of the phyfical caufe of menftruation; of fleep; of cathartics; of emetics; of the influence of comets and volcanos upon the atmofphere; and of light: to which is added, a letter, of nearly thirty pages, from Mr. Blanchet to one of his friends in Quebec, on the yellow fever. In a preliminary difcourfe are contained fome obfervations on fyftems of medicine, and on chemical nomenclature.

But to defcend a little into detail.—Mr. B. dwells very particularly on the effects of caloric and oxygen, the two agents which, in his opinion, produce moft remarkable effects on the living body, tending, by different modes of operation, both to promote its decay and to keep it alive. For the information of our readers we have tranflated the paffages:

"We conclude this fection (p. 17) by affirming that our old age, and the death which terminates it, are occafioned by oxygen and caloric operating on us during a feries of years; and, when this admirable fabric of our bodies crumbles down, from the unceafing effect of thefe two powerful principles, we return to the fource whence our exiftence was derived. In vain fhould we ftrive to withdraw ourfelves from the law which demands of us this tribute."

"We conclude this chapter (p. 27) by giving it as our opinion, that, though vital air tends to deftroy the animal conftitution inceffantly, and without remorfe, yet life is the effect of the operation of this air jointly with caloric, in an organized body; and although, in man and other animals, the brain is the part in which all the fenfes are concentered, by means of the nerves, which feem to poffefs an energy of their own, ftill we believe they derive their influence from the common caufes, vital air and caloric, as all the other organs of the body do. It is idle to fuppofe the nerves contain a peculiar fluid, which fills them, and gives them motion. It might be faid the mufcular fibres were quite as much in need of a fluid to enable them to act, contract, dilate and move."

"Every thing concurs to prove," fays Mr. B. (p. 15), "that oxygen, aided by caloric, combines with the human body, and tends to deftroy it every moment while it lafts."—And then again, in p. 25, he expreffes himfelf thus: "To form the univerfe, Des Cartes afked for nothing more than matter and motion. To give life, I merely want an organized machine, oxygen and caloric."

All thefe effects, he thinks, are brought about by the chemical combination of thefe two fubftances, into oxyds and acids, with the different bafes which the animal conftitution contains; forming fweat, urine, fperm, and other fecreted fluids. The accumulation of caloric and oxygen in the fyftem, in confequence of obftructed excretions, gives rife to both general and local inflammation.

Purfuant to thefe ideas, Mr. B. in his chapter on acids, contends that they are compofed not merely of radicals united to oxygen, but contain a very large quantity of fixed caloric. This, our readers will recollect, is contrary to the common doctrine; oxygenous gas lofing its caloric on combining with an acidifiable bafis into an acid. Acids, he thinks, are active, becaufe they poffefs caloric and oxygen, and are violent in proportion to the quantity they contain, and the eafe with which the two elements break loofe or are feparated. To illuftrate the author's meaning, we fhall take one of his own examples. Though Mr. B. expreffes his perfect conviction that feptic acid, or its gas, according to MITCHILL's doctrine, is the exciting caufe of peftilential diftempers (p. 75), yet he confiders the azotic bafis of this acid as having very little to do in the bufinefs. It is not fo much the *tertium quid*, formed by fepton and the principle of acidity, which caufes the mifchief, as the caloric and oxygen, extricated fuddenly and copioufly from that wonderful acid, on its decompofition in the animal conftitution: and all other acids he confiders active for a like reafon. Notwithftanding the ingenuity of Mr. B. we ftill are of opinion, that *all* the ingredients of an acid, its *radical* as well as its caloric and oxygen, confpire to make it what it is, and are of great moment in its conftitution.

This difcuffion leads Mr. B. to give a theory of poifons (p. 79); and from a review of the effects of cantharides, the venom of the viper and other ferpents, opium, ftramonium, cicuta, digitalis, arfenic, lime and ftrong liquors, he concludes that they owe their activity to the liberation of much imprifoned fire, condenfed within them. He judges in the fame manner of the virus of the rabid dog, of fyphilis, and of the fmall-pox. We fhall not deny that all thefe things may be fo; but we own our conviction would have been ftronger, if, in the fprightly and rapid career of the author, he could have ftopped to ftate more pointedly his proofs.

Mr. B. afcribes death by lightning to an immediate evolution of caloric in the conftitution, forming inftantaneoufly, among other new compounds, *in articulo mortis*, a *portion of feptic acid* (p. 116).—In p. 151 & feq. he comments upon the opinions of BROWN, DARWIN, and feveral other refpectable writers; and here, as in the other parts of his work, he exercifes his critical powers with boldnefs and freedom. The feventh chapter contains his fentiments on the menftrual flux, which, he fays, "is undoubtedly caufed by a fuperabundance of caloric and oxygen accumulated in the blood, and exerting their influence particularly on the womb." (P. 156).

But in a work which treats of fuch a variety of important matter as the one before us, it is difficult, in a review, to do juftice to *all* its parts. In the difplay we have given, our readers will have perceived numerous indications of a mind vigorous and glowing, diſengaging itſelf from the influence and authority of others, and reſolutely determining to think for itſelf. It is the happineſs of civilized America, that its inhabitants are leſs trammelled by ancient uſage and prejudice than the people of any other part of the globe. Mr. B. has exerciſed the privilege of an American, and ſpeculated on the *medicina chemica* in a manner which, in many reſpects, we think peculiar to himſelf. We hope the French language, in which he has written his book, will be no objection to its being read in the United States. In Canada, the author's native province, we ſuppoſe it will have an extenſive circulation; and, wherever it is peruſed, give a ſpecimen of the learning, taſte and talents of the author. From his induſtry and ability, we preſage a large ſhare of uſeful exertion in the future part of his life.

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ART. IV. *A Proſpect of exterminating the Small-Pox: being the Hiſtory of the Variolæ Vaccinæ, or Kine-Pox, commonly called the Cow-Pox, as it has appeared in England; with an Account of a Series of Inoculations performed for the Kine-Pox in Maſſachuſetts. By* Benjamin Waterhouſe, *M. D. Fellow of the American Philoſophical Society, Academy of Arts and Sciences, &c. &c. Cambridge.* Hilliard. 8vo. pp. 40. 1800.

OUR readers will recollect, that in the ſecond volume of the Medical Repoſitory, p. 255, we gave them ſuch an account of the cauſes and effects of the variolæ vaccinæ as we had received in that part of the year 1798. In our vol. iii. p. 70, we gave a further account of the proceedings with this ſingular poiſon in Great-Britain. In the ſame volume, p. 310, it was announced, that Dr. Miller had received ſome of the virus, very obligingly forwarded to him by Dr. George Pearſon, of London. A ſummary of the experience by inoculating with it in Europe, was given in p. 315. And in our preſent volume, p. 88, we inſerted further information on the advantages to be derived from the ſubſtitution of this new contagious diſeaſe in the place of the ſmall-pox.

Since the ſpreading of the ſmall-pox over the earth, by the increaſed intercourſe among mankind, its violence has been ſeverely felt by moſt civilized nations, and frequently by the uncivilized people who have traded with them. Dreadful were its ravages in Europe, before the Asiatic method of lessening its fury by inoculation was introduced. And even since that time, and the adoption of this artificial and safe method of infecting the constitution with the venom, its benefits have been but partially experienced: for, in some communities, the introduction of it, even in the inoculated form, has been prohibited by laws; and, in others, where no such prohibition exists, the expense and trouble of undergoing the disease have debarred many from submitting to its operation.

It has seemed politic and proper to the governments of those parts of federated America, called the New-England States, to prevent, by various legislative provisions, the introduction and spread of this formidable distemper among their citizens, in the natural way, and, in some, by inoculation. Of these regulations, a good and instructive account has heretofore been drawn up by the learned author of the piece now before us. We know not of any similar laws in any other part of the United States. In consequence of such statutes, it has many years been customary for persons in New-England, who wished to have the small-pox, to come to New-York for the purpose of being inoculated, and, after their recovery, to return home. There was an inconvenience in this, but this was thought a trifle compared with the evil of its indiscriminate introduction. In sea-port towns, possessing a large share of foreign commerce, it has been found impossible to exclude this malady altogether. In spite of all possible precautions, the contagion would, at certain times, be secretly introduced. To relieve themselves, in some degree, from the perpetual anxiety of having the small-pox spread among them in the *natural* way, the inhabitants of the town of Boston, a few years ago, underwent a general inoculation, by common consent.

Notwithstanding the mitigation of the symptoms excited by the variolous poison, when introduced by art into a body duly prepared for its reception, benevolent men, in different countries, have formed projects for a total extinguishment of the casual kind. Some of these philanthropists had, in the warmth of their zeal, persuaded themselves that such a plan might be carried into effect, and shown how the multiplication of this terrible poison might be stopped. But while these friends of mankind, in various parts, were maturing their schemes, and labouring to bring them into practice, a discovery was made by an English physician, which is likely to supercede them all. This consists in the facts ascertained by Jenner, that a new ſpecies of virus, called "vaccine matter," does, by inſertion in a bleeding wound, ſo affect the human conſtitution as to render it unſuſceptible of the action of "variolous matter;" and that, in working this deſirable change, it ſcarcely puts either beauty or life in jeopardy. It does not ſpread from perſon to perſon through the medium of common air.

To a people ſo circumſtanced as our fellow-citizens in New-England are, it would ſeem that ſuch a diſcovery would be deemed peculiarly important. They will thereby be enabled to fortify their conſtitutions againſt the ſmall-pox, by ſubmitting to inoculation for a diſtemper by far more lenient, and which appears to be contagious *by contact alone*, and not by diſperſion through the atmoſphere. Information, however, muſt be gained of the diſcovery, hiſtory, progreſs and effects of this extraordinary contagion, before men will conſent to be infected by it. To give the public ſuch information, is an object of Dr. W. in the preſent piece.

We need not inform our readers that the author is the Profeſſor of the Practice of Phyſic in one of the moſt reſpectable of the American univerſities. A publication of this kind comes with peculiar force from ſuch a character; and, we doubt not, will attract a good deal of notice. Profeſſor W.'s pamphlet is divided into three chapters; to which are added an appendix and a poſtſcript. The firſt is chiefly employed in relating, that after receiving, in 1799, Jenner's, Pearſon's and Woodville's publications on the cow-pox, he made known ſomewhat of their contents to the inhabitants of Boſton, through the newſpapers, in the months of March and November of that year, and mentioned the ſubject at a meeting of the American Academy of Arts and Sciences, in one of the rooms of the univerſity. In his ſecond chapter, Dr. W. relates how, after ſeveral diſappointments, he at length procured ſome of the vaccine matter from England, and, with it, inoculated all the younger part of his own family, and ſeveral other perſons. The virus produced a diſeaſe ſimilar to that deſcribed by the Engliſh phyſicians. He informs, in the third chapter, that ſome members of his family, who had ſuffered the vaccine malady, were afterwards inoculated at the ſmall-pox hoſpital, in the neighbourhood of Boſton, by Dr. Aſpinwall, and that his ſon, who had been the ſubject of the firſt experiment, was found to be proof againſt the ſmall-pox poiſon. The other five were under trial at the time of publication. We have ſince underſtood neither of them ſickened with the variolous contagion. He concludes by ſtating various good and ſolid reaſons in favour of the vaccine inoculation, and in explanation and removal of objections brought againſt it.

We had read the contents of the *appendix*, before we ſaw it here, in the newſpapers; and in the *poſtſcript* we obſerve a valuable practical caution to the people, " leſt they conceive too lightly" of this diſeaſe, which, " mild and ſafe as it is, requires more of the phyſician than merely putting the matter into the arm."

It ſeems, at firſt glimpſe, a little odd, to congratulate the inhabitants of the weſtern hemiſphere on the introduction of a new diſeaſe among them; yet when a mild diſorder is ſubſtituted for one ſo wide-ſpreading and ferocious as the ſmall-pox, it muſt be owned there are few things of a medical nature which afford à better ſubject for rejoicing. It muſt be borne in mind, that the diſeaſe introduced is to expel one already among us; and in this deſirable work Profeſſor W. is entitled to the merit of having exerted himſelf among the foremoſt.

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## Art. V. *Tranſactions of the American Philoſophical Society, &c. Vol.* iv. *&c.*

[Continued from page 68.]

### *Experiments on Evaporation, by C. Wiſtar, M. D. &c.*

THE object of this paper is to prove that evaporation may be produced, without regarding the degree of abſolute temperature, by merely creating a degree of temperature relatively lower than that of the evaporating ſubſtance, in the ſurrounding medium; or, in other words, that a ſlow diſtillation may be performed, with the common apparatus, by applying cold to the receiver or refrigeratory, without increaſing the heat of the retort or ſubſtance to be diſtilled, as there will be a continual paſſage of heat from the body, to be evaporated or diſtilled, into the air of the receiver.

With theſe views, Dr. Wiſtar poured an ounce and a half of vitriolic (ſulphuric) æther into a retort, and luted it to a receiver with a long neck, which was placed in a mixture of ſalt and ſnow, while the retort was ſurrounded by air of the temperature of 50° of Fahrenheit. The frigorific mixture, from the impurity of the ſalt, was ſeldom below 10°; ſo that the difference between the æther in the retort, and the air in the receiver, did not exceed 40°. When the apparatus had been thirty hours in this fituation, the frigorific mixture was removed, and one third of the æther was found diftilled into the receiver. In order to be certain that the application of cold to the receiver really produced the diftillation, Dr. Wiftar prepared a fimilar diftilling apparatus, in the fame manner precifely, and placed the retort in contact with that of the other apparatus, while the receiver, inftead of being chilled by the cold mixture, ftood in air of the fame temperature with the retorts, viz. 50°; but no diftillation took place during thirty hours. To vary the experiment, fome camphor was placed in another apparatus prepared as above, and the receiver was fixed in the frigorific mixture, while the retort ftood in air of the temperature of 50°; at the expiration of thirty hours fome of the camphor was found fublimed, and the fublimate had thofe arborefcent appearances which ufually attend when produced by heat.

Thefe experiments are ingenioufly devifed, and feem to have been conducted with warinefs and accuracy. The refult is not only interefting in a fcientific point of view, but appears to open the way to practical improvements, and particularly to economy of fuel and time in managing the bufinefs of diftillation.

Might not the ufe of iced water, or a ftream of cold fpring-water, running through the refrigeratory, upon this principle, facilitate the procefs of diftillation? When this bufinefs is conducted during the winter of our climate, ice may be obtained without much trouble or expenfe; and, in many fituations, a ftream of cold fpring-water, fully adequate to this purpofe, is always at hand.

*A Memoir concerning the Fafcinating Quality which has been afcribed to the Rattle-Snake, and other American Serpents, by Benjamin Smith Barton, M. D.*

For an account of this Memoir, fee our volume i. p. 79, firft edition.

*Some Account of an American Species of Dipus or Jerboa, by Benjamin Smith Barton, M. D.*

This is a brief and impreffive defcription of one of the native quadrupeds of North-America. It is accompanied by a good plate. The lovers of zoology cannot fail to be gratified as well by the description itself as by several general obsevrations concerning that department of natural history, which are interspersed with the account of this animal.

*An Inquiry into the Causes of the Insalubrity of flat and marshy Situations; and Directions for preventing or correcting the Effects thereof, by William Currie.*

In this inquiry Dr. Currie attempts to deliver some account of the composition of the soil of marshes, which, besides different earthy matters, he states to consist of animal and vegetable substances broken down by putrefaction, of carbon and nitre, and that this mass, by distillation, affords oil, hydrogen and azote.

Finding that carbonic acid gas, hydrogen gas, and ammoniacal gas, are exhaled from the soil of marshes, Dr. C. inquires whether any of these gases, in a separate or combined state, can be supposed to constitute the miasmata said to issue from such low grounds. If carbonic acid gas, diluted with atmospheric air so as to become respirable, were to produce morbid effects, he thinks such effects would be more likely to appear in the form of paralytic or comatose diseases than in that of intermittent or remittent fevers. He rejects the opinion of the febrile influence of hydrogen gas itself, or of any combination of carbon and hydrogen in the form of gas; and forms, likewise, a similar conclusion concerning ammoniacal gas.

Having thus decided upon the morbid qualities of the above-mentioned gases, Dr. C. proceeds to deliver his own opinion concerning the cause of the insalubrity of flat and marshy situations as follows:

" From the facts and observations which have now been stated, I think it may be fairly concluded, that the cause of the unwholesomeness of low and moist situations, in the summer and autumnal months, is not owing to any invisible miasmata or noxious effluvia, which issue from the soil and lurk in the air, but to a very different cause, viz. to a deficiency of the oxygenous portion of the atmosphere in such situations, in consequence of vegetable and animal putrefaction, in conjunction with the exhausting and debilitating heat of the days, and the sedative power of the cold and damp air of the nights.

" For want of the refreshing and salutary stimulus of pure air, all the functions of the body are performed imperfectly and languidly. The nervous system in particular becomes preternaturally susceptible of impressions from every change that occurs in the temperature of the ſurrounding atmoſphere. The application of or expoſure to a damper and colder ſtate of the air than uſual, renders the veſſels on the ſurface of the body powerleſs and atonic, the brain and heart ſympathize with the extreme nerves and veſſels, the power of every function of the body declines, till the heart, rouſed by accumulating blood, re-acts with increaſing velocity, and is relieved of the unuſual burthen.

"That the cauſes which I have now aſſigned are the true ones, is rendered next to certain from the frequent occurrence of thoſe diſeaſes (which have heretofore been ſuppoſed to depend upon the operation of ſpecific miaſmata), in ſituations remote from marſhy ground, particularly in large and populous cities, where ſedentary occupations, and want of exerciſe, render the inhabitants delicate and infirm. I have ſeen numerous inſtances of this kind, even in the winter ſeaſon, when no effluvia from marſhes could poſſibly exiſt, eſpecially among thoſe who had been previouſly debilitated by other diſorders. Nor is it uncommon for perſons who have recovered from intermittents in the autumn, to have frequent recurrences of the ſame diſeaſe in the winter, merely from ſitting in a damp room, or other expoſure to cold."

The hypotheſis which aſcribes the prevalence of intermittent and remittent fevers, in marſhy ſituations, chiefly to a deficiency of oxygen, is now ſo generally abandoned, that it may be deemed ſuperfluous to undertake its refutation. With all the fallacy of eudiometrical experiments, made in the moſt careful manner, it appears that ſuch trials of the air of marſhes as have been moſt accurately performed with that inſtrument, are far from warranting ſuch a concluſion. But even admitting that the air of marſhes is deficient in oxygen, why ſhould we apprehend more miſchief from the abſtraction of oxygen, by means of putrefaction on that kind of ſoil, than by means of combuſtion, fermentation, or the reſpiration of animals? If merely the ſudden conſumption of pure air be the object of dread, there is as much reaſon to avoid a brewery, a furnace or a glaſs-houſe, a crowded church or theatre, as a marſh or a ſwamp. The attack of intermittent or remittent fever, ſo often taking place in conſequence of only a ſhort immerſion in noxious air, and the frequent poſtponement of the attack till one or two weeks after ſuch immerſion, while, in the mean time, the healthieſt air had been breathed, are likewiſe unanſwerable objections to Dr. C.'s hypotheſis.

*(To be continued.)*

# Medical and Philoſophical News.

## DOMESTIC.

### PROGRESS OF PNEUMATIC MEDICINE.

IN our vol. i. p. 122, firſt edition, we announced the deſign of an eſtabliſhment to cultivate pneumatic philoſophy experimentally, and to diſcover its relations to medicine. In vol. iii. p. 305, of our Repoſitory, we mentioned Mr. Watt's account of the breathing of dephlogiſticated nitrous air; and, in p. 423 of the ſame volume, we inſerted an abſtract of the remarkable experiments made on that aëriform ſubſtance.

In addition to theſe, the philoſophical world has now before it an octavo volume of nearly ſix hundred pages, publiſhed by the ſuperintendant of the Medical Pneumatic Inſtitution. This is Mr. Humphry Davy, a man of much originality and philoſophical acumen, and poſſeſſed of as much, or more, intrepidity in ſcientific inquiries than Roſier himſelf. The title of the work is, "*Reſearches, Chemical and Philoſophical, chiefly concerning Nitrous Oxyd, or Dephlogiſticated Nitrous Air.*" It is replete with novel and intereſting matter, which is not of a general or deſultory kind, but is engaged in the details of experiments, and the minutiæ of calculation.

To this inveſtigation, Mr. Davy informs his readers, he was led by *Dr. Mitchill's attempt to explain the phenomena of contagion*; in which the Doctor originally conjectured, that ſome of the ſymptoms of endemic diſtempers were induced by this modification of azote exhaling from corrupting ſubſtances, and infecting the atmoſphere. To this belief Dr. Mitchill had been led by the experiments of Dr. Prieſtley and Meſſrs. Trooſtwyck and Deimann, on the fatal effects of that ſpecies of air, when breathed by animals; and, connecting them with ſome appearances during the prevalence of the yellow fever in New-York in 1795, threw the whole, in the form of a little eſſay, before the learned world, for conſideration, and for promoting inquiry. And if this early ſpeculation on the ſubject had been followed by no other conſequence than such a train of investigation as Mr. Davy has made, Dr. Mitchill might feel highly gratified that he published it, and that Dr. Beddoes caused it to be reprinted in his Collection of Observations on the operation of factitious airs.

The essay which thus turned Mr. Davy's attention to these elegant and instructive experiments on dephlogisticated nitrous air, was, however, so little thought of by Dr. Mitchill himself, that though it has been much in request since the few copies originally printed were expended, he never consented to give a second edition of it.

This indifference to a republication arose from a conviction that the ground he had first taken was by far too narrow, and that the subject was of vastly greater extent than he had originally supposed. He became convinced that oxyd of azote was neither copious nor active enough to produce all the effects he witnessed in seasons of pestilence; but grew more and more suspicious, that a more highly oxygenated form of that ingredient in animal and vegetable matter called *azote*, might be the occasional agent in exciting many forms of febrile distempers.

Finding, about that time (1796), that the *nitrous acid*, and not merely *water*, was procured by Dr. Priestley (an authority high in all chemical investigations), by incorporating oxygenous and hydrogenous airs, he began to doubt whether there was any solid reliance to be placed upon the experiments pretending to explain the composition of water and of nitrous acid; and, in a letter to one of his correspondents, soon after, expressed this sentiment: "If, by adopting the French nomenclature, and by building upon facts which *have been said* to be firmly established, I have been led into any mistakes, either of language or science, they will, I trust, be found to interfere with some part of my *particular reasoning* only, but not to militate at all against my *general conclusion*." (See Med. Rep. vol. i. p. 266, first edition). Dr. Priestley adheres to the correctness of this experiment to this day, in his late tract on the refutation of the composition of water.

Considering it by no means certain what the precise chemical constitution of *nitrous acid* was, he left that point to be settled by the experimenters, who, notwithstanding all their skill in ascertaining by the balance the fractional parts of a grain in the gases they mingle, are still at variance with each other. Some of them, men of great consideration and experience, even believe *azote* itself to be a compound. To avoid all this controversy, and in conformity to what he had observed of a connection between putrid effluvia and endemic diftempers, in American fummers and autumns, he altered the nomenclature, and adopted a fet of terms to exprefs his own ideas, leaving the former phrafeology to the difputants, who appeared to him likely to continue difputing as long as they adhered to their ill-chofen manner of expreffion. And all that he intended to exprefs, in this caft of language, was, that during the corruption of the *lean* and fome other parts of animal and other organized matter, an acid was fometimes formed and extricated, which was often injurious to the health, and deftructive of the life of human beings. This acid he called *feptic*, becaufe produced by putrefaction; and not *nitrous*, as it had never been, as yet, a conftituent part of *nitre*. The influence of this acid in its *original form*, and *before* its connection with other acidifiable bafes, or with alkalies, he was convinced, is a very powerful, frequent and extenfive agent in nature. But if from this it is interpreted that Dr. Mitchill ever meant, or now means, the *artificial* products of the laboratories, called nitrous and nitric acids, nitrous gas, &c. they quite mifunderftand him. He knew, from the beginning of his inveftigation, the qualities of thefe fluids, the greater part of which can only exift in *clofe veffels*, too well to fuppofe they were the modifications of azote which could poffibly produce any lafting effects in *the open atmofphere*. Things known but in the laboratories, have but a fmall operation out of doors. And it is not a little curious to read Mr. Davy's avowal (though there was no need of making it) concerning the fubftance which is the principal fubject of his book, that "there are no reafons for fuppofing nitrous oxyd is formed in any of the proceffes of nature." (P. 231).

Mr. Davy obferves (p. 145, note), that *carbonic acid* and *ammoniac* are both products of animalization (he might have added *vegetalization* too); why could he not have faid that *feptic acid* was alfo? This feptic acid, as underftood by Dr. Mitchill, produces its deleterious effects quickly after its production, and *before* combination with pot-afh. Mr. Davy's experiments are made upon the *altered* acid and its modifications, *after* its feparation from that alkali, when its native virulence is very much diminifhed. The almoft endlefs modifications and mitigations of feptic acid by nearly every thing that it comes in contact with, were, in 1797, pointed out by Dr. Mitchill, in his paper on manures. Mr. Davy's excellent and admirable book bears witnefs, throughout, of the diminution of its virulence after frequent mixtures and decompofitions.

Mr. Davy has attempted to prove, that one hundred grains of nitrous oxyd conſiſt of about 63 parts nitrogen (as he calls it), and 37 oxygen, exiſting, *perhaps*, in the moſt intimate union which thoſe ſubſtances are capable of aſſuming; that nitrous gas is compoſed of about 44 nitrogen and 56 oxygen; that nitric acid (p. 329) conſiſts of about 1 nitrogen and 2. 3 oxygen (is this in the ratio of 33 nitrogen and 67 oxygen to the 100, or what is it?) that nitrous acid is a mixture of 68. 06 nitrous gas, combined with 31. 94 oxygen, or of nearly 30 nitrogen and 70 oxygen (p. 19); and that atmoſpherical air, which is the leaſt intimate of the combinations, is made up of 73 nitrogen and 27 oxygen.—In our preſent vol. p. 83, we ſtated the reſult of Berthollet's late experiments, that the atmoſphere contained but 22 parts of oxygen in the 100: in our vol. iii. p. 382, we gave an account of Prieſtley's later experiments, that nitrous acid was made by ſyntheſis, without a particle of nitrogen: in the ſame volume, p. 213, we inſerted Profeſſor Woodhouſe's experiments, to ſhow that nitrous gas can never be obtained of one and the ſame degree of ſtrength: in Mr. Lee's experiments, ibid. p. 29, the difference between nitrous gas and a mere mixture of nitrogen gas and vital air are pointed out: and we now obſerve, that from the diſcordant relations of the beſt chemiſts there muſt be great uncertainty and much gueſs-work in theſe matters, notwithſtanding the fair and ſpecious ſhow of decimals, which ſum up ſo nicely.* The whole myſtery is very far from being unfolded yet. It ſeems, indeed, to reſt about where it was. None of the uncertainty is removed by Mr. Davy's experiments.

Mr. Davy has made many experiments upon nitrous oxyd, and diſcovered a great number of new facts. He procures it

* Mr. Davy is very free in pointing out the fallacies and miſtakes of Humboldt, Vauquelin, the Dutch chemiſts, &c. they, in their turn, might poſſibly think there were ſome miſtakes in the *Reſearches*, &c. not corrected in the column of errata. For example: In p. 19 it is aſſerted that 100 grains of *nitrous* acid, and this Mr. Davy's ſtandard acid too, conſiſt of 29. 9 parts nitrogen and 70. 1 oxygen; and in his *table of approximations*, p. 565, he ſtates that *nitric* acid is compoſed of 29. 50 nitrogen and 70. 50 oxygen in the 100—A very trifling difference indeed, amounting to but a few decimal parts of an unit;—too trifling a difference, ſome have thought, to be true; eſpecially ſince, in p. 329, he tells his readers, quite as gravely, that *nitric acid* is compoſed of about 1 nitrogen and 2. 3 oxygen; a ratio differing four or five WHOLE NUMBERS from what he ſtates in the other place; that is, *nitric* acid differs from itſelf more, by ſeveral integral parts of an hundred, than it does from *nitrous* acid. But printers will commit blunders. The alteration of a few cyphers will remove this ſeeming contradiction in the ſecond edition.

for common use from nitrate of ammoniac, slowly decomposed by the heat of a spirit lamp. Among other qualities, it readily unites with water, with alkohol, ether, and essential oils, and even with alkalies, into a *new* class of mixed salts. The researches are four in number, and the most valuable matter is contained in the *third* and *fourth*. They treat of its effects upon breathing animals, quadrupeds, birds, amphibia, fishes, insects, and upon human beings. These could generally live in it longer than when immersed in water or inflammable air; whence it appeared to act directly upon the constitution, imparting, for a time, somewhat capable of preventing the *immediate* extinction of life. But they died infinitely sooner than in common air or oxygenous gas. He shows that nitrous oxyd is absorbed and combined with venous blood in the lungs; and that, in common respiration, a considerable portion of nitrogen (contrary to the experiments of others) enters into the circulating system too. By breathing *nitrous oxyd*, after having made two inspirations and a complete expiration of hydrogen, Mr. Davy put his own life in jeopardy. He run a greater risk in making three inspirations and expirations of *hydrocarbonate*; and, in an attempt to respire *nitrous gas*, would undoubtedly have been killed, had not the epiglottis spasmodically closed by its stimulus, and excluded it. On admitting common air into his mouth, after this bold trial, aëriform nitrous acid was instantly formed, which burned his tongue and palate, injured his teeth, and produced an inflammation of the mucous membrane.

We gave some account of the effects produced by nitrous oxyd in our vol. iii. p. 423, to which we refer our readers, as they are an anticipation, in part, of the cases reported by Mr. Davy in the work before us. In its pure form it frequently produced increase of muscular strength, pleasurable feelings, high, exquisite, sublime and indescribable emotions; mounting from delicious tremors of the nerves, through all the gradations of thrilling sensation, up to ungovernable gestures, ecstacy and transe. In its pure form, so violent are its effects, that "the most robust are unable to respire it with safety for more than five minutes" (p. 553). Some were much incommoded by two or three inspirations (p. 498, 531). Involuntary laughter, vertigo, intoxication, fainting, tremors, delirium, suspension of the senses of seeing, hearing, feeling, and, ultimately, the power of volition itself (p. 504), are among the symptoms sometimes induced by the reception of it into the lungs. Dizziness, fulness of the head, luminous flashes in the eyes, incapacity to fpeak, torpor and drowfinefs, increafe of irritability, dimnefs of fight, hyfterical and nervous affections, privation of voluntary motion, renewal of old pains, fleepinefs and light-headednefs, were alfo induced, on fome occafions, by this fingular agent. *Three* or *four* refpirations frequently produced fome of thefe extravagant and diftempered emotions.

Making all the deductions which a calm mind may think requifite from the highly coloured and glowing account given of thefe proceedings, they are ftill very curious in themfelves, and prefent fome grand and inftructive analogies. Candid feekers after truth will rejoice in tracing a few of them.—The *dark purple colour* (Refearches, p. 347 & feq.) of the venous blood of animals deftroyed by Mr. Davy's gafeous oxyd of fepton (nitrous oxyd), agree very well with the dark purplifh complexion of blood drawn from the veins of perfons under the influence of the poifon from putrefying beef, fifh, &c. forming the yellow fever defcribed by Dr. Rand (Med. Rep. vol. ii. p. 473, firft edition). The *extravafated blood*, *brown*, *red*, and *purple* and *dark* fpots of the lungs mentioned by Mr. Davy, induced by the fame agent, have a near refemblance to the condition of thofe organs in Drs. Warren and Rand's diffections of human bodies deftroyed by the locally-produced peftilential exhalations in Bofton (ibid. p. 251). The *dark colour of the mufcular fibres* obferved by Mr. Davy, with his gafeous oxyd, *and their diminifhed irritability*, correfpond with feveral diffections, witneffed by Dr. Pafcalis, of perfons killed by expofure to feptic gafes, and with his obfervations on their effects during the rage of yellow fever in Philadelphia (ibid. p. 347, 348). The like feems to obtain as to the hue of the *brain*. And the agreeable fenfations experienced by thofe who breathed this fpecies of air, bring to mind the "unufual vivacity," which feemed, as Dr. Rufh obferved in 1793, to have been produced "by a lefs quantity of the contagion acting as a cordial upon the fyftem;" and which that admirable writer records among the premonitory figns of yellow fever (Account of Yellow Fever, p. 36). This amounted, in fome, to *preternatural excitement* and morbid ftrength. In fome, death feemed to infinuate itfelf into the fyftem with all the gentlenefs of natural fleep, and fome expired with fmiles on their countenances (ibid. p. 78).—Others have obferved extraordinary exhiliration from the effects of peftilential poifon.

It is matter of importance to find this powerful fpecies of air, which fo readily difturbs the functions and deftroys the lives of animals, like ſeveral other noxious gaſes of the ſame family, is capable of attraction by alkalies. Mr. Davy has enlarged our knowledge of the action of theſe bodies, by proving THAT NITROUS OXYD CAN BE COERCED BY POT-ASH AND SODA, AND, HE IS INCLINED TO THINK, BY AMMONIAC AND LIME (p. 262 & ſeq.). He propoſes to call ſuch a combination "nitroxis" of pot-aſh, ſoda, &c.

The managers of the Pneumatic Inſtitution are of opinion, that the excitement produced by nitrous oxyd is not followed by collapſe or indirect debility; that its high ſtimulation has no weakneſs conſequent upon it. This, we muſt own, is paſſing ſtrange, when, on the face of their own narrative, it appears to be ſo violent a ſtimulus, and ſingularly to diſorder the animal machine. Experiments are making on its medicinal powers. Conſiderable advantages are ſaid to have been already derived, and much more benefit is anticipated. Their American brethren heartily wiſh the enterpriſing and indefatigable gentlemen ſucceſs in their labours. Such zealous and amicable co-operation between the votaries of ſcience on both ſides of the Atlantic promiſes abundance of good.

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## POT-ASH FORMED DURING THE INCINERATION OF WOOD, FROM ITS ELEMENTS.

If the fixed vegetable alkali is an elementary material, it might be expected to ſhow itſelf after the decompoſition of plants by *putrefaction* as well as by *incineration*. Yet the American foreſts, where immenſe quantities of timber are rotting down, afford no evidence of this. On the contrary, the trunks of the largeſt trees, as they undergo gradual decay upon the ground, give no ſign of pot-aſh. Frequently, in the progreſs of decompoſition, the annual circles are ſo detached from each other as to be eaſily peeled off, and the coheſion of the wood ſo much leſſened, that the blade of a knife or of a ſword can be thruſt in toward the medullary part their whole length. Now, there is no ſaline efflorefcence on this rotten timber in dry weather: nor is there any alkaline taſte; nor any pot-aſh to be obtained by macerating it in water: nor are vegetable blues or purples in the leaſt rendered green by dipping in ſuch water. Indeed, the manufacturers of the article, which is one of the great ſubjects of export from New-York, know, that in clearing the wilderneſs, *the trees, in order to afford pot-aſh, muſt be burned*; if they are ſuffered *to rot, no alkali can be procured.* On the contrary, the rotten wood contains an acid.—Did pot-afh pre-exift in the wood, why fhould it not be evolved by putrefaction? Thefe confiderations, and the analogy of ammoniac, lead to a perfuafion, that this alkali and foda are compounds. Whether, as fome have afferted, carbon and azote are the ingredients, or whether there are other conftituent parts, are points not as yet fettled.—From their compound nature, a confideration refults worthy the attention of experimental chemifts, in refpect to their union with acids, and the conftitution of neutral falts. The acid of putrefaction furnifhes an example. This pernicious offspring of corruption very readily affociates with moft natural bodies, except filicious earth, or is decompofed by them; becoming, oftentimes, a complicated and ftrange production. Moft of thefe endlefs modifications of the feptic acid combine, more or lefs forcibly, with pot-afh. And it is well known, the acid procured by diftilling and decompounding falt-petre poffeffes a number of qualities which it is not known to poffefs *before* its connection with pot-afh in the form of nitre. There is reafon to believe, therefore, that this alkali itfelf undergoes fome decompofition, and proportionally modifies or affects the *feptic* acid, fo as, on its difengagement, to exhibit itfelf in that modified and difguifed appearance called the *nitrous*. Both manufacturers and confumers of pot-afh know how exceedingly it varies in quality. And our infpectors themfelves, in New-York, acknowledge and lament the want of a juft ftandard to determine its ftrength. They frequently find a difference in alkalefcency, pungency and external appearance, which they know not how to explain; but the beft explanation of which is, that the different famples or parcels vary in the proportions and combinations of their conftituent elements.

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### ANTISEPTIC POWER OF CALCAREOUS EARTH.

Naturalifts have often remarked, that the bones of animals were preferved, in a tolerably entire condition, in the calcareous rock of Gibraltar. America furnifhes two facts that are no lefs remarkable. The bones of the Megalonyx, or Great Claw, defcribed by Mr. Jefferfon, were found in one of the *lime-ftone caverns* in Tenneffee, covered with the feptite of lime, the acid of which was probably derived from its body, in part, as it putrefied, and other calcareous matter. And the other enormous bones of the Megatherium, of which Mr. S. Miller has given an account, exift, in great numbers, in Ulfter county, within one hundred miles of the city of New-York, bedded in marle, and found when that calcareous material is dug out for the purpoſe of manuring land. It is remarkable of theſe bones, that, after being removed from their calcareous graves, they ſoon begin to crumble by expoſure to the atmoſphere. The teeth particularly, which are whole and ſound when taken out of the marle, ſoon turn black, crack, loſe their enamel, and crumble ſlowly to pieces. Without ſuch a preſervative, it is preſumable theſe animal remains would have been *decompoſed ages ago.*

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### HYDROGEN AN INGREDIENT IN NITROUS OXYD.

Nitrous oxyd can be obtained from nitrate of ammoniac. During its decompoſition by moderate heat in a retort, that ſalt is almoſt reſolved into a liquid and an aëriform fluid. The gas is the nitrous oxyd, which is reported to conſiſt of 37 parts oxygen and 63 nitrogen in the 100. It is formed by a decompoſition, as is thought, both of the nitric acid and of the ammoniac; part of the oxygen of the nitric acid joining with the hydrogen of the ammoniac to form water, and the nitrogen of the ammoniac uniting with the reſidue of the nitric acid to make nitrous oxyd (Reſearches, p. 104). But this theory is evidently not correct: for Dr. Prieſtley's experiments ſhow that phlogiſton, or the baſe of inflammable air (Med. Rep. vol. iv. p. 103), is a conſtituent part of phlogiſticated or azotic air. This concluſion ſeems to be countenanced by the appearances, related by Mr. Davy, on burning a candle in nitrous oxyd. "It burnt with a brilliant and crackling noiſe; and, before its extinction, *the whole inner flame* became ſurrounded *with an exterior blue one.*" This latter was evidently a portion of *hydrogen* extracted from the nitrous oxyd, and undergoing a new combination. And to the preſence of this ingredient does the nitrous oxyd probably owe its maddening and intoxicating quality, as wine and alcohol do. It is even likely a portion of the *hydrogen of the ammoniac* unites with the nitrous oxyd.

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### ABSTRACT OF DR. CURRIE'S WORK ON WATER AS A REMEDY.

A neat and judicious abridgement of the publication of Dr. James Currie, of Liverpool, on the medicinal uſe of water of different temperatures, has been made by Mr. Benjamin Vaughan, of Hallowell, in the Province of Maine. A ſenſible exhibition of the leading points of doctrine and practical direction, in works like this, in a cheap and popular manner, is a very desirable object in a country where the original is rare and hard to be procured.

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EXPERIMENTS TENDING TO SHOW THAT AZOTE IS A COMPOUND OF HYDROGEN AND OXYGEN.

A memoir on the composition of azote has been published in the French Annals of Chemistry. The author is Dr. Girtanner. He is of opinion that azote is not an element, as has been generally understood since the publication of the table of the nomenclature, but a compound; and that it consists of the same ingredients that water does, varying only in their proportions; thus—water consisting of 85. 66 oxygen and 14. 34 hydrogen, and azote 79 oxygen and 21 hydrogen.

The proofs on which this idea is founded are stated in the London Monthly Magazine, vol. ix. p. 585, as follows: 1. It was observed by Mr. Van Hauch, that if a porcelain tube was heated red-hot, and steam passed through it, the aqueous vapour undergoes no alteration; but that if it be filled with tin filings previous to passing the steam through, the tin becomes oxydated, and oxygen and azote pass into the receiver. The same effects take place if lead be made use of instead of zinc. 2. Mr. Van Hauch filled a porcelain tube with black oxyd of manganese, and heated it strongly till no more oxygen came over: he then passed steam through it, and obtained, at first, pretty pure oxygen, and afterwards azotic gas. 3. Dr. Pearson, in the decomposition of water by the electric spark, always obtained azote, as well as oxygen and hydrogen. 4. Dr. Pearson, in recomposing water by the combustion of oxygen and hydrogen, by means of the electric spark, obtained water and azote. 5. In the combustion of oxygen and hydrogen, when this last is in excess, nitric acid is obtained.

Girtanner's own experiments are suppressed, with a remark of the editor, that he is not much worthy of credit. We believe the subject to be exceedingly important in science, and are sorry Girtanner's experiments have not reached us. But we are happy to add, however light they may be deemed, the philosophical world will find sterling weight in the following ones of Dr. Priestley.

1. He is convinced, from many experiments, that azote is not a simple substance, but a compound of the bases of inflammable and dephlogisticated airs, and capable even, in some

cafes, of being generated from inflammable air alone (Doctrine of Phlogifton eftablifhed, fect. 11).

2. From many more experiments, he is convinced that the *whole* of *any given quantity of water* is converted, by frequent freezings, to *phlogifticated air* (Med. Rep. vol. iv. p. 17 & feq.)

3. Various other experiments made by him, and publifhed in 1793, tend to prove that water, when turned to *vapour*, is always in *part* converted into phlogifticated air; and, by continuing the procefs, *the whole* is fufceptible of a fimilar change.

4. When dephlogifticated and inflammable airs are confined in a fuitable veffel, and the electrical fpark paffed through them, a highly phlogifticated nitrous acid is inftantly produced; and the purer the airs are, the ftronger is the acid found to be. When phlogifticated air is prefent, it remains unchanged, unlefs there is a confiderable deficiency of inflammable air; in which cafe it unites with the phlogifticated air, and forms the fame acid: whence it is inferred, inflammable and phlogifticated airs have a great fimilarity of conftitution. If there is a redundancy of inflammable air no acid is formed.

5. Where water is formed by combining the two airs, a quantity of phlogifticated air is always produced as a matter of furplufage in the experiment.

6. In fome cafes, iron filings and fulphur, immerfed in mercury or water, or placed in a vacuum, yield phlogifticated inftead of inflammable air.

From fuch experiments, and a variety of others, it is fairly to be inferred, that there is a nearer refemblance of *water* to *azotic* air, and of *this* to *hydrogenous* gas, and of both to *nitric acid*, than the adherents of the French doctrine are willing to allow. Indeed, if *azote is a compound of hydrogen and oxygen*, as both Dr. Prieftley and Girtanner feem to have rendered probable, a large part of the controverfy can be eafily fettled, as all thefe fubftances are but different modifications of the fame elements.

Dr. Prieftley has long ago fhown by what procefs in the economy of nature, the *oxygenous portion* of the atmofphere was reproduced and reftored; to wit, by the operation of light on growing vegetables. He has now prefented as notable a difcovery, which is the counterpart of the former, of the means by which its *azotic part* is renewed and kept in equilibrium, viz. by the converfion of water to phlogifticated air, when it is reduced, by *any means*, into a ſtate of vapour. (See Med. Rep. vol. iv. p. 20).

The philoſophical men who had implicitly adopted the doctrines of the French ſchool, as originally promulgated, were ſo numerous, ſo poſitive, ſo impetuous, and ſo perſevering, as nearly to bear down, at their firſt charge, every kind of oppoſition. Dr. Prieſtley, almoſt alone, or with a handful of adherents, has remained firm in his citadel, and refuſed both to ſurrender and to capitulate. His conduct has been eminently heroic, and honourable to him. He is plentifully ſupplied with the beſt of intellectual ammunition and proviſion. And as there is no probability that his adverſaries can ſucceed, either by ſtorm or blockade, the only reſource they have left is, on conviction of the weakneſs of their force, or the injuſtice of their cauſe, to raiſe the ſiege, and march off to their proper provinces.

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DOUBTS CONCERNING THE PLAGUE IN EGYPT.

The philoſophers and phyſicians who accompanied Bonaparte in his expedition to Egypt, in 1798 and 1799, have brought home very little information concerning that diſeaſe which the Europeans ſpeak of with ſo much terror, THE PLAGUE. Mr. CERESOLE, one of the phyſicians of the army, relates that the word *koubeh*, in Arabic, which is tranſlated *plague*, is a generical denomination applied to all very violent and malignant diſeaſes; and that he was unable to obtain ſo much information relative to *koubeh* as he could have wiſhed. DESGENETTES too, the Phyſician-General, teſtifies, that in that country they generally confound all peſtilential fevers, which are exceedingly various, and form a genus of themſelves, with the plague properly ſo called; which is a very circumſcribed ſpecies, but leaves the queſtion to be decided by future obſervations. The truth is, there is no proof of the exiſtence of ſuch a ſpecific diſeaſe as the *peſtis* of the noſologiſts, and the *plague* of the commercial nations of Europe. The accounts they give of it are imperfect in ſome reſpects, and fictitious in others. The fevers of Aſia and Africa, like thoſe of America, take on an hundred different forms, ariſe from the like cauſes, and die away under ſimilar circumſtances.— If buboes, and hæmorrhages, and mortifications, are criteria of the plague, then we certainly have *plague* in the United States. But we are warranted, by much experience and obſervation, in concluding that yellow fever is not *ſpecifically* *contagious*, but is excited by naftinefs and corruption both within and without the body. The fame we believe to be equally true of the Afiatic plague, which has been fo fearfully fwelled and exaggerated in defcription. Read what the philofopher of Maroftica has left on the fubject of local caufes of difeafe in Egypt, more than two centuries ago, and judge.

Profper Alpinus (De Med. Ægyptior. lib. i. cap. 13) fays, an almoft infinite number of the Egyptians, impelled by poverty and want, fed upon the worft kind of aliment, and drank muddy and putrid water, at Cairo. The Mahometans ufed wine very commonly, and got drunk as well as the Chriftians and Jews. The houfes of that city are very high, and are conftructed fo as to fhelve over the ftreets, and exclude funfhine and light (cap. 6). At Alexandria peftilential fevers happened almoft every autumn, and were more deftructive to *ftrangers* than to the *natives* (cap. 14). P. Alpinus takes up almoft a page in enumerating local caufes of this difeafe, fuch as the corrupt exhalations from Lake Mareotis in its neighbourhood; from low places and funken holes in the city itfelf; from the water of the Nile conducted to the town, drawn off into ftagnant refervoirs, kept during the year for family ufe, fometimes growing poifonous before it was confumed, and ufed in this condition for cookery and drinking, &c. (p. 52). He mentions the canal of Cairo as an abominable nuifance, as becoming charged with abundance of putrefying things, changing from green to black, and becoming horribly ftinking, and deftroying the lives of perfons living near it. He defcribes the diet of the poor (in a fociety where almoft all are poor) as confifting of muddy and corrupted water, and half rotten beef, camel's flefh, fifh and cheefe, eaten by them becaufe they are cheapeft, and becaufe they can buy no other. —After all this, Alpinus admits, though with a feeming reluctance, that the peftilential contagion may be engendered from putrefaction, in certain places, after the waters of the fwollen Nile have withdrawn. But he thinks, upon the whole, the contagion is commonly imported, either from Greece, Syria or Barbary, and that the contagion from Barbary is by far the worft!! It rages from September to June, and then ftops fpontaneoufly, when the Etefian or cool northerly winds begin to blow.—Leave out the contagion, and this account is philofophical and correct.

## *Obſervations in Natural Hiſtory, made in the Summer and Autumn of the Year* 1800, *by* S. L. M.

1. *Account of the Motions of the Hedyſarum Gyrans, or moving Plant, deſcribed in Botanic Garden, Part* II. *Canto* iv. *l.* 335 *& ſeq.*

In the note to this paſſage, Dr. Darwin informs his readers "that its leaves are continually in ſpontaneous motion; ſome riſing and others falling; and others whirling circularly by twiſting their ſtems. This ſpontaneous movement of the leaves, when the air is quite ſtill and very warm, ſeems to be neceſſary to the plant, as perpetual reſpiration is to animal life." From this deſcription we were led to believe that *all* the leaves of this remarkable plant were to be ſeen in a riſing, falling, or whirling motion; and probably other readers of the paragraph are led to think ſo too. Our curioſity was excited to ſee this vegetable in a growing ſtate. Some ſeeds were procured and ſown. From theſe ſprang ſeveral thrifty plants. As they grew we looked for the movements of the leaves for ſome time in vain; but, at length, we diſcovered them. They fell ſo far ſhort of what we had been led, from the deſcription, to expect, that we were not a little diſappointed. This hedyſarum produces two kinds of leaves, the one *large* and the other *ſmall.* The former are, when full-grown, about $2\frac{3}{4}$ inches long, and $\frac{3}{4}$ wide, and are ſupported by a foot-ſtalk of one inch in length. Theſe conſtitute the principal foliage of the plant, and we expected to ſee them fanning themſelves, and panting for breath, during the heats of July, Auguſt and September (1800). But in *theſe* no ſuch changes of poſition could be ſeen, nor any other alteration of place different from other plants. They, indeed, cloſed themſelves to the ſtems at night, and in cool and ſtormy weather, as happens to a multitude of other vegetable ſpecies. Mere elevation and depreſſion, at ſuch times, were all the motions we could diſcern in the large leaves. The *latter* kind of leaves grow out of the foot-ſtalk about $\frac{1}{4}$ of an inch below the inſertion of the large one. Theſe are not more than $\frac{1}{2}$ an inch long, and $\frac{1}{8}$ of an inch broad. Generally, each foot-ſtalk ſupports *two* of theſe ſmall leaves. Not unfrequently, however, there is but *one*, and ſometimes there are *none*. Both kinds are well delineated in Dr. Darwin's plate, which is a very good repreſentation of the plant. *The ſpontaneous motions are performed by theſe leaflets, which move backwards, forwards, and ſomewhat circularly, like the ears of horſes or ſheep.* And with this limitation ought the celebrated gyrations of this fpecies of the numerous family of hedyfarum to be underftood. So much is the account exaggerated, that fome patience and nicety of obfervation are neceffary to difcern them.

2. *Account of the Sun-dew, or Drofera, defcribed in the fame Work, Part* II. *Canto* i. *l.* 239 *& feq.*

"The leaves of this marfh-plant," writes this philofophical poet, "are purple, and have a fringe very unlike other vegetable productions; and, which is curious, at the point of every thread of this erect fringe ftands a pellucid drop of mucilage, refembling a ducal coronet. This mucus is a fecretion from certain glands; and, like the vifcous material round the flower-ftalks of the filene (catch-fly), prevents fmall infects from infefting the leaves." The drofera rotundifolia growing in my fwamp is rooted in peat-mofs (fphagnum paluftre), and is very fmall. The leaves are green, and not only the margin, but the *whole upper fide* is thickly befet with hairs or briftles of a *red* colour. Upon the fummit of each of thefe, in the vigorous ftate of the plant, there is formed a globule as clear as cryftal. Forty or fifty fuch *pellucid* balls, fuppported by *red* pili, growing out of a *green* leaf, make an uncommon and beautiful appearance. Thefe globules confift of a tenacious liquid, which entangles the legs of ants, flies, or other fmall infects which attempt to travel acrofs the leaves. Whenever this happens, a leaf which is naturally concave on the upper fide, feems to form a more confiderable hollow than before; the confequence of which is, that the briftles are made to converge in a degree proportioned to this concavity; and the unfortunate little creature is completely furrounded by an apparatus fomewhat refembling the palm of the hand, with the thumb and fingers half clofed, and there held and invifcated until it dies. My own obfervations correfpond with thofe which Dr. Darwin quotes from Mr. Wheatley and Mr. Brouffonet.

3. *Hybrid Variety of the Almond-Nut.*

Among the trees in my peach-orchard grows a thrifty young almond (amygdalus communis), which has borne fruit for two or three feafons. On tafting them this year, we were all fenfible of a refemblance between the flavour of the kernel of the almond and that of the peach (amygdalus perficus). And in fome, foon after gathering, their peculiar bitternefs refembled fo nearly that of the peach-kernel, that the former might, by an unadvifed perfon, almoft have been miftaken for the latter. It was remarkable, too, that the nuts (drupa) were very hard and ſolid, like the peach-ſtone, and required ſmart ſtrokes of the hammer to crack them.—Hybrid plants have long been known to botaniſts and cultivators, and their numbers ſeem to be increaſing.—I was led to believe, according to the received doctrine of ſexes in plants, that the *fruit* and *kernel of the almond* had, in this inſtance, undergone a change by growing in the midſt of many trees of a different ſpecies. And if the pollen or fecundating powder of the peach has really wrought ſuch an effect upon the almond, is not this a new mongrel, and an additional fact in favour of the ſexual ſyſtem?

4. *Domeſtication of the Wild-Gooſe (Anas Canadenſis).*

Attempts have frequently been made on Long-Iſland to render the wild-gooſe which winters in the bays adjoining the Atlantic Ocean, a tame and domeſticated bird. Individuals of this ſpecies have accordingly been catched alive by the gunners after having been wing-broken by a ſhot, and carried home free from any other injury. When thus diſabled from flying, they become gentle, and will mate with common geeſe. They even breed together; but the offspring is a mule, incapable of further propagation. Mr. Daniel Coles, of Oyſter-bay, has gone a ſtep beyond others in this buſineſs. He has a wild-gooſe and gander in a domeſticated ſtate, whom he keeps from flying away by taking off the extreme bones of the wings at the joint. The gooſe has laid eggs and hatched a brood of goſlings. For fear of loſing the young ones, their wings have been treated in the ſame manner; and the whole family now compoſes (September, 1800) a beautiful flock of wild-geeſe, in a domeſticated ſtate. They are as gentle as common geeſe, and live upon the food obtained about a houſe and on a farm quite as well. Mr. Coles even found that the goſlings, on the day of being hatched, ate Indian meal as readily as chickens. They are more active and handſome than the tame-gooſe; and their long necks are arched more like thoſe of ſwans. If this experiment ſhould be continued for ſeveral generations, it is highly probable the temper and habits of the breed may be changed, ſo that the deſcendants of theſe wild-geeſe may loſe their inclination to fly from country to country, and attach themſelves, like turkeys, ducks, and other birds whoſe progenitors were once wild, to the ſociety and protection of man. Should Mr. C. meet with no diſaſters, it is not improbable that the wild-gooſe will be eventually added to our ſtock of poultry.

### 5. *Squid, Ink-Fifh, or Cuttle-Fifh (Sepia).*

A beautiful fpecies of the cuttle-fifh is fometimes found on the fea-coaft of New-York. It is about eight inches long. The tentacula, or feelers of this animal, are furnifhed with many mouths without throats, which are armed with a circular row of teeth to feize their prey. Thefe convey the food to the real or principal mouth, which is armed with a beak, refembling the roftrum of a parrot. The creature is furnifhed with a bag of black liquor for its defence againft its enemies. When purfued by them, it ejects this fluid into the water through a particular orifice in the anterior part of its body. The water is darkened and rendered of an inky colour thereby, fo that its adverfary is enveloped in a cloud, while the fepia fuddenly darting backward with a fpring to the diftance of feveral feet, makes its efcape. It is very amufing to view them thus employing the means of felf-defence. Some of the larger fpecies of the fepia are faid to be the chief food of the fpermaceti-whale (phyfeter macrocephalus), and the likeneffes or impreffions of their beaks are frequently feen in ambergreafe, which is faid, by the more intelligent of our Nantucket whalemen, to be but the indurated excrement of that animal in a conftipated ftate of the inteftinum rectum.

### 6. *The Jerboa or Dipus.*

I have feen this little animal, which has been defcribed by Col. Davis, of Quebec, in Tilloch's Philofophical Magazine, No. 3, p. 285, and by Profeffor Barton, in the fourth volume of the American Philofophical Tranfactions, p. 114, in the State of New-York. It is fometimes killed on Long-Ifland by the farmers when engaged in carting hay and corn-ftalks.

### 7. *Another Inftance of a Negro turning white.*

The change of colour which Harry Mofs has, within a few years, undergone, from black to white, has been publifhed fo often that few curious perfons are ignorant of it. In the town of North-Hempftead, fomething of the fame kind is now to be feen. A young negro, named Maurice, aged 25 years, began, about feven years ago, to lofe his native colour. A white fpot appeared on the right fide of his belly, which is now about as large as the palms of two hands. Another white fpot has appeared on his breaft, and feveral more on his arms and other parts; and the fable cloud is plainly difappearing on his fhoulder. The fkin of thefe fair fpots is not furpaffed by the European complexion. His general health is and has been good; and he has ſuffered no ſcalding ulceration, ſcabbineſs, or other local diſeaſe. The change is not the dead white of the *Albinos*, but is a good wholeſome carnation hue. Such an alteration of colour as this, militates powerfully againſt the opinion adopted by ſome modern philoſophers, that the negroes are a different *ſpecies* of the human race from the whites, and tends ſtrongly to corroborate the probability of the derivation of all the *varieties* of mankind from a ſingle pair. Facts of this kind are of great value to the zoologiſt. How additionally ſingular would it be, if inſtances of the ſpontaneous diſappearance of this ſable mark of diſtinction between ſlaves and their maſters were to become frequent! They would then be no leſs important to the moraliſt and political economiſt.

### 8. *Clay for manufacturing Tobacco-Pipes.*

A ſmall attempt has been made at Muſqueto-Cove, in Queen's county, to manufacture tobacco-pipes. An Engliſhman, who poſſeſſes the machinery and ſkill for moulding them, has been for ſome time engaged in making trials on the different clays he can procure thereabout. On the economy or probable ſucceſs of ſuch an eſtabliſhment at this time in America, we offer no opinion. We underſtand that a former attempt failed. Be that as it may, it is agreeable information that pipes, of a tolerable quality, have been *formed of American clay*. The ſamples of the manufacture which we have ſeen, do not indicate want of talent in the artiſt; and, though rather deficient in whiteneſs and coheſion, will anſwer for common uſe. It is to be hoped, *clays of greater purity and toughneſs* will ſoon be found, and thereby afford another proof of the *reſources of our country.*

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## CHRONOLOGY.

The Rev. John C. Kunze, S. T. D. is preparing for the preſs, a work on chronology. It is intended to treat of the chronological character of the year which cloſes the eighteenth century, in the following points of view:—What year actually cloſes it, according to the received chronology? What year ought to cloſe it by following juſt computation? Whether the eighteenth centurial year ought to be a leap-year? What year the 1800th J. C. probably is ſince the creation? What year it may be in the anti-chriſtian period? Of the aſtronomical incidents of the year which cloſes the eighteenth century.—A ſerious and formal diſcuſſion of a ſubject which engages ſuch general attention, and on which there exiſts great difference of opinion, will doubtleſs be highly welcome. We hope the learned author will gratify public curioſity as ſoon as he conveniently can.

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MATHEMATICAL PRINCIPLE FOR CONSTRUCTING THE MOULD-BOARDS OF PLOUGHS.

In the 4th vol. of the Tranſactions of the American Philoſophical Society is a paper of Thomas Jefferſon, the Preſident, whoſe object is to inveſtigate, geometrically, that figure of the mould-board which will turn over the ſward and paſs through the ground with the leaſt poſſible reſiſtance, or with the ſmalleſt loſs of exertion in the team. Unfortunately, in binding up the ſheets of the book, the plate of diagrams, explanatory of the deſcription, has been left out, ſo that the piece is not exhibited as the author intended. But he has forwarded to the Preſident of the Agricultural Society *a ſet of the figures referred to in the deſcription*, together with *an elegant wooden model*, illuſtrative of the manner of applying the principle to practice. That patriotic aſſociation in New-York will thus have an opportunity of becoming fully acquainted with this noble inveſtigation of the philoſopher of Monticello.

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CASTOR-OIL MADE IN NEW-YORK.

The plant whoſe ſeeds afford caſtor-oil has long been cultivated in our gardens, under the name of *head-ach-bean*, or *bug-bean* (ricinus palma chriſti). Little or no uſe had generally been made of it, other than to bind the leaves on the head for relieving pains of that part. Some perſons raiſed it under a perſuaſion it would keep moles out of gardens, and others merely for curioſity. Latterly, however, John G. Gebhard, of Claverack, has prepared the oil from the ſeeds by expreſſion; and the product appears quite as good as the beſt imported from the Weſt-Indies, with this circumſtance in its favour, that it is *cold-drawn* and *always freſher*. This is another evidence of the reſources of the United States, and the citizen who has undertaken the manufacture merits the encouragement of his countrymen, whether druggiſts, houſekeepers, or phyſicians.

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GRAND SPECIMEN OF MEXICAN GOLD.

A maſs of native gold from one of the Mexican mines, which, on account of its rare ſize and beauty, was intended, by the Viceroy of Mexico, as a preſent to the King of Spain, is now possessed by Capt. O'Brien, in the city of New-York. The metal, which is malleable, and not mineralized, is connected with quartz. The whole lump weighs 46 ounces troy. No part of it is crystallized. The colour of the gold is a fine yellow, with a tincture, in one part, of whitish, and in another of greenish. The quartz is white, with a dusky complexion. The mass seems to be a loose nodule, never connected with a large rock. The value of the gold it contains is estimated at five hundred dollars. In the collection of a prince, who can afford such specimens, this piece is invaluable.

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MINERALOGICAL SPECIMENS FROM GIBRALTAR AND ICELAND.

The Mineralogical Society of New-York has received from Dr. Thomas Wilson two fine specimens; one of the *calcareous* rock of Gibraltar, inclosing animal bones; and the other a *silicious* stalactite from the boiling-hot fountain of Guysar, at the foot of Mount Hecla. Our readers are referred, for particular accounts of these remarkable natural productions, to Major Imrie's description of the former, and Professor Black's analysis of the waters of the latter, published in the Transactions of the Royal Society of Edinburgh.

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MEDICAL SOCIETY OF NORTH-CAROLINA.

On Monday, the 16th of April, 1800, a convention of the Faculty was held in the city of Raleigh, associated under a constitution and form of government by the name of the "*North-Carolina Medical Society*;" and the following gentlemen were elected officers for the ensuing year:

Richard Fenner, *President*.
Nathaniel Loomis, John Claiborne, } *Vice-Presidents*.
Sterling Wheaton, James Webb, James John Pasteur, and Jason Hand, } *Censors*.
Calvin Jones, *Corresponding Secretary*.
William B. Hill, *Recording Secretary*.
Cargill Massenburg, *Treasurer*.

The following gentlemen were appointed to deliver dissertations on some medical subject at the next meeting of the Society, viz. J. J. Pasteur, J. Webb, S. Wheaton, and N. Loomis.

An Essay on the Symptoms, Nature and Cure of the Dysentery, was made a prize subject for any medical gentleman practising in this State, at the next annual meeting, which will be held on the first day of December next. The prize dissertation must have annexed to it some cypher or emblem to identify the author, enclosed and sealed, which will be burnt if it should not be accounted worthy of the prize. The sealed enclosure to be broken open in the presence of the Society.

From the early patronage of the Legislature towards this first scientific Society of the State (having, at their present session passed an act for incorporating it), and from the zeal and enterprise of the gentlemen who compose it, we trust it will prove a Society of the first respectability and usefulness.

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SODA FORMED FROM ITS ELEMENTS BY INCINERATION!

Kelp or impure soda has, since the year 1746, been manufactured in the western islands of Scotland. The plants which afford it are the different sorts of sea-weeds which attach themselves to rocks. The principal species of these are, the *fucus vesiculosus*, *nodosus*, *serratus* and *digitalis*, Lin. But in order to afford kelp, these marine vegetables must, in their sound state, be completely burned. Professor Walker, in his essay on kelp, published in the first volume of the Transactions of the Highland Society (Edinb. 1799), mentions, that when the *sea-weeds become putrid* their produce of *lixivial salt is small*; and Mr. Beaton affirms, when they are not *completely* burned, what is left in that state *yields no ley* (ibid. p. 36). Mr. Jameson, too, considers these plants, when damaged by fermentation, as yielding kelp of a very inferior quality (p. 45). It has been believed, that the soda obtained from these plants by burning, proceeds from the decomposition of the sea-salt, or muriate of soda, they contained before combustion. This, however, must be a mistake; for though the fuci contain sea-salt, it is in too trifling a quantity to account for the soda actually produced. This, therefore, must be formed from elementary combination taking place in the fire. But what is this combination? Perhaps the following facts will lead toward an answer of the question. It is reported that carbon, if burned in *oxygenous* air, will be changed thereby to carbonic acid gas. It is said, too, that if carbon is burned in *atmospheric* air, that not only *fixed air* but *pot-ash* is formed. Now, atmospheric air differs from oxygenous air by possessing or containing a portion of *azotic* or *phlogisticated* air. From this, then, combining with *something else*, is the pot-aſh formed. And the detection of *this ſomething* is the preſent object of reſearch. In the formation of *ammoniac* by diſtillation, Profeſſor Woodhouſe has ſhown (letter to Mitchill, Med. Rep. vol. iii. p. 210) how largely the azotic part of the atmoſphere contributes to the formation of *that alkali.* The evidence ſeems quite as ſtrong in favour of the fixation of *azote* in *ſoda* and *pot-aſh.* The day is probably not far diſtant, when we ſhall be informed with which of the known elements, as carbon, lime, &c. it combines; or whether a new, and, as yet, an unknown element, is concerned in the proceſs.

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## VACCINE DISEASE.

Matter of the vaccine diſeaſe, received in this city from Boſton, is now under trial. Many perſons are already inoculated: the progreſs of infection is favourable, and there is every reaſon to expect, that in a ſhort time this mild and manageable diſeaſe will be univerſally ſubſtituted for the ſmall-pox.

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## PESTILENCE.

We have thus far deferred our account of the malignant epidemic which lately prevailed in ſeveral parts of the United States, in the hope of obtaining many important documents, already prepared, but not yet come to hand. Some of theſe diſcloſe facts of the utmoſt conſequence, and ſuch as greatly confirm our opinions concerning the origin and nature of the American peſtilence. But the periodical limits of this work compel the poſtponement of them to another occaſion.

The courſe of the weather, during the ſummer and autumn, in this part of the United States, was generally favourable. A great part of the month of July was, indeed, extremely hot; but this heat was ſeldom accompanied by humidity, the chief means of rendering it pernicious. In Auguſt the change was equally unexpected and ſalutary. The heat of that month was moderate, both in degree and duration; cool days very frequently intervened; and the rains, unlike thoſe of preceding years, were almoſt invariably followed by coolneſs of the air for many days. September partook of the ſame character, neither warm nor moiſt to an exceſſive degree, but generally ſeaſonable and pleaſant.

Baltimore and Norfolk have ſuffered greatly beyond any other places in the United States, by the ravages of this malignant diſeaſe, in the late epidemic ſeaſon. Providence (Rhode-Iſland) and New-York have likewiſe experienced a ſlight degree of it; but, in moſt of our other cities, from the ſingular felicities of the ſeaſon, only a few rare and tranſient inſtances of the diſeaſe were obſerved.

From Baltimore we expect to receive ſome intereſting communications concerning the origin and nature of the late epidemic. The Board of Health of that city, on the 22d of Auguſt laſt, publiſhed the following account of the diſeaſe:

"We have no heſitation in declaring it to be entirely owing to our own local ſources of filth, vegetable and animal putrefaction, and marſh effluvia, within and around that part of the city (Fell's Point), particularly the foul ſhore of the cove, and not to any imported or human contagion. This being alſo the unanimous opinion of the Faculty in that part of the city, ſtrongly points out, that the means of prevention in future, under *favour of Divine Providence*, are now in our hands, and that a rigorous and energetic execution of the nuiſance and health ordinances muſt, and, we have no doubt, will take place."

We learn that the whole number of deaths which have taken place from the epidemic in that city, from Auguſt 1ſt to October 31ſt, of adults, amounts to 978—of children, to 219: total 1197.

Of the epidemic, as it appeared at Norfolk, the following account has been obligingly tranſmitted to us by Drs. Taylor and Hansford, in a letter of 20th October laſt.

"The diſeaſe which we have experienced this year is that which it ſeems agreed to call the yellow fever; but is, nevertheleſs, the ſame we have known for a ſeries of years, altered, at different periods, in its aſpect, by a combination of unknown, or, at leaſt, undefined cauſes, but ſtill preſerving the leading features of the autumnal bilious fever. Nor with men of obſervation and experience, who diſregard bold and innovating theories, can the varieties of appearances excite ſurpriſe, or lead to confuſion.—Do the meaſles, the ſmall-pox, the pertuſſis, the cholera infantum, or any epidemics, ſhow themſelves in different years in the ſame form? Are they not ſometimes mild, ſometimes malignant, often combined with other diſeaſes, and depending, in a great meaſure, as to their tendency, upon cauſes not to be explained? The due conſideration of thoſe analogous truths would have, perhaps, prevented the ſchiſm in the treatment of the yellow fever, which has diſtracted the public mind, and diſgraced the ſcience of medicine. No intelligent perſons amongſt us believe the diſeaſe to be imported; nor was there any quarantine ordered ths year, although it was known the fever exiſted in Baltimore before it appeared here—called by them an inflammatory bilious fever. This diſeaſe, in its malignant form, always originates on the river, or on low new made grounds, and in houſes built on the docks; and, in all caſes, begins with ſtrangers and new ſettlers, affecting every one in proportion to his time of reſidence, and leaving the old inhabitants (viz. thoſe who have been twelve months conſtantly in the town, or abſent a little while only) not wholly exempt, yet proof againſt its deſtroying power. The natives of Virginia, and to the ſouth (though new-comers), for the moſt part, eſcape with life. Thoſe from higher latitudes oftener fall victims; and, with European ſtrangers, the fever is generally uncontroulable, depending more upon conſtitution, for recovery, than the aid of medicine.—We muſt, with caution, hazard an opinion reſpecting its contagious tendency. So fearleſs are the inhabitants, that the diſeaſe is, very ſoon after its appearance, by the removal of the ſick, conveyed to every part of the town, yet ſtill is confined to the ſame deſcription of perſons, unleſs a partial ſort of diſeaſe, which ſometimes affects the attendants, &c. can be called contagion. We have been told, that in the towns of the northern and eaſtern States, no perſons of any deſcription eſcape when equally expoſed.* If this be ſo, it is the only difference we perceive in the diſeaſe, as it has been deſcribed in various parts of the world."

We are authorized to expect an account of the diſeaſe at Providence, in a ſhort time, from Dr. Levi Wheaton.

A few caſes of malignant fever occurred at Philadelphia in the courſe of the ſummer and autumn. They were admitted by all to be genuine inſtances of yellow fever. The principal part of them took place in the neighbourhood of a moſt offenſive ſpot, where a great common ſewer, called the *dock*, empties itſelf into the Delaware. After fruitleſs attempts to trace the infection from Baltimore, they were aſſerted, by the advocates of imported contagion, to be the offspring of ſome undiſcovered importation, or of the awakened fomites of the laſt year's epidemic!!

At Wilmington (State of Delaware), among the more common forms of intermittent and remittent fevers, there occurred ſeveral very malignant caſes, which wanted nothing of the character of the yellow fever (in the opinion of ſuch as doubted) but general prevalence as an epidemic.

* It is obvious that theſe reſpectable phyſicians have been miſinformed on this point; for the reverſe has been remarkably verified.

Some few inftances of malignant difeafe, under the form of yellow fever, were alfo obferved in the town of Bofton. They were univerfally afcribed, by the phyficians of that place, to the influence of domeftic miafmata.

In New-York, the late epidemic feafon, compared with the malignancy and mortality of preceding years, muft be confidered as mild and favourable. In thofe parts of the town which are chiefly low, damp and filthy, and which have heretofore been diftinguifhed for an unhealthy character, the ufual difeafes of the fummer and autumn prevailed to a very great degree. Difperfed among thefe, and confined within the fame local boundaries, there appeared, here and there, cafes of a more malignant grade, terminating fatally after an illnefs of only a few days, and exhibiting the fymptoms of yellow fkin, black vomiting and ftools, hæmorrhages, convulfions, &c. In many of the cafes of mild remittent fever, which terminated in three or five days, and in the moft favourable manner, the tendency to malignity was indicated by the fuddennefs and violence of the attack, by hæmorrhages more frequent than ufual, by the copious difcharge of black ftools, by a fudden fubfidence of the force and activity of the arterial fyftem after violent excitement of a few hours, and a reduction of arterial pulfations, in many inftances, to forty beats in a minute, and by uncommon debility, greatly difproportioned, both in degree and duration, to the preceding appearances of the difeafe.

From a journal regularly kept, it appears that upwards of fifty perfons died of the yellow fever, in this city, in the courfe of the late feafon. Befides thefe, we find many more fatal cafes, reported under the title of bilious and malignant fevers, which no difcerning perfon can hefitate to add to the former catalogue. Under this mode of computation, then, it will appear, that from feventy-five to eighty perfons, whofe cafes were carefully obferved and recorded, exclufive of all fuch as efcaped notice, muft have perifhed of the malignant difeafe called yellow fever.

Thefe malignant cafes, though nearly all occurring in the low and filthy parts of the town, were remarkably detached from one another. Of the whole number above-mentioned, only two examples (fo far as we know, and the reports have been carefully examined for this purpofe) are to be found of more than a fingle cafe exifting in the fame family. And, admitting that the cafes which every body agrees to denominate yellow fever did not much exceed fifty, it will appear, on inſpection of the reports, that this number of caſes was diſtributed through at leaſt twenty-five ſtreets.

It has been contended, by a few perſons, that the origin of theſe malignant caſes may be found in the awakening of the reſidual fomites of laſt year's epidemic. If this had been the caſe, we ſhould expect to find the diſeaſe re-appearing in the ſame houſes and families where it had raged laſt year. But, on a compariſon of the reports of the preſent year with thoſe of the laſt, as far as they go, only a ſingle inſtance of ſuch re-appearance in the ſame houſe is found, and this is attended with circumſtances which prohibit every ſuſpicion of dormant contagion.

No attempt, with which we are acquainted, has been made to point out any channel by which this diſeaſe might have been imported from abroad. On the contrary, we are perſuaded that the quarantine law has been interpreted and executed with an unprecedented degree of vigilance, punctuality and rigour.

No propagation of the diſeaſe by contagion is pretended to have occurred beyond the limits of that portion of the atmoſphere of the town allowed by every body to have been contaminated by the exhalations of putrefaction; and within ſuch limits, it is well known, that an adequate cauſe is conſtantly in operation, independently of contagion. In the worſt caſes, the ſick were ſurrounded, as uſual, by relatives, friends, phyſicians, nurſes, &c. After death, the bodies of the deceaſed were unreſervedly handled, laid out, placed in coffins, and conveyed to graves; the bed and body clothes were delivered to waſherwomen, &c. And yet all theſe various deſcriptions of perſons eſcaped without injury, except where they happened, in the diſcharge of ſuch offices, to be immerſed in the air of thoſe parts of the town originally contaminated by the exhalations of putrefaction.

The inferences from theſe facts, in reſpect to the origin, nature and relations of our few late caſes of yellow fever, are ſo manifeſt, that it may, perhaps, ſcarcely be deemed neceſſary formally to deduce them. As it is impoſſible to trace a line of demarcation, the whole aſſemblage of epidemic diſeaſes of the ſummer and autumn of the preſent year, whether mild or malignant, muſt be referred to the ſame cauſe. If it be contended that this cauſe is of foreign growth, the conſequence will go further than the importers of contagion are willing themſelves to believe; for it muſt then follow that we import from abroad our mild as well as peſtilential, our common as well as extraordinary diſeaſes. The irregular aſcent of our former epidemics in this city up to the malignancy of that of 1798, and the gradual declenſion ſince, altogether militate againſt the doctrine of imported contagion, and can only be accounted for from ſuch varieties of ſeaſons as are partly cognizable by the ſenſes, and partly occult and unknown.

Upon the whole, it appears that every ſucceeding year furniſhes an additional maſs of evidence of the origin of this malignant diſeaſe from domeſtic ſources. It was our deſign here to exhibit a more ample view of this ſubject; but the non-arrival of ſome communications of the greateſt importance, for the preſent, neceſſarily ſuſpends the plan.—In the next number will be publiſhed an account of a moſt formidable diſeaſe at Narbonne, in France, originating from a local cauſe; and alſo ſome notices of a peſtilential diſtemper in the interior of this State, produced by the effluvia of a fœtid pond.

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LONDON MEDICAL REVIEW AND MAGAZINE.

We announce, with great pleaſure, a new periodical work, entitled, "*The London Medical Review and Magazine*," conducted by a ſociety of phyſicians and ſurgeons in that metropolis. One of the friends and patrons of this work has lately preſented us with the three firſt volumes, containing a variety of intereſting matter, with the obliging offer of an exchange for the Medical Repoſitory; an offer which we cordially embrace, not only from the reſpect we bear to that publication, but from our wiſh to ſtrengthen the ties which connect the ſcientific inſtitutions of the old and new world.

Our limits only allow us, at preſent, to ſelect (from p. 424 of the third volume of that work) the following paper:

THE EFFICACY OF COLD IN MADNESS.

Dr. G. G. Brown, of Bath, has communicated the following account of the good effects of cold in apoplexia mentalis, or delirium ſine febre.

Within the period of theſe laſt ten years, I have met with five caſes in the courſe of practice. The two firſt caſes were abandoned by two very eminent phyſicians, who have already done ample honour to their profeſſion, and for whom I entertain the higheſt regard. Two more caſes were attended by me alone; and two moſt reſpectable phyſicians were witnefs to the fubfequent mode of treatment in the fifth cafe. After a failure of the moft approved medicines and practice, the application of cold water to the head, affiduoufly perfevered in for many days, performed the cure. I well know that this is an old fpecies of practice, and alfo that it has often proved unfuccefsful: this, however, I attribute, in a great meafure, to the manner of ufing it, and likewife to the want of perfeverance in it. The method I purfued, in the firft four cafes, was, by winding an handkerchief round the head, and keeping it continually wet by a fponge dipped in cold water, until it produced a fhivering fit: it was then defifted from, for about an hour, more or lefs, and re-applied as before. After the firft twenty-four hours, there was no inconvenience felt in having it always kept round the head. Between thirty and fifty hours from the commencement of the application, fobbing and fighing came on, which have hitherto proved the criterion of the incipient return of rational ideas. This being effected, the vitriolic acid, alone or combined with the cinchona, in conjunction with the cold application, have uniformly perfected the cure. In the firft and fifth cafe, the application was not confined to the head, but extended along the courfe of the carotid and fubclavian arteries. From feven to fifteen days, where the delirium had been of confiderable ftanding, have been the extent of this mode of practice; although I fhould not have hefitated continuing it a much longer time, had it been found neceffary. Perhaps I fhall be induced, at fome future period, to deliver my fentiments more fully on this fubject, but could no longer withhold from the public a remedy I have found fo efficacious in fo dreadful a malady. I have alfo reafon to believe that it will be found equally fuccefsful in fome other difeafes, not only in the head, but the trunk of the body.

# APPENDIX.

## ARTICLE I.

Account *of* large Bones *dug up in* Orange *and* Ulster Counties *(State of New-York): In a Letter from* Sylvanus Miller, *Esq. to Dr.* Mitchill; *dated New-York, Sept.* 20, 1800.

Sir,

I RETURNED, on the 10th inſt. from a tour to the counties of Orange and Ulſter. On my arrival at Newburgh, I was informed, that about twelve miles to the weſtward of that place had lately been diſcovered the ſkeleton of an animal of uncommon magnitude, and decidedly larger than that of any of which we have at this time any knowledge. The information, to me, was not ſo extraordinary as to ſome others, as I had ſeen ſpecimens of parts of like ſkeletons, about nine years ſince, when at grammar-ſchool, in the town of Montgomery, near which place there was a part of the bones dug up: but as there were now proſpects of procuring the whole of the ſkeleton, and as more bones had already been procured than I had ever as yet ſeen, my curioſity could only be ſatiſfied by viewing them myſelf, and ſeeing if there was any difference, in magnitude or form, from thoſe formerly obtained, and to obſerve what might have been the nature, ſize and qualities of the huge beaſt when alive. Theſe objects could now be better aſcertained, as the whole of the ſkeleton would probably be obtained. Unfortunately, however, this could not be effected time enough for me to ſee the ſkeleton entire. There remains, however, no doubt, but that the reſidue of the bones are there, and nothing but want of exertions, or means to defray expenſe, will hinder the whole of them from being procured.

The places where theſe ſkeletons have been diſcovered are generally called marl-pits, and are low, ſunken places, very wet and miry. The hole which had been made to procure this ſkeleton lately diſcovered, was ſo nearly filled with water, that the nature of the earth, and the colour, could not be aſcertained, otherwiſe than by the earth on the banks or borders of the hole. The draining of theſe places has been only attempted, for the benefit of the farmer, about nine or ten years, before which time they were either unknown as affording good manure, or not in uſe in the neighbouring country. The bones here diſcovered lay buried about ten feet under this marle and earth, which generally conſiſts of five different *ſtrata* —the firſt is the common earth found in low meadows; the ſecond a very black and rich earth, and is deemed good for manure; the third a ſmall ſtratum of blue clay; the fourth a ſtratum of white marl; and the fifth a ſtratum of grey or black marl; at or near the bottom of which theſe bones are diſcovered, and ſome of them ſunk into the earth ſome inches below the marl. It may be proper to remark here, that theſe marl-pits (as they are generally called by the farmers) are very numerous, and ſome of them large and extenſive where theſe ſkeletons have been found, and that a very ſmall proportion of them have been ditched or drained off, ſo that the farmers might be able to procure the manure, to the better cultivation of wheat, corn, &c.

The bones which were lately diſcovered appear of the ſame ſpecies, though I think larger, with thoſe found ſome time ſince in the ſame vicinity, and afford a ſpectacle truly aſtoniſhing; they appear little decayed by the lapſe of time, and their proper places, and names of the ſeveral parts of the ſkeleton, could, I preſume, eaſily be diſcovered by a perſon poſſeſſing your knowledge in anatomical ſcience.—They are, however, not as yet entirely procured, though great exertions have been made, and are ſtill making, to effect ſo deſirable an object—the difficulty is made much greater by the influx of the water, continually ruſhing in from the bottom and ſides to the hollow already made—there are among the bones found, ſeveral of the legs, ſome of the back bones, ſeveral ribs, and the upper part of the head,* &c.—one bone of the thigh meaſures more than forty inches in circumference round the joint, and thirty-ſix inches on the cylindrical part of the bone, and is nearly five feet long; the teeth are nearly ſeven inches long, and four broad—they are found white, and faſt in the jaw, without appearance of decay; the holes in the ſkull where appear to have been the noſtrils, meaſure nearly eight inches in diameter; the orifice occaſioned by the decay of marrow is, in the back bones, three inches and an half diameter; there are ſeveral others of like magnitude, and ſome bones of the foot which ſhows evident marks that it once had claws.

I muſt not forget to mention to you, my dear Sir, that eight

* The head is thought, by Dr. Graham, to have been as large as an ordinary hogſhead.

ſimilar ſkeletons have been diſcovered within eight or ten miles of the neighbouring country, and to aſſure you, that ſome of them were from fifteen to twenty feet below the ſurface of the earth, and theſe within a few years paſt. I will leave the ſubject of this prodigy for your reflections, and requeſt of you ſome remarks, to ſatisfy the public mind.

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## ARTICLE II.

*Further Account of the Foſſil Bones in Orange and Ulſter Counties: In a Letter from Dr.* JAMES G. GRAHAM, *one of the Senators of the Middle Diſtrict, to Dr.* MITCHILL; *dated Shawangunk, Sept.* 10, 1800.

DEAR SIR,

THE reſult of my inquiries and obſervations reſpecting the bones of the unknown animal found in this part of the country is as follows: Some time in 1782, ſeveral of them were diſcovered in a meadow or ſwamp about three miles ſouth of Ward's Bridge, in the town of Montgomery, now in the county of Orange, three or four feet below the ſurface, moſt of them much decayed. The next diſcovery of them was made about one mile eaſt of ſaid bridge. In this place three or four ribs were found, about eight feet below the ſurface, in a very ſound ſtate. The ſwamp here does not contain more than three or four acres, and the remaining bones of the ſkeleton probably yet remain at its bottom. About three miles eaſt of ſaid bridge ſome other bones have been found; and about ſeven miles eaſt of ſaid bridge, a tooth (one of the grinders), and ſome hair, about three inches long, of a dark dun colour, were found by Mr. Alexander Colden, four or five feet below the ſurface. About ſeven miles north-eaſterly from ſaid bridge, a vertebra has been found; and five miles weſterly from ſaid bridge, a number of bones were taken up, ſix years ago, from about five feet below the ſurface. Theſe I procured, and ſent them to Dr. Bayley, of New-York, who has, I am informed, depoſited them in Columbia College. And laſt week another ſkeleton has been diſcovered, about three miles eaſt of my houſe, in the town of Shawangunk, about ten miles north-eaſt of ſaid bridge. Theſe laſt diſcovered bones lie about ten feet from the ſurface, and are in a very ſound ſtate. Many of them have been raiſed, but ſome much broken, eſpecially the bones of the head, which, I am perſuaded, lie entire, and in their natural order.

I have procured two bones of this laſt diſcovered ſkeleton, and ſent them to New-York, by Edward W. Laight, Eſq. for the purpoſe of having them examined by yourſelf, and other well-informed naturaliſts in the city. One of theſe I take to be a metacarpal or metatarſal bone, which indicates the animal to have been claw-footed, and, from the forms of the aſtragalus and os calcis which were among the bones ſent to Dr. Bayley, to have reſembled the foot of the bear. With reſpect to the other bone, I am at a loſs where to aſſign it a ſtation among thoſe of the ſkeleton.

Mr. Laight can inform you of many other particulars reſpecting theſe lately diſcovered bones, as he has ſeen and examined them himſelf.

Theſe large bones are uniformly found in deep wet ſwamps only, by farmers, in digging up black mould and *marl* for the purpoſe of manuring their lands. Thus a little enterprize and induſtry has enabled them to convert thoſe parts of their farms which were formerly eſteemed nuiſances, into valuable manures, and to make diſcoveries of great importance in the natural hiſtory of our country.

I have been particular in ſtating the relative ſituations and diſtances of thoſe places in which bones have been diſcovered, from a certain point, to ſhow, from the ſmall diſtrict in which many diſcoveries have been made, the great probability that theſe animals muſt have been very numerous in this part of the country: for if we compare the ſmall proportion that thoſe ſwamps, in which only they are found, bear to the reſt of the ſurface, and the very ſmall proportion that thoſe parts of ſuch ſwamps as have yet been explored, bear to the whole of ſuch ſwamps, the probable concluſion is, that they muſt once have exiſted here in great numbers. And why Providence ſhould have deſtroyed an animal or ſpecies it once thought proper to create, is a matter of curious inquiry and difficult ſolution. If, however, they were voracious, it muſt appear happy for the human race that they are extinct, by whatever means.

The hair above-mentioned ſeems to prove that it was not the elephant, or, if it was, that it muſt have been of a ſpecies or variety widely different from any known at preſent. With ſincere wiſhes for your proſperity,

I am your friend,

JAMES G. GRAHAM.

# ARTICLE III.

## *On the* Submersion *of* Swallows: *In a Letter to the Editor of the (New-York) Monthly Magazine.*

THE fubftance of what is contained in the enclofed letter, was related by the writer, in an accidental converfation on the difappearance of Swallows. As he had preferved a memorandum of the facts, and the utmoft reliance could be placed on the accuracy of the ftatement, I thought it of too much importance, in relation to a much agitated queftion in natural hiftory, to be withheld from the public. More particularly as, from its coincidence in time, it may ferve to confirm a fimilar fact, ftated in the Medical Repofitory, vol. ii. p. 178, firft edition, as obferved by Mr. Peter Cole, in this city; the truth of which is queftioned by an anonymous writer in the 3d vol. p. 241, of the fame work, who regards the opinion of the fubmerfion of fwallows as exploded. Mr. Pollock has obligingly complied with my requeft to make the fact known, by fending me the enclofed, with liberty to infert it, with his name, in your ufeful Magazine. That the fwallows could defcend, in fpite of their fpecific levity, to the bottom of fo deep and rapid a river as the Hudfon, or remain there during the winter, is not, perhaps, to be fuppofed.* Yet the fact of their *fubmerfion*, after the teftimony of Mr. P. and Mr. S. men of undoubted veracity, cannot be queftioned. Their continuance in a torpid ftate, and re-appearance, are different queftions, which remain to be decided. The apparent impoffibility of their exiftence under water, arifing from their peculiar organization, fhould make us very doubtful, but not abfolutely to reject the utter poffibility of the fact. For "natural hiftory," fays Kalm, who, with the reft of the Swedifh naturalifts, defends the *hybernation* of fwallows, in lakes, ponds, marfhes, and caverns, "as all other hiftories, depends not always on the intrinfic degree of probability, but upon facts founded on the teftimony of people of noted veracity." Reafonings and conjectures on the fact here ftated, I leave to naturalifts. It is to be hoped, that it may not be thought unworthy of the notice of the learned, candid, and ingenious Dr. Barton, who has already beftowed fo much attention on the fubject. W. Johnson.

* The houfe of Mr. Pollock is fituated near the margin of the Hudfon, about two hundred yards from the Battery. The river is about a mile and an half wide, and from feven to nine fathoms deep, and runs with a ftrong and rapid tide. Mr. P. does not recollect the fpecies of fwallow which then difappeared. The Barn Swallow *(Hirundo ruftica)*, Chimney Swallow *(Hirundo pelafgia)*, the Sand or Bank Martin *(Hirundo riparia)*, and the Purple Martin *(Hirundo purpurea)*, all frequent and build their habitations in the city and its neighbourhood.

"ON the afternoon of the 24th of Auguſt, 1798, I was ſitting in my parlour which looks towards the North River, about fifty feet from the bank, in company with our mutual friend Mr. Jacob Sebor. Our attention was attracted by numerous flights of birds, which appeared to come acroſs the town from the eaſtward, and deſcend immediately into the river. So ſingular an appearance excited our particular obſervation. We went out and ſtood cloſe to the bank, and then perceived that what we at firſt imagined to be black-birds, were actually ſwallows; and that, as ſoon as the various flocks had cleared the houſe, and got directly over the river, they plunged into the water and diſappeared. This was not confined to the vicinity of the place where we ſtood, but was the caſe as far as the eye could reach, up and down the river, and continued, without ceſſation, for nearly two hours, when the cloſing of the evening prevented our further obſervation.

"Aware of the importance of affording any additional information on this long diſputed queſtion in the natural hiſtory of the ſwallow, I procured a teleſcope, and watched attentively many of the flocks from their firſt appearance until their immerſion, continuing my eye fixed upon the ſpot long enough to be fully convinced that not one of the birds returned to the ſurface again. Indeed, one flock of about two hundred birds plunged into the water within thirty yards of us, and inſtantly diſappeared, without the leaſt appearance of oppoſition that might be expected to ariſe from their natural buoyancy, and, at the ſame time, the evening was ſo ſerene, and the river ſo unruffled, that no deception of our ſight could poſſibly have occurred.

"When the birds firſt came in view, after croſſing the town, their flight was eaſy and natural; but when they deſcended nearly to the water, they appeared much agitated and diſtreſſed, flying in a confuſed manner againſt each other, as if the love of life, common to all animals, impelled them to revolt againſt this law of nature impoſed upon their ſpecies.

"As ſome time has elapſed ſince the above mentioned facts occurred, I thought it proper, before I gave you Mr. Sebor's name, as having been a witneſs to them, to conſult his recollection on the ſubject, and I have pleaſure in aſſuring you he diſtinctly remembers every circumſtance I have recited, and of which I made a memorandum at the time.

"It may be worthy of remark, that as far as my obſervation went, the ſwallows totally diſappeared on the 24th of Auguſt, 1798; for, during the remainder of that year, I did not ſee one. "H. POLLOCK.

"*New-York, 18th July, 1800.*"

MEDICAL REPOSITORY.

Vol. IV.—No. III.

## ARTICLE I.

### Facts *concerning the* Yellow Fever, *as it appears at* Charleston *(South-Carolina): Communicated in a Letter from the Hon.* David Ramsay, *M. D. to Dr.* Miller.

*Charleſton, Nov.* 18, 1800.

Sir,

We have had a fever the laſt ſummer which has been uſually called the yellow fever, but its ravages were by no means ſo extenſive as repreſented by common fame. Our whole mortality, including people of colour, in the months of July, Auguſt, September and October, was 516. Of theſe, 134 were reported to have died of the yellow fever; viz. in July 23, in Auguſt 55, in September 46, in October 10. Of the 134 fatal caſes of yellow fever, 41 (nearly one third of the whole) were ſailors from the Marine Hoſpital. On the ſecond day of September there were twelve deaths, which was the greateſt mortality in one day throughout the ſeaſon. September was, as uſual, one of our moſt ſickly months; but there were only ſeven days in the whole of it in which the deaths exceeded ſix in a day. The yellow fever has been epidemic in this city in 1700, 1732, 1739, 1745, 1748, 1792. When it was not epidemic, our oldeſt inhabitants inform us, that a few caſes occurred in ſeveral ſummers that would now be called yellow fever. Since the year 1792, we have had an alarming number of caſes of this deſcription every year, except the years 1793 and 1798. In the year before the great yellow fever of 1793 in Philadelphia, we had much more of this diſorder than in the preſent year, but it excited no general alarm among the permanent inhabitants. In the year 1799, five or ſix caſes occurred of children born, and usually resident in Charleston, who died of this disease. In 1800 only two such cases have been noticed by the physicians. With the exception of these children, the disease has been exclusively confined to persons who were unaccustomed to the air of Charleston. A few of such have escaped altogether; a few others the first year, and took the disease in the second. One died with it in his third summer, who had enjoyed good health for the two first years of his residence: but, in general, the disease attacked its unhappy subjects soon after their arrival. The constitution of the air, in 1800, is supposed to have been less favourable to the propagation of the disease than in several of the preceding years: but it is more than probable that the decreased number of strangers who visited Charleston in the late sickly season was one considerable cause of the diminution of its ravages. Farther observations are necessary to ascertain the length of absence from our city which may consist with the safety of a returning native or old inhabitant. Some instances have been observed of our youth, who have returned to us from a more northern latitude, after an absence of three, four, and five years, and, in one instance, of twelve years, without contracting this inhospitable disease. The only exceptions to this remark, which have come to my knowledge, are two; the one after an absence of five years, and the other of nine.

The disputes about the origin of the yellow fever, which have agitated the northern States, have never existed in Charleston. There is but one opinion among the physicians and inhabitants, and that is, that the disease was neither imported nor contagious. This was the unanimous sentiment of the Medical Society, who, in pursuance of it, gave their opinion to the government last summer, that the rigid enforcement of the quarantine laws was by no means necessary on account of the yellow fever.

I have nothing new to communicate on our mode of treating this disease. Under the most approved methods, and the ablest physicians, when clearly marked, it has, in most cases, proved fatal. Many of our yellow fever patients are in circumstances unfavourable to their recovery. Such is the rapid and violent nature of the disease, that they should have free ventilation, and several attendants by night as well as by day: but they are mostly unknown strangers, and often in crowded lodging houses, in the most thickly settled parts of the city, where the apartments are small, and the servants few.

It would be prudent for strangers proposing to reside in

Charleſton, to arrive in November and December, and to abſent themſelves from the city for the two or three firſt ſummers after their arrival. Such as only purpoſe to viſit us ſhould avoid the months of Auguſt and September. The months of July and October, and the firſt days of November, are not without danger, but it is much leſs than in the two intermediate months, and varies very much with the heat of the weather, the late or early appearance of froſt, and other circumſtances. Danger, though diminiſhed, cannot be ſaid to be entirely over till the air is thoroughly purified by ſevere black froſts.

We have not yet made a ſufficient number of obſervations to determine accurately how far it is poſſible for ſtrangers to avoid our yellow fever, by reſiding, while it is prevalent, entirely on Sullivan's Iſland, or in the out-ſkirts, or open, airy environs of Charleſton. In one caſe the diſeaſe proved fatal to a gentleman on Sullivan's Iſland, who had not been off the Iſland for ſix weeks before: in another, to the head maſter in the college grammar-ſchool, who had confined himſelf to the yard and vicinity thereof, from and after the firſt of July. In all other caſes that have come to my knowledge, the perſons making the experiment, and who have taken the diſeaſe, had occaſionally viſited or paſſed through the thickly ſettled parts of Charleſton. Strangers coming amongſt us, too often preſume on their conſtitutions as being able to reſiſt the peculiar diſeaſes of the climate and ſeaſon. They cannot be perſuaded of the danger of a ſhort viſit to Charleſton, or of ſlight imprudences or exceſſes.

My private opinion is, that our yellow fever is a local diſeaſe, originating in the air of Charleſton; that the chances of eſcaping it may be conſiderably enlarged in favour of ſtrangers, though reſiding in the city, who avoid the night air and all exceſſes; live prudently, and in clean, airy apartments; and obſerve a medium between living too high and too low: and that the diſeaſe might be generally avoided by ſuch, provided they kept entirely out of the city, or even in the ſparſe ſettlements in its out-ſkirts. And, on the other hand, that the moſt tranſient viſit to, or paſſage through Charleſton, when the yellow fever is prevalent therein, may as certainly and as fatally induce that diſeaſe as a more permanent reſidence.

I remain, with great regard and eſteem,

Sir,

Your moſt obedient ſervant,

DAVID RAMSAY.

*P. S.* Since writing the above, I have been informed of one case of a gentleman who died here of the yellow fever last summer, who took the disease very soon after his arrival, though he had resided in Philadelphia for the five immediately preceding years, and had had the disease there twice in that period.

It is also proper to add, that of the forty-one cases of yellow fever which took place in the Marine Hospital, forty were brought there, from the shipping in the harbour, with the disorder on them, and, in many cases, far advanced. Only one case originated in the hospital, and that was of an old intemperate man. While so many patients were dying of the yellow fever in the hospital, there was always a considerable number of other patients under the same roof, who all (with one exception) escaped it. This is the more remarkable, as the greatest number of them, as well as several of the nurses, were strangers, and affords additional evidence that the disease was not contagious. As the hospital is half a mile out of Charleston, it adds probability to the opinion I have before given, that our yellow fever might generally be avoided, even by strangers who would confine themselves, while the disease was epidemic, to the out-skirts or environs of the city. D. R.

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## ARTICLE II.

*On the* IMPORTANCE *of* SAVING SKIN *in* CHIRURGICAL CASES *and* OPERATIONS: *Addressed to the Editors of the Medical Repository, by* RICHARD HILLIER, *Surgeon: In a Letter dated Sparta, on the River Hudson, November* 4, 1800.

GENTLEMEN,

PERMIT me, through the medium of the Medical Repository, to invite the attention of the faculty to the improvement of saving skin, and healing by the first intention in surgical operations. I pretend not to the merit of invention. My object is partly to recommend a practice which lessens the mass of human misery, and partly to render honour to whom honour is due.

About the year 1785, Mr. Mynors, of Birmingham, wrote a little treatise on the operation of the trepan, wherein he enumerated the leading ideas of surgeons, from very remote antiquity to the time of Mr. Pott. The result of his reflection was, that but little improvement had been made in that branch of surgery; and that the inflammatory adhesion of the scalp to the contents of the cranium, after a complete removal of the causes of compression, was the thing wanted to render the cure of injuries on the head, by the operation of trepanning, perfect. Although this beautiful and simple theory had the sanction of experience, and the approbation of many eminent surgeons in the vicinity of Birmingham, on my entering as a pupil at St. Thomas' and Guy's Hospitals, in the year 1790, I found it unpopular; and, by an article in the London Medical and Physical Journal, I find the old method still prevails. Mr. Bell, in an edition of his System of Surgery, printed since the appearance of Mr. Mynor's work, neither notices the author, nor appears to know any thing of his manner of treatment. I will not investigate the causes of this neglect. It will be more profitable to examine the use of inflammatory adhesion in the cure of diseases, and its application to surgery, particularly to the operation of the trepan; first premising that mistakes may arise from the term "morbid" being often connected with adhesion, as though it were a disease, and not a cure: whereas, when any two vascular, living substances, in a state of inflammation, come in contact, they will adhere. The inflammation may be morbid, but the adhesion is salutary. Thus, nature sometimes cures carditis by the adhesion of the heart to the pericardium; pneumonia, by that of the lungs to the pleura; hepatitis, by attaching the liver to the peritoneum, stomach or duodenum; and peritonitis, by adhesions, at one time or other, to every possible variety of abdominal viscera. And if a musket-ball, passing through a large extent of cellular substance, appear to produce no inflammation, it is because union by the first intention takes place in the cavity of the wound. Nor is this adhesion limited to similar parts, or to parts nearly similar; but cutis will unite alike to muscle, to bone, to tendon, to ligament, and to cartilage, as we see in many operations of surgery.

Taught by Mr. Mynors to apply these ideas to the operation of the trepan, let us suppose ourselves called to a person with a wounded head. Being convinced that the brain is suffering from compression, either by the evidence of the senses, or by a knowledge of the symptoms, we lay the patient on a table, in a good light; and, making first an incision along the course of the injury, which, though seldom sufficient for the purpose of a full examination, serves to direct us in making a second incision, beginning at one end of the first, and going off at right angles, like the Roman letter L, we now dissect back the divided portion of scalp, and endeavour to remove every cause of compression in the usual way. If two incisions do not give room enough, we lengthen the second incision across the first, thus making a resemblance of the letter T. We then dissect back the second flap, and proceed as before. Should these two flaps not sufficiently expose the injury, a continuation of the first incision, by making a rectangular cross, gives us an opportunity of turning back two flaps more, whereby any curable fracture may be amply exposed. The causes of compression being removed, the peculiarity and excellence of our mode of operating begins. The contents of the cranium being cleaned with very particular care, the flap or flaps are to be carefully brought to their former places, and there to be closely secured by slips of adhesive plaster. Afterwards a compress of soft lint is to be laid over, and retained by any convenient bandage, with just pressure enough to keep the parts intended to unite in easy contact. In a few days the scalp will be found to have adhered to the sound bone and dura mater. Thus will the danger from the contact of external air be obviated, and exfoliations, fungous excrescences, and large suppurations be prevented, while the cure will be much accelerated. In support of the above theory, you will oblige me by inserting the following

## Case.

On the 18th of August last I was called to Gerry Vredenburg, a boy of eight years old. Forty-eight hours before I was applied to he had been thrown from a horse. He fell with his head upon a sharp-pointed rock. He was immediately bled, and a wound, about two inches long, in the frontal muscle, an inch above the right eye-brow, was carefully caulked with weeds, and payed with rum and sugar. On my arrival, symptoms of oppressed brain were sufficiently clear: I therefore proceeded, without delay, to an examination. On shaving the head, and clearing the wound, I discovered a considerable fracture of the os frontis. A tumour, in appearance like the half of a damson, situate rather above the centre of the temporal muscles, convinced me that the injury extended thus far. I made my firſt inciſion ſeven inches long, beginning immediately over the noſe, and, inclining obliquely upwards, paſſed through the wound and tumour, avoiding the temporal muſcle. My ſecond inciſion was between two and three inches long, at right angles, upwards from the end of the firſt. I fortunately had now a good view of the fracture, which, notwithſtanding it was ſo extenſive as to include part of the right parietal bone, did not deter me from making a perforation on its moſt poſterior edge, directly under the tumour. On completing the perforation, I found the natural coheſion between the dura mater and cranium deſtroyed by an effuſion of blood, which was coal-black, and adhering to the dura mater with the tenacity of liver. By five applications of the trephine, I removed nine pieces of bone, meaſuring, when laid together, two inches and a half at their ſhorteſt diameter, and weighing three drachms and one ſcruple. The dura mater and ſcalp being laid in contact, adheſion was found to have taken place between them, on the firſt removal of the dreſſings, which was done within a week. The contuſed parts went on as well as could be expected. The child only kept his bed eight days; after which, though reſtrained from running in the ſun, he was conſtantly at play. For the firſt week he took occaſional purges, and lived low. Afterwards he was put on bark, lime-water, and a more generous diet. In ſix weeks he was quite well, and continues ſo.

I am, Gentlemen,
With much reſpect,
Your humble ſervant,
RICHARD HILLIER,

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## ARTICLE III.

EXTRAORDINARY CASE *of a* MAN *who appeared to have* THREE TESTICLES: *Communicated by Dr.* SAMUEL BROWN, *of Lexington (Kentucky), to Dr.* MILLER, *in a Letter dated Nov.* 10, 1800.

ON the 6th of July, 1800, Mr. R. a ſtrong, healthy farmer, aged 37 years, applied to me to reduce a tumour in his groin, which he believed to be a caſe of hernia. About two months before he had perceived a ſlight uneaſineſs in the ring of the abdominal muscle, on the right side, and felt a small tumour, which was easily pushed back into the abdomen by pressure with his fingers. This circumstance excited but little attention until the 2d instant, when, after great fatigue in the harvest field, he was called, by business, a few miles from home. As he rode, in the evening, the pain in his groin became much more acute than it had formerly been; upon which he dismounted from his horse, and was greatly alarmed at the discovery of a tumour as large as one of his testicles, lying immediately on the cord of the right testicle, which remained in its proper place, perfectly sound and free from pain. Having communicated his case to his family, on his return, fomentations, the inverted position of the body, pressure on the part with a plate of lead, and a variety of other remedies, were tried in vain.

Having slightly examined the tumour, I endeavoured to reduce it in the usual manner. But I soon discovered that it was neither the omentum nor a portion of the intestines; for the bowels were perfectly regular, and the injections which had been administered, although they operated powerfully, produced no change in the size or shape of the tumour. The ring did not admit of the introduction of the point of my finger when the tumour lay near to it: I therefore drew the tumour down towards the testicle, when I plainly perceived it to be suspended by a cord, in size and feel exactly resembling those of the other two testicles.

Some slight pain was experienced on drawing down the tumour, and I distinctly felt the action of the cremaster muscle as often as I directed the patient to retract the testicles. The case appeared to me so remarkable, that I prevailed on Mr. R. to submit to the examination of three or four of my pupils, and I also called in another practitioner, who, without having any knowledge of the opinion I had formed, did not hesitate to conclude that it was a third testicle. The same evening I fortunately met with Drs. Warfield and Marshall, two physicians of eminence, who were obliging enough to examine the case with great attention, and who, by concurring with me in opinion, have removed all doubt from my mind with regard to its real nature.

The cords of the two testicles, on the right side, appeared to have no connection with each other, although they both descended through the same opening in the muscles. The patient was a married man, had children, and enjoyed excellent health, which this tumour does not seem likely to impair.

A fact of a nature fo anomalous does not admit of much fpeculation. It is, however, very difficult to fay what could have retarded the defcent of this tefticle until the patient was 37 years old, and it will be interefting, in future, to obferve what effects the defcent of it may have on his powers and his appetites. If any more information on this fubject is obtained, it fhall be communicated to the world through the medium of your interefting Repofitory.

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## ARTICLE IV.

Curious Instance *of* Disease, *in which, though Feeling was abolifhed, the Power of Motion was unimpaired: From the fame to the fame.*

MRS. M'L. of Bairdftown, Kentucky, aged about 40 years, has been deprived, for more than two years, of the power of fenfation in her hands and feet. She is quite infenfible of the effects of cutting inftruments, or of burning coals applied to them. In one inftance, when fhe was employed in fhaping a piece of wood with a knife, fhe incautioufly turned her eyes on fome other object, and cut off the end of the thumb of her left hand, without perceiving the fmalleft fenfe of pain. She cannot, from her fenfations, difcover the leaft difference between a hot and a cold iron, and has frequently burnt the fkin and flefh to a confiderable depth, by miftaking the one for the other. Thefe wounds and burns heal without any uncommon difficulty. Notwithftanding this total lofs of fenfibility, fhe retains the power of motion in full perfection, and purfues her domeftic employments without any remarkable inconvenience. All her animal and vital functions are in a natural, healthful ftate, and her fpirits are regular—nay, even cheerful. She feels no uneafinefs from her complaint, except a fenfe of fulnefs in the veins, which fhe afcribes to the flow circulation of blood in the extremities. As the fenfe of touch, however, is entirely loft, fhe finds it difficult to retain fubftances in her hands without looking at them, as it is by fight, chiefly, that fhe regulates the degree of mufcular contraction neceffary to their retention. On turning her eyes afide, fhe often drops glaffes, plates, &c. which fhe holds, in fafety, as long as fhe looks at them. A variety of remedies had been tried without any effect. I was deſirous of witneſſing the effect of electricity. Although it produced very conſiderable contractions in the muſcles of her arms down to her wriſts, the effects of it on her hands were ſcarcely perceptible. After two or three days, however, ſhe imagined that ſhe was ſenſible of ſome kind of ſenſation from ſtrong ſhocks, and was, therefore, adviſed to continue the application of it. Volatile liniment was preſcribed, and rollers to ſupport the veins which appeared relaxed and diſtended by their contents. Of the reſult of theſe experiments I have not yet been informed, as my patient lives more than 70 miles diſtant from Lexington.

S. BROWN.

*June* 30, 1799.

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In the firſt volume of the Wonderful Magazine I met with the following facts and obſervations.

Dr. Hervey affirms that the heart (though the fountain of life) has no *feeling*; which he proves by the caſe of a gentleman whom he had ſeen, who, by an impoſtumation in his ſide, had an opening made to his heart, through which its motions could be diſtinctly obſerved, and the heart itſelf touched with the finger, which yet the gentleman affirmed that he felt not. [Vol. i. p. 386.

Dionyſius, the ſon of Clearchus, tyrant of Heraclea, through idleneſs and high feeding, had attained to a great degree of corpulency, and ſlept ſo ſoundly that it was difficult to awake him. His phyſicians, therefore, took this courſe with him: They had ſharp bodkins and needles, which they thruſt into divers parts of his body; but till the point of them had paſſed the fat he felt not, but the fleſh below retained its ſenſibility. [*Ibid.*

Dr. London knew a maid in England, otherwiſe of good health, that had no ſenſe of burnings in her neck: ſhe would ſuffer a needle to be run into her forehead, and into the fleſh of her fingers, near the nails, and yet without any ſenſe of pain. [*Ibid.*

Mr. Hollier and Dr. Hervey knew a girl, 18 years of age, who, without the loſs of motion, had ſo loſt the ſenſe of feeling in the external parts of her body, that her handkerchief could be pinned to her neck without her knowledge. Dr. Hervey adviſed marriage, and ſhe recovered. [*Ibid.*

The doctrine of the nervous fyftem is yet fo much embarraffed with contradictory facts and vifionary theories, that I fhall not attempt an explication of the phenomena of the above cafes. It is only by carefully noting and recording facts that we can hope to arrive at truth in our phyfiological inveftigations. S. B.

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## ARTICLE V.

REMARKS *on a* SUBTERRANEAN WALL *in* NORTH-CAROLINA, *by the Rev.* ZECHARIAH LEWIS, *of the State of Connecticut.* [*See Medical Repofitory, vol.* ii. *p.* 272 *and* 275, 1*ft edition.*]

SIR,

AGREEABLY to your requeft, I tranfmit to you an account of the fubterranean wall in North-Carolina.—This account was haftily written, amidft all the inconveniences of a journey. Since my return I have not found leifure to revife and correct it; and, at prefent, can only tranfcribe it in its original crude form.

I am, Sir,
With fentiments of efteem,
Your obedient friend and humble fervant,
ZECHARIAH LEWIS.

Dr. MILLER.

*Weft-Greenwich, Nov.* 12, 1800.

THE celebrated fubterranean wall, which, for feveral years paft, has been made the fubject of much converfation and inveftigation in various parts of the United States, is about twelve miles north-eaft of Salifbury, in the county of Rowan, State of North-Carolina. It ftands on uneven ground, near a fmall brook. The ftones of which it is formed are all of one kind, and evidently contain a quantity of iron ore. They are of various magnitudes; all of a long figure, and from one to twelve inches in length. The ends of the ftones, which are of different figures, form the fides of the wall. Some of the ends are fquare; others are nearly of the form of a parallelogram, triangle, rhombus, or rhomboides; but moſt of them are irregular. Some preſerve the figure and dimenſion of the end through the whole length; others enlarge or diminiſh from the end. The ſurface of ſome is plain, of ſome concave, and of others convex. Every concave ſtone is furniſhed with one of a convex ſurface. Where the ſtones are not ſo exactly fitted as to lie perfectly level and firm, they are curiouſly wedged with others, which are very ſmall, and of a plano-convex form. The moſt irregular and unmanageable ſtones are thrown into the middle of the wall. The whole appear to be arranged in the moſt ſkilful manner to make the wall ſolid and ſtrong.

Every ſtone is covered with a ſpecies of cement. The cement, contiguous to the ſtone, has the appearance of iron ruſt; and, where it is thin, the ruſt has penetrated through it. Many pieces, however, are found more than an inch thick. In theſe the cement appears to be of a fine and curious texture; not the leaſt ſand nor grit is diſcoverable. In the wet parts of the wall, the middle of the cement, which is not diſcoloured with ruſt, is nearly of the colour, the conſiſtence, and the ſoft, oily feeling of putty in its ſofteſt ſtate.

The width or thickneſs of the wall is uniformly twenty-two inches: its height and length have not yet been diſcovered. The Rev. Dr. M'Korkle, Rev. Mr. Hall, and Dr. Newman, began, with conſiderable ſpirit, to give it a thorough examination. A ſum of money was collected, and a number of workmen employed, who devoted ſeveral days to the buſineſs. About forty yards from the part firſt diſcovered, and on a line with the direction of that part, they dug a large pit. After digging ſeveral feet they ſtruck the wall. The pit was then continued on one ſide ſome depth, that the baſe of the wall might be found, and its height aſcertained. The workmen, however, were ſoon incommoded with water, which roſe in the pit with great rapidity. At length, the man who was digging, although long experienced in the buſineſs of ſinking wells, became alarmed with his ſituation, and totally relinquiſhed the object. They then proceeded to diſcover the length. Another pit was dug beyond the former, and the wall again found. In the attempt to find the northern limit, a bend or off-ſet was diſcovered; after which the wall was found to proceed in a line parallel with its former direction. The off-ſet is not rectangular, but a gentle bend or curve.

The perpendicular diſtance of the parallel lines is about ſix feet. Without finding the terminations or the height, the fund was exhaufted, the workmen fatigued and difcouraged, and the inveftigation relinquifhed. The whole length yet difcovered is about 300 feet, and the greateft height is twelve or fourteen. Both fides of the wall are plaftered with a fubftance which refembles the cement on which the ftones are laid.

The wall has been fo broken by its numerous vifitants, that the top of it cannot now be examined with accuracy. The Rev. Mr. Hall gives the following account of it: "Above the cavern or part firft difcovered, where the ground rifes abruptly, the wall afcends; and below the cavern, where the ground gently declines, the top of the wall runs nearly parallel with the declivity. So far as the wall has yet been difcovered, the higheft part is fifteen or twenty feet above the loweft."

It appears to be the prevailing opinion, in this region, that the wall is a production of nature. In fupport of this opinion the following inquiries are fuggefted:

In the firft place—What could have been the object of the wall? From the length already difcovered, it cannot have been the part of any houfe or public building; and the ground on which it ftands muft have been badly calculated for a fortification.

In the fecond place—To build the wall with fuch ftones—to fit them fo exactly to each other—and, particularly, to collect, and fo curioufly arrange thofe of the fmalleft fize, muft have been the work of much time and immenfe induftry. How is it fuppofable that men, in a rude ftate of fociety, would fubmit to the labour, or could poffefs the fkill?

In the third place—Where could the materials have been procured?

In anfwer to the firft of thefe inquiries, it may be obferved, that, although we cannot, with abfolute certainty, determine the object of the wall, yet we may form conjectures which contain, at leaft, as great probability as thofe which can be formed on the oppofite fide of the queftion. The form of the wall, fo far as it has yet been difcovered, will juftify the fuppofition that it was built for a wall of defence. Its ftrength, alfo, at a time when bows and arrows were the principal inftruments of war, would have been fufficient for the purpofe. Since the wall was erected, the furface of the ground may have been greatly changed by repeated and heavy rains, and, poffibly, by the general deluge.

It may have been built for the purpofe of enclofing a prifon, a garden, or a city.

It is alfo poffible that the fmall ftream which runs near the wall was formerly a confiderable river, and that the wall was erected to guard againft the rife of its waters.

To the fecond it may be replied, that we are not driven to the neceffity of fuppofing the wall to have been built in a very rude ftate of fociety. It may have been conftructed by fome enlightened antediluvian nation, or by fome civilized people who may have wandered to this region from the eaftern continent. A tribe, not more refined than the native Mexicans, might have poffeffed fufficient fkill. There are many productions of that nation, and even of more favage tribes, which exhibit more ingenuity and greater perfeverance. The floating gardens, which furnifhed the Mexicans with fubfiftence; and the dyke, nine miles in length, which guarded them againft the inundations of the lake, required incomparably greater efforts of induftry, perfeverance and fkill.

To the third a fatisfactory and full anfwer is at hand. On the adjacent hill are many ftones evidently of the fame fubftance and form: they are, however, larger and more broken than thofe in the wall. From this fact it appears that the beft were felected for the work. The diftance over which the ftones were carried is not more than two or three hundred yards, and nearly the whole is defcending ground. This is, poffibly, the very reafon why this fpot was chofen for the location of the wall.

In a river, not more than one fourth of a mile diftant, are found great quantities of mufcle-fhells, of which the cement may have been made. Mr. Probley, who lives within eighty yards of the wall, and who came to us while we were examining its materials and conftruction, affured us that he had carefully dried the cement, burnt the fhells, compared the two, and could find no difference between them.

At a fmall diftance there is alfo found a fpecies of clay, refembling fuller's earth, of which the inhabitants make a convenient and durable cement for their chimneys. This cement is free from grit, and very fimilar to that of the wall.

The wall is perfectly regular, and has every poffible appearance of an artificial production. The ftones are all laid acrofs the wall, and in a horizontal direction. The earth contiguous to it evidently appears to be what is generally termed made ground. It is of a grey, fandy character, and muft have been wafhed to the wall by repeated and heavy rains.

Philofophers have generally adopted the opinion that there are but three methods by which nature produces regular forms in the mineral fyftem. Thefe are, firft, that of cryftallization; fecondly, the crufting or fettling of the external furface of a liquid mafs while cooling; and, thirdly, the burfting of a moift fubftance while drying.* From a brief inveftigation, it will, I believe, be determined, that the wall cannot have been produced by either of thefe modes.

The different ftrata of fubftances formed by the firft mode are never found, in any confiderable quantities, to run in the fame direction, and never, I believe, horizontally. They generally run in oblique directions, inclining either to or from each other. But in the wall the different ftones are placed parallel with each other, and in a horizontal direction.

The fecond method is, the crufting of the external furface of a melted mafs. We cannot conceive it poffible that a mafs of melted fubftance, feveral hundred feet in length, twelve or fourteen in height, and precifely twenty-two inches thick, fhould ftand and cool in that pofition. The top would fink, and the fides fpread; and this, probably, not equally in all parts. But were it poffible that the liquid mafs fhould thus ftand and cool, it would be attended with the following procefs. The external parts firft lofing their heat, would firft congeal: the cold would contract the liquid ftratum, and thus feparate it from the remaining liquid fubftance. In the fame manner other ftrata would be formed, as the refrigeration fhould penetrate deeper into the mafs. Thus a ftratum would be formed on the top of the wall parallel with its length; and ftrata would, at the fame time, be formed on the fides, either parallel with its length, or perpendicular from the fummit to the bafe. As the middle of the mafs would not cool fo faft as the fides, fo the ftrata could not be formed horizontally from one fide to the other.

The third method, to wit, the burfting of a moift fubftance while drying, is fimilar, in its effects, to the fecond; of courfe fimilar remarks will apply. In this cafe the fubftance is in a moift inftead of a melted ftate. The burfting of the moift fubftance, or the feparating of the ftrata, is the effect of contraction by drying. The drying advances, in this cafe, juft in the fame manner with the refrigeration in the former; and, for the fame reafons, the wall cannot have been produced by the third method.

* Vide Encyclopædia.

Thus it is evident, in the firſt place, that no ſubſtantial argument is offered to prove that the wall cannot be artificial: in the ſecond place, that it has every poſſible appearance of being the production of art: and, in the third place, that it cannot have been produced by nature in either of its ordinary modes of producing regular forms.

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## *POSTSCRIPT.*

After my arrival at the Rev. Dr. M'Korkle's, I was informed, that in May, 1798, the Rev. Mr. Hall, of Iredell county, carried ſome of the materials of the wall to Philadelphia, and had them examined by a member of the American Philoſophical Society. By a chemical proceſs, from 50 to 54 grains of native earth was produced from 100 grains of the materials. The experiment was made ſeparately with the ſolid ſtone, the ruſt formed on the ſurface of the ſtone, the pureſt and whiteſt of the cement, and the cement which was impregnated with ruſt. The reſult, in every inſtance, was nearly the ſame. "All appeared to be radically of the ſame ſubſtance, and ſtrongly impregnated with iron ore." The mineralogiſt was firmly of the opinion, "that the whole is the work of nature, is what chemiſts call baſaltes, and may have been thrown up by a volcano." He concludes a letter to Mr. Hall in theſe words: "The wall is certainly a great curioſity, and will afford room for the ſpeculations of the curious for ages yet to come."*

The ſubject, I apprehend, received a ſuperficial inveſtigation. By a chemical proceſs it was found, that the ſtones and the cement contain one property of the baſaltes, to wit, native earth. It ought, however, to be remembered, that this baſaltic property exiſts, in a greater or leſs degree, in every ſpecies of ſtone. It ought alſo to be remembered, that baſaltes contain various properties, and that all of them ſhould be found in the wall. But a ſingle correſponding property having been diſcovered, the opinion was haſtily adopted, "that the whole is what chemiſts call baſaltes."

An eminent European philoſopher, who has attentively examined the nature of baſaltes, obſerves, "that the moſt remarkable property of this ſubſtance is its figure. It is never found in ſtrata like other marbles, but always ſtanding up in

* Theſe quotations were taken from a Saliſbury Gazette of the ſummer of 1798.

the form of regular angular columns, compofed of a number of joints, one placed upon and nicely fitted to another." The ftrata, in thefe columns, run perpendicularly, or nearly fo: all in the fame column are not of equal height: there is nothing between them refembling cement: and they are fo contiguous to each other that the point of a knife can fcarcely be thruft into the crevices. Thefe properties do not exift in the wall; confequently it cannot be bafaltes.

It is another property of bafaltes, that "it is fufible, *per fe*, by a moderate fire." This is not the fact with the wall; confequently it cannot be bafaltes.

Some philofophers have ftrenuoufly contended that bafaltes is a cryftallization; others warmly affert that it is of volcanic origin. If either of thefe opinions be true, the wall, as I have fhown while confidering the different methods by which nature produces regular forms in the mineral kingdom, cannot be bafaltes.

Neither ftones, nor other mineral fubftances found in the earth, unlefs they have been, at fome period, expofed to the aërial acid, are covered with ruft. On the fuppofition that the wall is bafaltes, and its prefent form the work of nature, the individual ftrata, or ftones, could never have been expofed to the air. The ftones in the wall, without a fingle exception, are covered with ruft; confequently the wall cannot be bafaltes.

In the accounts of bafaltes found in Ethiopia, in Spain, Ruffia and Poland; in the Giant's Caufewav in Ireland, and on the ifland of Staffa; in the vicinity of Mount-Ætna, of Heckla in Iceland, and of the volcano on the Ifland of Bourbon; nothing which has been defcribed bears the leaft refemblance, in its form, to the wall. We read of pillars, bafes, arches, fhafts, cones, &c. formed of ftrata running perpendicularly or obliquely, but not *horizontally*. Thefe have not the appearance of having been formed of individual ftones by the induftry of man. They are not conftructed with uniform mechanical exactnefs. With all their regularity, they bear evident marks of the rude hand of nature.

In fome parts of Scotland great quantities of bafaltes are found, in fragments or fingle ftones, lying on the furface of the earth. The ftones in the wall, as well as thofe on the adjacent hill, may, it is acknowledged, be of a fimilar fpecies, and may have been thrown up by a volcanic eruption. They muft, however, have been collected, and placed in their prefent fituation, by the hand of man.

On a review of the whole, I cannot but continue firm in the belief (the experiments and opinions above-mentioned notwithftanding), that the wall is a production of human induftry and fkill.

About fix or eight miles from this wall another has fince been found, which is forty feet in length, four or five in height, and uniformly feven inches in thicknefs. Thefe ftones are all of one length, but of different kinds. Some are of the iron character, others of a light grey colour, and differing as widely in kind as in colour.

## ARTICLE VI.

ACCOUNT *of the* YELLOW FEVER *which originated on Board the* UNITED STATES SHIP GENERAL GREENE: *By Dr.* EDMUND THOMAS WARING, *in a Letter to the Editors of the Medical Repofitory.*

THE malignant fever which occafioned the unexpected return of the United States fhip General Greene to this port, in June, 1799, having difappeared, fhe failed on her fecond cruife the 23d of September following. She put into Cape François on the 8th of October, to repair damaged fpars, &c. where fhe remained until the 13th, when fhe again failed upon the cruife. From this to the 5th of April, 1800, fhe failed from, and returned to the Cape, four times. On the 27th fhe was ordered to the mouth of the Miffiffippi, to receive on board General Wilkinfon and fuite. She arrived on the 10th of May, and, on account of the General not being prepared to embark, was detained upon that ftation thirty days. During this time the crew were fubjected to all the inconveniences and anxiety which alternate fultry calms and violent ftorms, connected with a fituation which they were but little acquainted with, could not fail to produce.—On the 9th of June fhe failed for the Havanna, and arrived on the 22d. Here fhe remained until the 27th, when fhe proceeded for America. She arrived at the Chefapeak the 11th of July; thence, after a detention of three days, fhe failed for Newport; and, on the 21ft, was moored in Newport harbour.

During this lengthy cruife, which was performed in a variety of climates, in fituations extremely unpleafant and unhealthy, and in which confiderable and fudden changes of weather were experienced, the crew continued unufually healthy. Agreeable to the ftatement of the furgeon, fome cafes of bilious fever occurred previous to their arrival at the Chefapeak, all of which were controuled by ufual modes of treatment, and no cafes of fatal termination had taken place at that time. Every cuftomary method of preferving purity of air, and the health of feamen, had been affiduoufly obferved. The fhip was freely ventilated, fcoured, white-wafhed, fprinkled with vinegar, and the nitrous fumigation, particularly recommended by Drs. Smyth and Patterfon, was frequently excited between decks. But notwithftanding all thefe precautions, and the ftill more favourable circumftance of her arrival in a more northern latitude, there was one man attacked, on the day of her leaving the Chefapeak, with a highly malignant fever, which terminated fatally on the fifth day; and, on the day after his attack, another was feized fimilarly, and died in eighteen hours. Five others were attacked about the fame time, but with lefs virulence. They all foon recovered. —The two above-mentioned cafes were the only inftances of mortality previous to her arrival at Newport; and as they were ftated in the furgeon's report to the Town Council thereof, it was contemplated to impofe a quarantine upon the fhip. But as there remained no recent cafe of the fever, and only three or four of the crew indifpofed, it was finally concluded to have a floop provided, remote from the town, for the accommodation of fuch others as might difcover fymptoms of the difeafe.

As I had been appointed to attend the invalid feamen in the Navy-Hofpital at this place, I was, accordingly, called upon to attend thefe men. I vifited them on the 23d, the day they were conveyed on board the fhip. I found one labouring under a chronical complaint, two with a diarrhœa, accompanied with little fever, and a fourth a convalefcent from yellow fever. The three laft recovered fo fpeedily that they were difcharged on the 29th.

The favourable termination of thefe cafes, and no others occurring, for a few hours fatisfied thofe minds which had apprehended danger. But a fifth man, with fymptoms of a highly malignant fever, was fent from the fhip after fhe was hauled afide the wharf, on the very day after thofe three were difcharged. He complained of pains in his head and loins, with univerſal ſoreneſs, and oppreſſion about the præcordia, with nauſea. He was a little comatoſe, his pulſe quick, but of little momentum, and his body extremely warm. On the ſecond day the adnata of his eyes, as well as his ſkin, became of a yellow complexion; and, in the evening of the ſame, he began to vomit and purge abundantly of a dark liquor. His diſtreſs increaſed with the duration of the diſeaſe; and, on the third day, his body became interſperſed with livid ſpots. He died in the evening, with extreme agony.

From this date, every ſecond, third or fourth day, I had one or two applications. They were all attacked with the characteriſtics of the ſame diſeaſe, with only the difference of degree in virulence. The immoderate uſe of ſpirituous liquors, with but two or three exceptions, was the apparent exciting cauſe of the diſeaſe.

As the ſick were attended under a great diſadvantage, in a place ſo inconvenient as that provided for them, and no inſtance had occurred wherein the attendants contracted the diſeaſe, they were admitted into the houſe which had been occupied as a temporary hoſpital in the town. Two caſes of death in it ſoon, however, excited ſome alarm, which was much increaſed by an inhabitant of the town, who had been employed on board the ſhip, being attacked with the diſeaſe, and dying on the 15th of Auguſt, after an illneſs of five days. In conſequence of this, the invalids in the hoſpital were removed into a houſe remote from the town, and the ſhip, which lay at the wharf, was hauled off into the ſtream.

Notwithſtanding theſe prudential proceedings, other inhabitants who had worked on board the ſhip, and, in particular, one young man and two boys who bathed near her at the time her bilge-water was pumped out, were attacked with the diſeaſe, and died.

It is impoſſible to reduce to ſatisfaction the opinion that all the caſes were derived from the ſhip, ſince ſome occurred wherein the patients had no communication either with the ſhip or any who had had the diſeaſe. They have been obſerved in but few families, moſt of which are not remarkable for cleanlineſs; whilſt others, contiguous to them, who cheriſh this great preſerver of health, and enemy to infectious diſeaſes, have not been infected. In particular, the family of a gentleman whoſe houſe is at the upper extremity of the wharf, and the neareſt to the place where the ſhip lay, have enjoyed perfect health; and individuals of the affected families were attacked, and died with the diſeaſe, a conſiderable time after the removal of the ſhip, and the ſick who were in the hoſpital; ſo that, I conceive, it may be an admitted preſumption to conſider the diſeaſe, as it appeared in ſome of theſe families, to depend upon the atmoſphere which immediately ſurrounded them being highly contaminated, and if not conveying the cauſe generated from materials within its limits, to have been highly inviting to the introduction of foreign peſtilence. Similitude of diſeaſe will, no doubt, favour the latter in many minds, and particularly in thoſe who are advocates of the opinion of foreign importation of yellow fever, ſince it appeared on board the ſhip previous to her arrival; whereas, the inhabitants of Newport were exempt from it for three weeks after, and it then appeared among thoſe who had either imprudently worked on board of her, or went within the probable ſphere of infection. But, on the contrary, it is obſerved, that no tranſient viſitors, or occaſional attendants, have contracted the diſeaſe upon the principle of a ſpecific contagion.

The number of inhabitants who have died is eleven, and two caſes ſtill remain under treatment. One of theſe is father to two lads who died of the diſeaſe three weeks ago, and, from report, will probably not recover. Of nineteen who were ſent to the hoſpital, ten were ſeriouſly attacked, of whom ſix died. At preſent there are nine under care.—Soon after the offenſive filth, which collected between the ſhip's ballaſt, was with it removed, and the ſhip properly cleanſed, no inſtance of the fever occurred on board of her.

The only mode of treatment which appeared to be productive of ſalutary effects, both in the town and hoſpital, was the early adminiſtration of a cathartic, commonly of calomel, with jalap or rhubarb; and, by a repetition of ſmall doſes of the calomel alone, to produce as ſpeedy a ſolution as poſſible. Evacuations by the bowels, by means of glyſters, and the application of bliſters on the legs, between the ſhoulders, and the præcordia, as ſymptoms indicated, were great auxiliaries during the mercurial courſe. Emetics did not anſwer any good effects; neither did the early and extreme irritability of the ſtomach appear to warrant them. The bark and other tonics required great caution in their uſe. They appeared to aggravate the ſymptoms if adminiſtered previous to convaleſcence, and increaſed much the diſtreſs of the patient if given by mouth.

*Newport (Rhode-Iſland)*, *October* 2, 1800.

## ARTICLE VII.

*An* ACCOUNT *of* DISEASES *at* WILMINGTON *(Delaware), in the Summer and Autumn of* 1800; *of the* DISEASE ORIGINATING *on* BOARD *of the* UNITED STATES SHIP GANGES; *and of a* DISEASE ARISING *from the* EFFLUVIA *of* HUMAN EXCREMENTS *at* NARBONNE, *in* FRANCE: *Communicated by Dr.* JOHN VAUGHAN, *of Wilmington, to Dr.* MILLER.

DEAR SIR,

IN compliance with your requeſt, in your letter of September 23d, I have obtained an account of the malignant diſeaſe which exiſted on board the United States ſhip Ganges; and have received an intereſting article, from a French gentleman, reſpecting an indigenous malignant fever in Narbonne, which I ſhall preface with a ſummary of our febrile diſeaſes of this ſeaſon.

The early part of this ſpring was remarkably cool and uniform; but the leading features of our diſeaſes indicated an unfavourable conſtitution of the atmoſphere.

Cynanche trachealis, as mentioned in Med. Rep. vol. iii. p. 339, formed the prelude, and its ſucceſſors were of an equal grade. The ſmall-pox was more general than it had been for many years, and exhibited a degree of malignity unprecedented here. By inoculation it was not fatal, but more inflammatory than uſual. A number of children had convulſive fits, and ſome the confluent form of the diſeaſe; and, in the natural way, it was almoſt uniformly confluent, and very frequently fatal. In ſome caſes the puſtules were black, the extremities cold, the patient comatoſe, and medical efforts entirely uſeleſs.

The ſmall-pox was ſucceeded by glandular ſwellings, eſpecially of the ſubmaxillary glands, and various intumeſcentiæ. In children this grade of diſeaſe was in the form of urticaria, and in grown perſons it was eryſipelatous or herpetic. In the caſe of one lady it was an univerſal herpes farinoſus. Her parents firſt attributed it to poiſon, next to a ſurfeit, and ſhe was ſent into the country, to be cured by a change of air and milk diet; but, at the expiration of three weeks, ſhe returned without relief, and was cured by a courſe of mercurial alteratives, with occaſional cathartics.

In the beginning of June the difeafe in children advanced to ulcerations of the mouth and throat, bordering on cynanche maligna; and in grown perfons it became a fcarlatina, attended with great anxiety at the præcordia.

Toward the middle of June the weather became warmer, with frequent thunder-gufts, and the revolutions of the atmofphere were accompanied with a modification of the prevailing difeafe—changing the feat of action to the inteftines, and releafing the fkin and lymphatic fyftem in a confiderable degree. Children were attacked with diarrhœas and choleras, and grown perfons with diarrhœas and dyfentery. Children, however, were the general fubjects of difeafe, and very few of the fecond fummer, or of one year and upwards, were exempt, while thofe under that age were undifturbed.

July commenced with exceffive heat, and the temperature ranged from 85 to 91 deg. with occafional thunder-gufts, throughout the month. Inteftinal difeafes continued exceffively violent, and frequently fatal in children. On the evening of the 14th inftant fix of my family were attacked with inteftinal fever, without any manifeft exciting caufe.

During this month there was a peculiar tendency to local inflammation. Several flight injuries produced violent inflammation and pain, and fymptoms of gangrene. In a cafe of fiftula in ano, in a healthy man, the operation was fucceeded by alarming fymptoms, and gangrene was, with difficulty, prevented. I was confulted in the cafe of a lady, a few miles diftant, who had tetanus from a flight prick of a needle in the wrift. She was cured by wine.

A few cafes of intermittent and remittent fevers occurred in the latter part of this month, and fome of the latter were of a ferious complexion. The moft violent cafe occurred on the 19th. A Mr. —— was attacked with fever: pains of the head and back, fuffufion of the eyes, delirium, and oppreffion of the præcordia, pretty foon fucceeded. I faw him the fame evening, and drew twelve ounces of blood from the arm; and as he had great pain and tormina of the bowels, I gave alkaline laxatives in large quantities. A profufe difcharge of black, granulated, fœtid matter, foon came on, which excoriated the verge of the rectum, and gave him great uneafinefs. Imputing the excoriation to an acid, I directed injections of weak foap-fuds every half hour, and the effect anfwered my expectation. The nature of the difcharge was changed, and the tormina relieved; but when the acid was neutralized, the alkali of the foap became irritating, and was difcontinued.

The indication of the soap-injection was twofold—to neutralize the acid forming septite of pot-ash, while the oil of the soap was disengaged to sheath the tender coats of the intestines.

On the 20th those symptoms were renewed, during the exacerbation of the fever, and relieved by the same remedies, which continued to be the cure for four days: after this he speedily recovered.

The first day of August the thermometer stood at 91 deg. but fell to 78 the next day, and rose from 73 to 85 during the month. This variation of temperature, with diurnal fogs, produced an immediate revolution in our disease. Affections of the bowels ceased, and the arterial system became the seat of disorder. The small-pox unhappily recurred, in the suburbs of the town, in some poor families, with its former malignancy. Several died, but a few who were inoculated succeeded tolerably well. Towards the middle of the month intermittents became numerous and general beyond precedent, and remittents proportionably violent.

Mr. W. an old and respectable inhabitant of this town, was attacked with fever on the 12th, but was up, more or less, every day, until the 16th. In the morning of the latter his fever assumed a more determined form, with pain of the head and irritability of the stomach, when his physician bled him, and gave a cathartic. A profuse discharge *per anum* succeeded, of a claret-coloured matter; his extremities became cold; his pulse imperceptible, with great oppression at his breast; and he expired, at eight o'clock P. M. without a struggle; in fact, he was some time dead before it was discovered: the attendants thought him asleep.

On the 18th I visited Mrs. H. in a bilious fever. Her skin was yellow, stomach irritable, pulse feeble, and tongue striped with purple and yellow. She died on the 25th.

The 24th, the ship Alexander, Capt. Davy, arrived here from the Spanish Main, last from the Havanna, in a sickly condition; but she was remanded back to the Delaware, to seek for another port.

September preserved the fogs of August, and was still more temperate—the temperature of noon varying from 63 to 84 deg. and the mornings and evenings about 10 deg. less than noon. Remittents were more frequent, and more of them of a high grade.

Mrs. C. had black-vomit, checked with magnesia. Her sister, in the same house, had scarlatina, and her mother and husband intermitting fever.

J. W. had bilious fever, with depressed pulse, nasal hæmorrhage, cold extremities, coma, blackness of the lips and tongue, and suffused eyes. Cured by one bleeding, blisters and alkalies.

A. O. had bilious fever, with depressed pulse, suffused eyes, &c. Cured by two bleedings, &c.

I. G. fever, with suffused eyes, pains of the head and back, constipation of the bowels, cold extremities, with an oozing of dark blood from the gums and bowels. Once bled, &c. and recovered.

On the 21st the equinoxial storm commenced, and continued until the 29th, which, like the West-Indian hurricanes, arrested our febrile disease in the height of its career. But, what is somewhat remarkable, there were a number of persons relapsed into fever the day on which the weather cleared. Since that period we have had but few complaints.

Having said but little on the treatment of the preceding disease, in any of its forms, I may now add, that I have but little to say. Being satisfied of a prevailing constitution of atmosphere, the protean shapes of the disease did not mislead me from the principle of its sameness: and whether it was cutaneous, intestinal or vascular, the remedies were the same—varied in proportion to circumstances. If there were inordinate action of the arterial system, or oppression of the heart and blood-vessels, I used the lancet until the excess of action was removed, or the heart and arteries released from the surcharge of blood. In several cases in which the pulse was depressed, the patient comatose, and labouring, as it were, in the last struggle for life, the loss of a few ounces of blood gave him new vigour, and diffused the concentrated excitement. Blisters were also highly serviceable. The forms of alkalies generally used were the carbonates of pot-ash and lime, the sulphate and tartrite of soda, the tartrite of pot-ash, castile soap, and ammoniac. These, with small doses of calomel, were my universal alteratives and febrifuges.

This practice was no less simple than successful. The only patient I lost with fever was an old lady, upwards of eighty years of age; and she must soon have died from the ordinary course of nature. And I am persuaded, that Dr. Mitchill's recommendations of the use of alkalies in fevers will be the means of saving many useful lives. That an acid prevails in intestinal fevers there can be little doubt, and I lately met with a case which serves to illustrate it. A child, labouring under a diarrhœa, swallowed a cherry-stone, which it could not void *per anum:* on extracting the stone with a pair of unpolished silver forceps, they were beautifully coloured of a purplish yellow by the acid.

One fact which merits notice in the history of the day is the disappearance of our birds, in the months of June and July especially. The cherry-trees were undisturbed by the common aërial robbers; the marshes were deserted by the red-winged chirpers; and the hedge warblers fled to some more friendly clime. Whether this desertion of the birds was owing to the presence of the locusts, or the state of the atmosphere, I am at a loss to determine: but the coolness and dryness of August and September may possibly have preserved us from an epidemic malignant disease. Our sources of miasmata are principally artificial; and most of our gutters, in the low parts of the town, being paved by the police, there were not sufficient sources of putrefaction to perfect the evil. Moisture and heat are the requisites of putrefaction, and both of these agents were suspended, in a considerable degree, after the first of August. One fact, which serves to characterize the grade of our morbid cause, is the circuit of our fogs: instead of soaring over the body of the town, to the hills, as in ordinary cases, or grovelling over the south-western flat, as in 1798, it took a circuitous route along the south-eastern level fronting the Delaware, and extending to Brandywine; and I believe not a single house escaped. It was sporadic over the town. Another singular circumstance is, that the French, who escaped the fever of 1798, were generally affected this season. Mr. Webster, in his History of Pestilence, mentions a variety of cases of pestilential diseases affecting certain descriptions of persons at one time, and exempting them at another; also, that it sometimes passed one town, and seized another contiguous. Such has been the fact in this neighbourhood. There is a small village, five miles distant from this, on the borders of the marshes, in a direct line between this and Christiana village, and it has been unusually healthy this season, while Christiana village was generally infected with bilious fever.

The experience of this season has, at least, established one fact, *i. e.* that yellow fever may exist without the subtle poison of contagion. Two of our medical gentlemen acknowledged to me, that they would not have hesitated to denominate some of the afore-mentioned cases *yellow fever*, if they could have been traced to contagious origin, or if the real yellow fever had been prevalent at the time. Those gentlemen are both celebrated for their candour, but their opinions are influenced by a firm belief in the doctrine of specific contagion.

We had an alarm of contagion this season. A poor woman received a trunk of clothes from the West-Indies, which was the bequest of her son, who had died with the yellow fever. The hapless mother carelessly washed the contaminated clothes, to the great distress of her friends and neighbours; but, as good luck would have it, neither the poor woman nor her neighbours were sufferers from her imprudence. How long this unhappy dread of contagion will continue to distress mankind I cannot determine; but I hope the illusion will be removed by the experience of our naval physicians. I have received a letter from Dr. Hanson Catlett, of the Ganges, which is important testimony on this subject, as follows:

"*Newcastle, September* 29, 1800.

"Dear Sir,

"With pleasure I comply with your request to be informed in what manner the fever was introduced, or made its appearance on board the Ganges. If this will afford any useful information, or tend, in any manner, to do away the very mistaken opinion, that this fever ever takes place, in any considerable degree, where the climate, and every other circumstance, does not favour its progress, I shall be more than doubly rewarded for the small trouble I take in complying with your wish.

"For six weeks after our arrival on the station, the crew were remarkably healthy. Early in August the ship lay several days in the Havanna, which harbour is much confined with hills and castles. We were then but a few days at sea before we went into the harbour of Matanzes, and remained there about a week. Here also we wanted that free circulation of air which we enjoyed at sea: the heat was, consequently, more intense, and the debilitating and pernicious effects of the climate more prevalent: the height of the sickly season was also coming on.

"None of the ship's company, except myself, had the least intercourse with other shipping. I was sometimes called upon to visit sick persons on board merchant vessels. About the 14th of August several of the men were complaining of headache, weakness, and want of appetite. Capt. Mullowny was attacked with violent pain in his head and back, and a high fever. John M'Guir (marine) complained of symptoms very different—great prostration of strength, vomiting, and pain about his breast. He was a man of a debilitated habit. With Capt. Mullowny the most powerful depleting means were used, to which his fever yielded on the second day, and on the third the pains entirely subsided. To M'Guir I gave stimulant medicines, and applied blisters, without effect. His extremities remained cold, and vomiting continued, until he died, on the 17th, with the black-vomit, which was the first symptom that gave me any apprehension of its being a case of yellow fever. Our sick list was now increased to ten patients, a number it had not before known: the surgeon's mate and myself were added to the number; and what passed until the 19th I was unconscious of. We had now arrived again in the Havanna: my fever left me, and I was supported from my bed to the hammocks of the sick, who were increased to eighteen. The symptoms were become more violent; fifteen were sent on shore to the hospital, of whom seven died in three days. New cases were produced almost every hour, and it was determined that we should fly the climate, as the only means of saving any part of the crew.

"On the passage home, our sick list contained, generally, from twenty to thirty. To all evacuant medicines were given, and those of full habit I bled. We lost on the passage ten—since our arrival three—in all twenty-one—and left at the hospital, in Havanna, eleven.

"The great effects of the change of climate I think worthy of observation: before we came on the coast of America we had thirty patients; and, on our arrival, there were but three or four cases of fever.

"I discovered no instance of personal contagion. Those who were constantly among the sick were not affected in greater proportion than those most distant from them; nor was there an instance of the disease spreading from the sick after their being landed.

"With respect to progressive debility, languor, lassitude, and loss of complexion, they were evident in many, previous to the occurrence of any malignant symptoms. I did not discover any premonitory symptoms: our first attacks were less violent than they afterwards became.

"To describe all the various forms and complicated symptoms of this disease would be tedious. If you can collect from this the information you were desirous of obtaining, you will excuse my not giving you a more particular account at present. I am, &c. HANSON CATLETT."

This communication of Dr. Catlett is conclusive, on the origin and non-contagious nature of the disease on board the Ganges: and the disease which lately existed on board the ship Delaware, was equally limited in its nature. Dr. Anderson, of that ship, informed me that the disease unquestionably originated on board, in the harbour of Curracoa, while the inhabitants of the island were perfectly healthy. As soon as the nature of the disease was known, they put to sea, in hopes of receiving advantage from a free circulation of air; but the sick list increased daily, and they returned to the harbour of Curracoa in a much worse condition than they left it. Forty sick were then landed; and though there were no restrictions in intercourse with the inhabitants, there was not a single suspicion of contagious influence. They, however, were not released from disease until after their arrival at Newcastle.

Dr. Anderson promised me a minute history of their disease, with its attendant circumstances; but, returning to sea sooner than he expected, I have not had the pleasure of receiving his written statement on the subject. I do not recollect the precise mortality of the disease, but I think it was not less than twenty deaths.

To these two indisputable testimonies of the origin of yellow fever on board of ships, I may add one, not less unequivocal, of its arising from human ordure:

"In the summer of the year 1783, M. Faure, a merchant of Narbonne, in Lower-Languedoc, in France, bought a house which had previously been occupied as an anatomical hall; and, being desirous of having a cave dug in the cellar, employed three men to do it. In digging they came to the wall of a necessary, which had been the common receptacle of the remains of human subjects, and which was covered in to prevent detection; and, on extracting a few of the stones with their picks, an offensive putrid matter rushed through the aperture, and suffocated them. M. Faure, going to see the workmen, descended but two or three steps before he fell senseless. The neighbouring people, perceiving the putrid smell, went to the house, and, of nine that entered to bring out the sufferers, six died. M. Faure was removed, but died in four days; and the unfortunate labourers survived their release but a day or two.

"In the mean time, the smell increased to such a degree as to create a pestilence, and the neighbours were obliged to remove; but a great many of them died. The Mayor of the city being informed of the circumstance, had the cellar filled up, and the houſe cloſed. But the malignant effluvia had pervaded the town, and a great many died with the *peſtis*. The diſeaſe was attended with the black-vomit, but not communicated by contagion."

The writer of this article, Mr. P. C. Varlé, lived with the former owner of the fatal houſe during the calamity, and was accurately informed of the ſtate of the poiſonous privy, and was attentive to the progreſs and nature of the diſeaſe.

This is the moſt deciſive fact that I have met with on the origin of peſtilence. The circumſtances of the caſe preclude all cavilling, and muſt be admitted as concluſive. It will tend much towards the eſtabliſhment of Dr. Mitchill's theory of the *oxyd of ſepton*, if he can ſurmount the old doctrine of alkaline, or ammoniacal gas, being the principal product of animal putrefaction. Nitrogen (ſepton) is acknowledged to be evolved in abundance by the putrefaction of animal ſubſtances, and to combine with hydrogen in the formation of ammoniac: but it is not unphiloſophical to ſuppoſe "that a modification may take place, and the nitrogen (ſepton) combine with oxygen in the formation of the gaſeous oxyd of ſepton."

The predominance of an acid in peſtilential diſeaſes is pretty well aſcertained by the beneficial effects of alkalies, independent of every other conſideration. I have been informed that Dr. Monges, of Philadelphia, who was celebrated in the *fever* of 1798, made uſe of alkalies in large quantities, and that he ſeldom failed in checking black-vomit with magneſia. And if Dr. Mitchill ſhould be miſtaken in the preciſe nature of the peſtilential acid, he has, at leaſt, opened the door of inveſtigation, and found the clew that leads to the peſtiferous labyrinth.

I am, with much eſteem,
Your friend and humble ſervant,

JOHN VAUGHAN.

*Wilmington, October* 20, 1800.

# ARTICLE VIII.

## SOME OBSERVATIONS RELATING *to the* SENSE *of* HEARING: *Addreſſed to the Editors of the Medical Repoſitory, by the Rev. Dr.* PRIESTLEY.

GENTLEMEN,

WE know ſo little concerning the ſenſe of hearing, and, indeed, concerning ſound in general, that the communication of any new facts, relating to either of them, may have their uſe, though, for the preſent, and, when ſeparately conſidered, they do not appear to throw any light on the ſubject. It is with this view that I take the liberty to lay before you the following obſervations; thinking it poſſible that other perſons may have made ſimilar ones, and that, by this means, ſomething of real value may, in time, be diſcovered.

Being accuſtomed to put a watch, and ſometimes two watches, under my pillow, eſpecially in winter, and ſometimes attending to the beating of them as I lie awake, I was ſurpriſed, about a year ago, to find only one watch under the pillow, when, judging by the ſound I heard, I thought there muſt have been two. Finding, however, that there was but one, I gave more particular attention to the phenomena; and, having repeated them more than a hundred times, I can, with certainty, ſay they were as follow:

1. Beſides the ſound that we may call *ticking*, produced by the ſtriking one piece of metal againſt another, I diſtinctly hear another ſound, coincident with it, reſembling that of a bell, but generally as at a conſiderable diſtance. It is, however, ſometimes louder than that of the ticking.

2. This additional ſound is generally a fifth, or an octave, lower than that of the ticking.

3. I ſometimes perceive two of theſe additional ſounds, differing in tone and intenſity.

4. This additional ſound is not the neceſſary effect of the ticking; for I do not always perceive it, and it has ſometimes frequent interruptions. Though the two ſounds, when both are hard, are always coincident, the interruption in the bell-like ſound is ſometimes regular, being heard every other beat, and ſometimes it is not heard for a conſiderable time together.

It is only with one of my ears, viz. the left, that I perceive this additional ſound, at leaſt very ſenſibly; and yet I cannot ſay that I hear diſtant ſounds any better with one ear than with the other. But if I ſtop my left ear with the end of my finger, I hear a conſtant undulating ſound, but none with the other; and the ticking of every watch is louder when held cloſe to the left ear than to the right.

6. This additional ſound is more diſtinctly perceived from one particular watch than from any other.

Submitting theſe ſingular obſervations to your conſideration,

I am, Gentlemen,

Yours ſincerely,

J. PRIESTLEY.

*Northumberland, May* 8, 1800.

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## ARTICLE IX.

*An* ACCOUNT *of the* EPIDEMIC DISEASE *which appeared in the* CITY *of* NEW-YORK, *in the* SUMMER *and* AUTUMN *of* 1800: *Communicated by* VALENTINE SEAMAN, *M. D. to Dr.* MILLER.

MY DEAR DOCTOR,

A DESIRE for fulfilling the requeſt of a friend, although not without its influence, is by no means the only reaſon for my drawing up and ſubmitting the following remarks upon our late autumnal fever to thy conſideration. A ſenſe of duty makes it neceſſary for me thus to hand in my mite to the hiſtorians of the diſeaſes of our country: peradventure it may give ſome little aid in their praiſe-worthy, though arduous undertaking; particularly as a variety of circumſtances have concurred in throwing a conſiderable ſhare of the complaint within the ſcope of my obſervation: furthermore, as the method in which my patients have been treated is ſomewhat different, and, as there is ſome reaſon to believe, more ſucceſsful, than what has been heretofore adopted, by thus communicating it, it may, perhaps, be of ſome practical uſefulneſs; at leaſt, it may gain a trial in unprejudiced hands, whereby its real value will be eſtabliſhed.

In the fore part of the 8th month (Auguſt) I was called to ſeveral caſes of irregular intermittent and remittent fevers.

Towards the end of the month applications confiderably increafed. Intermittents appeared now to be giving way. Febrile difeafes began to affume a more regular, uniform appearance, as will be prefently defcribed.

The 9th month (September) opened with a great accumulation of patients with this difeafe; indeed, fo rapidly did it increafe, that in the courfe of this fingle month upwards of ninety cafes of it came under my own particular attention.

In the firft part of the 10th month (October) people were ftill taken down with this difeafe, but not in fuch numbers as before. On the night of the 3d or 4th we had a froft fufficient to affect the leaves of a gourd-vine in my neighbourhood. On the night of the 6th there was again a flight white froft; fince which the weather has been more temperate (*i. e.* not fo cold). The difeafe did not fubfide immediately upon the appearance of froft, but continued for as much as ten days afterwards, viz. the 14th of this month; fince which I have not known of a fingle *decided* new cafe of it, and, indeed, but one any way fufpicious.

This fever came on, as fevers in general do, with chills, fucceeded by increafed heat, frequent pulfe, &c. but was attended with a difproportionate (if I may fo fpeak) pain in the head and back—that is, their pains feemed greater than what is ufually met with, in fevers of like appearance, in other refpects. The eyes were red, the appetite gone, fkin dry, tongue furred, &c.

Thefe fymptoms moft generally fubfided about the third day. The fkin then became cool, the eyes natural, pains abating, and that pulfe which, but a few hours before, beat from 80 to 130 ftrokes in a minute, now, in a great many inftances, funk down to 48, and, in one man, as low as 40: in a few days, however, they gradually returned to their natural ftandard of about 70.

With this fubfidence of febrile action, the patients generally complained of exceffive weaknefs, and frequently of naufea and great irritability of their ftomachs, which, in fome, was accompanied with puking of great quantities of a yellow bitter matter.

Befide the foregoing general fymptoms, many were affected with difcharges of blood, particularly from the nofe. Three, I now recollect, had bleeding from their gums; three had a two week's anticipation of their catamenia; and one raifed blood from his lungs.

Two of my private patients had yellow fkins, and the perſpiration of a third ſo ſtained his linen that his wife ſaid ſhe was not able to waſh the yellowneſs out of it.

The only one of my patients who died of this diſeaſe, during its prevalence this year, had, in its laſt ſtage, a dry tongue, covered with a brown ſcurf, and puked the coffee-ground matter. Beſides this one perſon, whoſe complaint proved fatal, I had an opportunity of witneſſing a like termination of three others, to whom I was called, in conſultation, a few hours before their end. From the beſt hiſtory I could gain from their attending phyſicians, the preceding ſtate of their complaints was like thoſe above deſcribed. Two of them became yellow, with brown dry tongues, and puked the coffee-ground matter before their death; the third appeared to die from mere debility, without any of thoſe ſymptoms of malignancy about him.

Of upwards of 150 perſons with this diſeaſe, whom I viſited, all of them, excepting one, reſided (or elſe had ſtores, wherein they were occupied during the greater part of the day) either in Pearl-ſtreet, or between that and the Eaſt-River. This one lived on the North-River ſhore, but lodged in a bed that had been immediately before occupied by a ſick perſon, who had been juſt taken with her complaint, after removing there from Cherry-ſtreet.

In the firſt ſtage of this complaint I gave from twenty to thirty grains of a powder, containing the proportion of one part of tartar emetic to thirty parts of calomel, with as much rhubarb, and double the quantity of prepared chalk, which generally purged freely, and frequently puked conſiderably, but without any violent ſtrainings. Its proving emetic did not appear, in the leaſt, to leſſen its effects upon the bowels. Sometimes, when the firſt doſe did not operate well, it was repeated.

The febrile commotion was, for the moſt part, conſiderably relieved by theſe evacuations. In the evening a draught of the ſpiritus Mindereri, with laudanum, was given, which often induced ſome ſweating, and generally procured a tolerable night's reſt. Afterwards my patients took ſmall portions of tartar emetic, with nitre, repeating the anodyne ſudorific draughts, with the ſemicupium, at night, till the violence of the fever ſubſided.

Some few were bled, and many who loſt blood ſpontaneouſly appeared to be benefited by it.

Upon the coming on of the ſecond ſtage of the fever, and whoſe approach was watched with the cloſeſt attention, immediately as the violence of action appeared to be giving way to an oppofite ftate of the fyftem, a ftrong decoction of Quaffia wood was begun with, and generally continued till the patient was recovered. I had formerly been in the habit of adminiftering the cold infufion of the bark in this ftate of the complaint; but having obferved that its ftimulating quality feemed to rekindle the immediate action of the arterial fyftem, inducing heat and hufkinefs of the fkin, &c. when given early, and not unfrequently difagreeing with the ftomach, even when deferred till a later period, I generally, nay, almoft uniformly, fubftituted a decoction of this fimple powerful bitter in its place, and I cannot but think with the beft effects: it appeared to ftrengthen without ftimulating, to brace the ftomach without exciting the fever.

The following is the manner in which the Quaffia was adminiftered: ʒj. of the fhavings of the wood was boiled in ℥xij. of water, till one third part had boiled away. A table-fpoonful of the ftrained liquid was given every two hours.

After two or three days, when the danger of re-exciting the fever was not much to be feared, and the ftomach was pretty fteady, the bark was fometimes given, and feemingly to good purpofe.

When ficknefs at the ftomach was troublefome, a plafter, containing a confiderable proportion of the effential oil of mint, was applied to the fcrobiculus cordis, which generally proved a remedy: however, in fome inftances it became neceffary to remove it, to give place to the more powerful operation of an epifpaftic.

In conjunction with thefe means, the moft rigid abftinence from all ftimulating drink and diet was adhered to. Nothing but bread and water was given as food; and water, with a piece of toafted bread in it, thin gruel, barley-water, or fomething of that kind, was the only drink, at leaft until the difeafe appeared to be fubdued. During convalefcency a more full diet was recommended.

Among the variety of queftions that the foregoing account might give rife to, the following may not be confidered as the leaft important: viz. Is this fever of the fame kind with that which has fo fatally fcourged our city for fome preceding years? If fo, why was it fo materially lefs mortal? Was it from the difeafe being milder in its nature, from a change in the difpofition of the atmofphere in our favour? Are we to hope that that heavy epidemic cloud which has fo dreadfully hung over us for thefe fome years paft is now going off, and that this feafon's difeafe was milder in confequence of the lighter influence of its paffing fkirt? Or, if the difeafe arifes from contagion, can it be affignable to its feeds, left from a laft year's prevalence, having degenerated, from having lain in a climate unfavourable for fupporting its original ftrength of malignancy? Or, finally, may its lefs fatality be afcribed to a difference in the mode of treating it?

In refpect to the identity of this feafon's epidemic with that of preceding years, I cannot, for my own part, entertain the leaft doubt. The part of the city in which it prevailed, the violence of attack, the degree of pain, the general fubfidence of the exceffive arterial action about the third day, the fucceeding paucity of circulation, hæmorrhages, yellownefs of the fkin, yellow fweating, coffee-ground vomiting, and death about the fifth or feventh day, all evince their being the fame. It is true, a very fmall proportion had the black-vomiting, and but few were yellow: however, black-vomiting, it muft be remembered, is by no means a neceffary fymptom of the difeafe—not much more fo than death itfelf is, as, in fact, it is almoft uniformly fucceeded by it: and even in regard to yellownefs of the fkin, every ingenuous phyfician muft acknowledge, that a fmall proportion only recover after it has taken place. It is highly probable to me, that a fuccefsful treatment is generally the means of preventing that appearance.

That the morbid influence of our atmofphere is moderating I am fully of the belief; but that the general recovery of my patients was owing *entirely* to the milder nature of the difeafe this feafon, I confefs I cannot but doubt. The following confiderations oblige me to think that fomething muft be attributed to the peculiarity of their treatment.

Firft, The only *one* that died was not prefcribed for till the third day of his complaint, and he neglected taking his medicine till the commencement of the fourth.

Secondly, Four perfons, thus treated, who were taken fick in houfes where perfons, under a different management, had previoufly died, all recovered.

Thirdly, By the accounts of deaths, as ftated by James Hardie, 67 perfons muft have died of bilious and of yellow fever between the 1ft of Auguft and 23d of October. Now, even admitting the death of my poor neglectful patient to have been owing to the inefficiency of this mode of treatment, ftill, if it has not been more fuccefsful than the various other methods as practifed throughout the city, we muft fuppofe that there has been, at leaſt, upwards of ten thouſand perſons ſick with this diſeaſe within that time—a number, I ſuſpect, far exceeding any one's calculation.

If this communication can be of any uſe to thee, I am rewarded for drawing it up. I muſt not cloſe, however, without begging an excuſe for the general egotiſm it poſſeſſes, which neceſſarily originated from my confining myſelf ſo cloſely to what came under my own particular obſervation. I may alſo be ſuſpected to have been too partial to my own method of cure. It may be that the milder nature of the diſeaſe was the *only* cauſe of the general recovery of the ſick; I can only ſay, that no one can more heartily wiſh that that may have been the caſe than thy friend,

VALENTINE SEAMAN.

*New-York,* 10*th month (October)* 30*th*, 1800.

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## ARTICLE X.

*On the* YELLOW FEVER, *as it appeared at* BALTIMORE *(State of Maryland), in the* SUMMER *and* AUTUMN *of* 1800: *Communicated by Dr.* CHATARD, *of that City, in a Letter to Dr.* MILLER.

SIR,

THE yellow fever, which formerly I have often ſeen and attended, both here and in St. Domingo, ſhall be the ſubject of my preſent letter. As it is not my deſign to give you a regular account of this diſeaſe, I ſhall omit all deſcription of it, and many other details which might otherwiſe be deemed neceſſary. If my obſervations have not deceived me, I can venture to aſſure you that the diſeaſe called yellow fever, and which has committed ſuch ravages, for many years, in the United States, is eſſentially a bilious fever—very often accompanied with a ſanguineous plethora—and ſometimes combined with nervous affections. Theſe nervous affections are more common in St. Domingo than in this country, and it is eſpecially in ſuch caſes that the cold bath is an appropriate remedy. It will readily occur that thoſe three ſtates of the diſeaſe require modes of treatment entirely different. The practitioner who can moſt certainly diſcriminate between theſe ſtates, with all their variety of complications, will be the moſt ſuccefsful in his practice. I might here properly undertake to deſcribe the ſymptoms belonging to each of the above-mentioned ſtates of the diſeaſe; but I decline this at preſent, becauſe it would carry me beyond my aſſigned limits, and becauſe theſe obſervations are addreſſed to a perſon who has often ſeen the diſeaſe. On this point I ſhall only remark, that it is not always an eaſy matter to diſtinguiſh an inflammatory ſtate of the ſyſtem from that ſanguineous turgeſcence produced by violent bilious affections on ſuch occaſions. In both caſes the face and eyes are equally red and ſuffuſed; but when this ſuffuſion is the reſult of bilious diſorder, pain of the head is more ſevere, the ſkin drier, the heat more pungent, the pulſe harder and leſs contracted, thirſt more ardent, and the tongue more foul. This is, indeed, a ſhort deſcription of the ſymptoms which characterize our epidemic fever of the preſent ſeaſon; and hence you will perceive the reaſon why I have ordered veneſection only in two inſtances of the prevailing epidemic, although, in that of 1797, at Fell's-Point, I had cured many by means of the lancet, as the learned Dr. Ruſh had previouſly done, by the ſame remedy, in the epidemic of 1793, at Philadelphia. That able phyſician enjoined copious blood-letting, becauſe he diſtinctly ſaw that the epidemic of that particular ſeaſon was accompanied with a real inflammatory diatheſis. Other practitioners have been leſs ſucceſsful in the uſe of this remedy than he was, and, conſequently, have contracted violent prejudices againſt it, merely becauſe it was employed in a different condition of the ſyſtem, or, in other words, where the ſanguineous turgeſcence was excited by bilious diſorder. Indeed, the celebrated Avicenna brought us acquainted, many centuries ago, with this diſtinction, by aſſerting, "*Sanguis eſt frænum bilis.*" Blood-letting is as pernicious in the bilious, as it is uſeful in the inflammatory condition of the ſyſtem.

Being, therefore, convinced that the prediſpoſing cauſe of our exiſting epidemic reſults from a load of bilious acrimonious matters lodged in the firſt paſſages, without any combination of inflammatory diatheſis, I direct all my attention, from the commencement of the attack, to the evacuation of the alimentary canal, and to the preventing of the abſorption of that deleterious matter confined in it, which, if once allowed to infect the maſs of circulating fluids, ſpeedily decompoſes the whole frame. Accordingly, if I am called at the firſt attack of the diſeaſe, I prepare my patient by copious draughts of chicken-water, barley-water, tamarind-water, or warm lemonade, to take an emetic in a form greatly diluted, as, for inſtance, a ſolution of three or four grains of emetic tartar in a quart of warm water, of which a tea-cupful is ordered to be taken every quarter of an hour until vomiting be induced; and, at the ſame time, the vomiting is promoted by large draughts of warm water, and continued, as long as it is deemed neceſſary, by an occaſional return to the uſe of the emetic ſolution. After the operation of the emetic I enjoin the plentiful uſe of either of the above-mentioned diluent drinks, at the option of the patient, for twelve hours. I then order a cathartic of Glauber's ſalt, or of caſtor-oil. Strict abſtinence from food is required, even although the patient ſhould have an appetite to eat. It commonly happens, after the operation of the cathartic, that the ſick find themſelves much better; and, if ſo, it is ſufficient to preſerve an open ſtate of the bowels by emollient clyſters, and by chicken-water, with wild ſuccory. But ſometimes the fever continues, vomiting comes on, and a burning ſenſation is felt at the ſtomach, attended with ſour eructations. In this ſituation I preſcribe ſmall doſes of magneſia, often repeated; a ſtrong decoction of barley, both for drink and food; and a wine-glaſsful of a weak decoction of columbo or gentian every ſecond hour. Sometimes I order a tea-ſpoonful of De Häen's ſedative potion to be taken every ſecond hour till the tumult abates, which uſually takes place in four or five hours, unleſs the diſeaſe go on to a fatal termination. It happens, now and then, that all theſe means prove unavailing; delirium and proſtration of ſtrength come on; and the ſkin becomes dry, and pungently hot. In ſuch a caſe as this I direct the warm bath, endeavour to excite ſweating, and to ſupport the ſtrength by giving wine-whey, or by a ſtrong infuſion of ſnake-root, taken warm. In the mean time I try emollient fomentations, and clyſters of like quality. If, to the alarming ſymptoms already mentioned, be added vomiting of black matter or of blood, ſtools of the ſame appearance, and eſpecially a ſuppreſſion of urine, the life of the patient is in the greateſt danger; and I confeſs that the remedies which I have hitherto employed have been ſo unavailing that I cannot undertake to recommend them in ſuch hopeleſs circumſtances. Perhaps it may be proper, on ſuch occaſions, to commit the patient to the efforts of nature, and to indulge every craving not abſolutely pernicious. In taking this courſe, I have had the pleaſure to ſee ſome recover.

The practitioners of this city made a frequent ufe of blifters, applied to the arms, to the legs, and to the epigaftric region. The object in applying them was generally to relieve the head, and to obviate the irritation of the ftomach. Thefe intentions were generally difappointed; and it was to be expected that fuch would be the event; for the vomiting and the delirium are produced by acrimonious matters lodged in the firft paffages, upon which a blifter can exert no action. Blifters, in my judgment, are not fuitable to this difeafe, except where there exifts a very obftinate fpafmodic conftipation, unconquerable by diluent and evacuant remedies. In this cafe, a blifter, applied to the lower belly, does wonders in refolving the fpafm by the continued irritation which it keeps up on the furface.

I cannot comprehend the advantages which are expected to be derived from the large and repeated dofes of calomel commonly prefcribed from the commencement of the difeafe. As a cathartic I cannot believe it to be the moft eligible. I can affert that it often operates in a very irritating manner, and that it frequently caufes evacuations debilitating and painful, which it is fometimes impoffible afterwards to reftrain. Such evacuations are fuccefsfully checked, on fome occafions, by emollient clyfters, by the preparations of opium, and by abforbents. Upon the whole, I cannot believe that this remedy poffeffes any fpecific power in this difeafe, as mercury; for, by diffolving the fluids, it co-operates with the deleterious and decompofing caufe of the difeafe, to deftroy the principle of life. Some medical gentlemen affure me that all their patients, in whom they can excite falivation, recover. If this affertion were correct, the yellow fever ought no longer to be the fcourge of American cities, and mercury, as an infallible preventive, ought to be vigoroufly and univerfally prefcribed. But, alas! on this, as well as on many other occafions, I fear our prejudices and miftaken obfervations deceive us. In this epidemic, I can affure you, it has fallen in my way to fee many perfons deftroyed by terror, under the impreffion that this difeafe was utterly incurable. And, indeed, the flight of phyficians from the city was not well adapted to remove fuch an impreffion.

Another prejudice, not lefs fatal, exifts with regard to emetics. Many practitioners fuppofe, as the ftomach is very irritable in this difeafe, that emetics muft be pernicious by increafing this irritability. But they do not confider that the irritation of an emetic is always lefs than that which is inceffantly kept up and renewed by the acrimony of bile and other contents of the ftomach, unlefs they fhall have been early evacuated by this remedy, whofe operation is neither violent nor of long continuance, when its ftimulus is blunted by a large quantity of warm water. Befides, why fhould we apprehend mifchief from an emetic in this difeafe, while we daily adminifter cathartics, with fuccefs, in dyfentery. The irritation of the inteftinal canal is as much to be dreaded in the one cafe, as that of the ftomach in the other.

Such, my friend, are the reflections concerning yellow fever which I wifh to communicate. I fhould be glad to offer to you fome opinions concerning the nature of the efficient caufe of this deftructive diftemper; but the whole of this fubject appears to be fo obfcure, that it feems advifable rather to keep filence than to hazard mere conjectures. This much appears to be certain, that hitherto no perfon has difcovered effectual means of extinguifhing the acrimony of the bile, which feems to act a very important part in this difeafe, and which, by its highly exalted acid or alkaline quality, excites, at firft, irritation of the ftomach, and, eventually, decompofition of the whole fyftem.

*Baltimore, October* 29, 1800.

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## ARTICLE XI.

## EXTINGUISHMENT OF PESTILENCE.

[Continued from page 97.]

### No. III.

*On the* EFFICACY *of the* VOLATILE ALKALI *to overcome* PESTILENTIAL FLUIDS; *fhowing the wholefomenefs of burning Foffil Coal in Cities: In a Letter from Dr.* MITCHILL *to* WILLIAM BLAIR, *Efq. Surgeon of the Lock-Hofpital, in London, &c. dated New-York, December* 18, 1800.

IT becomes me to make a grateful acknowledgment of the receipt of your excellent Effays on the new antifyphilitic remedies, and of the London Medical Review and Magazine you were fo polite as to fend me laft fummer. I ftill fufpect the gentlemen who attempt to cure, by acids, difeafes produced by poiſon, are not in the beſt train of inveſtigation; for we find, in America, that the ſeptic gas which excites our autumnal peſtilence is an acid—that dyſenteric evacuations contain an acid—and ſyphilitic, cancerous and malignant ulcers contain acids. I am, therefore, of opinion, that the adminiſtration of alkaline remedies is more agreeable to the method of nature.

It is well known to you, that ſince the foreſts of many parts of Europe have been cut down, the ſcarcity and dearneſs of fuel, in ſome cities, have become ſo great, that the uſe of wood, for the purpoſe of keeping up fires, has been generally diſcontinued. Inſtead of this material, in ſome places, peat or turf, and in others coal, have been dug from the earth, and ſubſtituted. And ſince the introduction of the latter, after the firſt oppoſition to it was overcome, an opinion has been very prevalent that coal is a wholeſome kind of fuel, and that there is ſomething very conducive to health in its thick and diſagreeable ſmoke. Its ſalubrity has thus been deemed more than an equivalent for its offenſiveneſs.

Still, though popular opinion was in favour of coal, men of ſcience have either diſputed the fact, or differed with each other as to the manner of accounting for it; and, in a complicated caſe, it is not wonderful they ſhould. In order to underſtand the queſtion, it is neceſſary to attend to the analyſis of coal by fire. This may be done by collecting the vapours of that inflammable ſubſtance, and examining their kinds and qualities. The Earl of Dundonald's method of making tar from it was a pretty good analytical proceſs. I remember to have viſited the manufactory of that noble and ingenious chemiſt at Culroſs, when the coal-tar was much celebrated for preventing the entrance of the pipe-worm into the timber of ſhips. The vapours exhaling from pit-coal, by ſlow combuſtion, were collected into cold chambers, and there condenſed. Theſe vapours were merely the thick common ſmoke proceeding from the fuel when a little ſmothered, or not burning clear. From the liquor obtained by confining and cooling them, was procured, among other things, by diſtillation, a large quantity of volatile alkali, or ammoniac. The inference, therefore, is, that mineral coal, while it undergoes the operation of fire, affords an alkaline vapour, which, in common caſes, is not collected into reſervoirs, but diffuſed through the ſurrounding air, where it exiſts as a conſtituent part of the ſmoke of cities.

The celebrated Iriſh philoſopher, Mr. Kirwan, who has made many experiments on various forts of coal, with great care, has proved, in a manner quite as fatisfactory, the formation of the volatile alkali from moft fpecies of that fuel, when fubjected to the action of heat. The atmofphere of towns, where coal is the general material for making fires, may be, therefore, confidered as containing a confiderable quantity of ammoniacal gas, or alkaline air.

Great cities are almoft conftantly enveloped in the fmoke of their own fires, efpecially in winter and in calms. Their inhabitants are in a perpetual fumigation; and, where coal is burned, the chief active material in this fumigating mixture is alkaline air. The inhabitants of London, Leige, and other places where fires are made of that article, are fubjected, daily and inceffantly, to fumigation with ammoniacal gas. Their philofophers ought to have attended to this part of the conftitution of the air in which they live: yet I do not know that they have difcuffed it properly. Its commonnefs is probably the caufe of its having been overlooked: yet the inhabitants of London have been thus fumigated for more than two hundred years.

It is the difpofition of the alkaline air employed in this fumigating procefs to unite with acids. In ordinary cafes, a fufficient quantity of carbonic acid gas is formed, during combuftion, to allay its caufticity, and to render it mild: therefore, the ufual form in which it exifts is that of the carbonate of ammoniac. But if an acid fhould prefent itfelf, for which this alkali has a ftronger attraction than for that with which it is already affociated, a combination with the new acid will take place, and the connection with the former be diffolved of courfe.

Now, in many cafes, fuch a ftronger acid does exift in cities, and frequently in the form of vapour or exhalation. Experiments and obfervations, made by refidents of New-York, have fhown that fuch acidity can be fmelled and tafted, that it corrodes metals, decompofes foap, curdles milk, effervefces with fixed alkalies, and imparts active qualities to the dews. Thefe acid exhalations are of a noxious and ftimulant nature, fince they are known to act as the exciting caufes of catarrhs, of dyfenteries, yellow fevers, and various other kinds of peftilential diftempers, often deftroying life in a fhort time.

Mr. Thouvenel has proved that the vapours exhaling from putrid fubftances are attracted by chalk, and are highly acid; and Profeffor Chaptal, of Montpellier, has repeated the experiment with a fimilar refult. This acid, which I have called septic acid, because produced ordinarily by putrefaction, has both the *property of corroding silver*, and of *exciting pestilential fevers*, when in the form of vapour, as the following account will show:

Martyn's abridgment of the Philosophical Transactions, vol. ix. p. 212, contains the case of Mr. Cox, surgeon at Peterborough, who tapped the abdomen to draw off the dropsical fluid remaining there, of a woman, a few hours after death, and was nearly killed by the poison of it. The included humours had reached to so violent a degree of corruption as to discolour the external parts with a green and livid hue; and, on flowing through the *silver canula*, *deeply corroded it.* On every spot where the least portion of this moisture had fallen, about the hands and fingers, angry pustules arose, which festered and broke; some of them healing soon afterwards, and others continuing very painful, and ending in universal convulsions, and great oppression of the vitals. The septic vapours which arose from this poisonous fluid were so subtle and malignant, that some of Mr. Cox's assistants, who were in the chamber only, and did not touch a drop of the fluid, were very much disordered, and afterwards had red and livid spots on their skins. This is a decided case of the local origin of pestilential fever from the vapours of a fluid which deeply corroded silver.

Pestilential acidity, it seems, may also exist in the atmosphere, after emission from putrid bodies of animals, from corrupting provisions, and from rotten excrements. And the production and emission of such mischievous acid vapours, in the vicinity of their sources, is one of the most frequent processes of nature. During the puerperal fever, the sourness of the exhalations from the patient has been so manifest in some cases, that fumigation with ammoniacal gas has been practised by Mr. Guinot, to overcome it. In many common malignant ulcers, as well as those of the syphilitic and cancerous kinds, the matter on their surfaces is of an acid quality. When the pus turns to vapour, in the crowded and filthy wards of ships and hospitals, there exists a sour exhalation also, which gives rise to infection and fever. Ammoniacal gas would be the proper substance for fumigations in such places. Its volatility makes it singularly proper for this purpose. It appears wholly accordant to the numberless other cases of wisdom displayed in the creation, that this light and penetrating alkali should be capacitated to reach every place into which septic acid gas may insinuate itself, and there to destroy its virulence. If ammoniacal gas is ever formed in putrefactive processes, its use and object are the neutralization of the same deleterious acidity.

In the second volume of Lowthorp's abridgment of the Philosophical Transactions, p. 525 & seq. may be seen the opinion of Dr. Charles Leigh, that the volatile alkali contributes to the stopping of the plague in Grand-Cairo. This discerning writer, on the nitrian water of Egypt, affirms, that the *nitre* which is the ingredient in gun-powder is not to be understood when we meet with that word in Hippocrates, Galen, Matthiolus, Diascorides, Pliny and Agricola; for all these authors mean, by that term, soda, or the mineral alkali. Sad mistakes have arisen, in the modern practice of medicine, from an ignorance of this distinction; when physicians, in imitation of the ancients, ought to *have prescribed soda*, have, instead thereof, dosed their *patients with salt-petre!* And, what is worse, these same pernicious mistakes are repeated, every day, with this *modern* nitre and its *acid!*

I now recollect a case of the exhibition of the latter, recorded in a book not often read. Poterius, the German chemist and physician, whose works are extant in a quarto volume, published, 1698, at Frankfort on the Maine, declares, that he has known *dysentery* to be occasioned "nimio et incauto *spiritus nitri* in febribus usu, pro extinguendo calore," (Centur. i. p. 54)—*by a too free and incautious use of spirit of nitre in fevers, administered with the view of extinguishing their heat.* This curing of fever, by inducing dysentery, is a match for the common practice of inducing a bubo by the acid of lunar caustic employed to cure a chancre!

Science is not always progressive: it is sometimes retrograde. I shall give you an instance of it. Etmuller had taught, long ago, in Germany, "that every febrile paroxysm arose from an acid;" and that an acid, engendered in wounds and ulcers, stirred up symptomatic fevers. The reader of the third chapter of the fifteenth section of his Compendium, will find near twenty arguments in favour of this opinion, by the old Professor of Leipzig. Sylvius (de la Boe), of Leyden, was convinced that the malignant fever of that place, in 1669, was caused by a prevailing acid. It is very reproachful that these doctrines have, of late, been so totally neglected or forgotten.

In some foul dissecting rooms, septic acid vapours have occasionally been so abundant as to cause dysenteries and fevers, and otherwiſe exceedingly to injure the health of thoſe who, by paſſing much of their time there, were particularly expoſed to them. *New* diſſectors are more liable to be incommoded by them than other perſons. Where many carcaſes are collected into a chamber, and are ſuffered to undergo the putrefactive proceſs before they are removed, as happens ſometimes in your metropolis, have you not known diſorders to be cauſed thereby in your cooler climate, differing but in degree from thoſe which ariſe in this town, during our intenſe ſummer heats, from corruping beef, &c. (See Med. Rep. vol. iii. p. 309 and 409.) If any of the laborious cultivators of anatomy in the Borough of Southwark, under the able directions of Cline and Cooper, for example, had ſuffered inteſtinal diſorders, had contracted ill health from reſpiring the peſtilential atmoſphere of their apartments, and had been obliged to withdraw awhile to the country to repair their exhauſted conſtitutions, would not this be evidence that that noxious SEPTIC acid vapour was ſuch as the old Egyptian embalmers uſed to correct by *their* nitre, or *our* ſoda, and which the modern chemiſts of France have found to be actually attracted by chalk, and, on obtaining it from that ſubſtance, to wear the altered face of the NITROUS? And would not ammoniacal gas neutralize and overcome it?

Two facts are, in this inquiry, rendered plain enough for any body to underſtand: firſt, the evolution of ammoniacal gas from coal-fires; and, ſecondly, the extrication of ſeptic acid gas from corrupting ſubſtances. The former of theſe, by its neutralizing power, tends to render cities healthy, by overcoming the noxious and peſtilential quality of the latter. Yet here a queſtion occurs to me. As the ſalt called nitrous ammoniac is the offspring of the two airs, may not the gaſeous oxyd of azote be one of its products, by natural or accidental decompoſition, and thus ſometimes abound in the atmoſphere?

Cities where coal is burned (I do not mean charcoal) ought to be free from the ſeptic poiſon which excites fevers, in proportion to the quantity of ammoniac ſent forth into their atmoſphere. There can be little doubt that this is the fact. In England and Scotland, wherever this material is employed as fuel, infectious diſtempers have become leſs prevalent; though, notwithſtanding its alkaline vapour from local cauſes, the ſeptic virus may ſo predominate about the bodies, in the clothing and habitations of certain perſons, as to cauſe malignant fevers of various types. The cities in the Netherlands and Germany, where coal is employed, have been less ravaged, of late, by pestilential diseases, than formerly. The city of Richmond, in Virginia, has been referred to, by some sensible observers, as an example of the febrifuge operation of the smoke of coal; the febrile ailments of its inhabitants having greatly lessened since their fires were generally made of that material.

When modern improvements are taken into consideration, it would be improper to ascribe the greater healthiness of cities now-a-days to their alkaline smoke *alone*. Greater regard to personal cleanliness, the introduction of better water, the more general use of soap, a more complete system of removing nuisances, all contribute toward lessening the mortality consequent upon the accumulated filth of former times. Among these, ammoniac acts not by carrying out of town any of those baneful productions, but by rendering them harmless in or near the places of their origin. Much good may, therefore, be expected from the general use of coal, in process of time, in the large cities of America.

The antiseptic quality of ammoniac has been proved, half a century ago, by Sir John Pringle, who says that the volatile alkali, so far from being dreaded as a deleterious part of corrupted bodies, is rather a corrector of putrefaction; though I find it employed for preserving animal substances from putrefaction as long ago as 1695. Blancard, the anatomist, in his treatise on the art of making preparations (De Balsamatione nova Methodus, § 5), recommends the preserving of dead bodies by means of rectified spirit of wine, mingled with a *fourth or fifth part of spirit of sal ammoniac distilled with quick-lime* (caustic volatile alkali); for in that way they may be kept a great length of time (diutissimè conservantur). He particularly mentions, that the delicate anatomical preparations of the incubated egg can be nicely made with this liquid, and be preserved fit for use and instruction at all times.

However, the good to be expected chemically from ammoniac, and, indeed, from the other alkalies, will be determined chiefly by the acidity present, and threatening, or actually working mischief. Now, besides the cases in which I believe an acid to be a noxious agent in the living body, Hufeland is convinced of the fluid acidity of the lymph in scrophula—the French Encyclopædists of the concrete acidity of the stone in the bladder—and others of the existence of lithic acid with ſoda, in the chalk-like matter of gout; and of another kind of acid in the pus of fever-producing ulcers. From ſuch correct authorities as theſe you may learn more than

> Omnia quæ, Phœbo quondam meditante, beatus
> Audiit Eurotas, juſſitque ediſcere lauros—
>
> VIRG.

Though ſome parts of the ſubject muſt be inquired into to a greater depth and extent. In this arduous undertaking I hope much from your helping hand, and from your continued exertions as a fellow labourer with us; remembering always that I remain reſpectfully, &c.

SAMUEL L. MITCHILL.

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## ARTICLE XII.

CONJECTURES *concerning the* ACTION *of the* CONTAGION *of* SMALL-POX, *and of other Diſeaſes which only once attack the Human Body: Addreſſed to the Editors of the Medical Repoſitory, by an anonymous Correſpondent.*

*Fairfield County (Connecticut), March* 10, 1800.

GENTLEMEN,

ENCOURAGED by an invitation that extends to all, I ſhall offer to your conſideration a few obſervations on the ſmall-pox, but which will generally apply to ſome other exanthemata.

Why the ſmall-pox never returns after one has once been carried through it, and why it is ſo much ſeverer when received from natural contagion than by inoculation, are queſtions that have conſiderably been agitated in the medical world.

The doctrine of excitability is univerſally underſtood: but I have long thought that it was a different thing in different parts of the body. Dr. Brown, with a confidence rarely obſerved in eminent productions, does, indeed, conſider it as one undivided property over all the ſyſtem. But whoever conſiders, with candour, that opium and fulphate of foda, though applied to the fame organs, produce different actions—or that mercury, tincture of cantharides, bark and alcohol, all are ftimuli, yet each has a peculiar effect, will, I believe, find ferious difficulties in fupporting that theory.

Almoft every organ of importance is poffeffed of branches of *different* nerves. Why this deviation from the fimplicity of nature, if excitability be the fame in every part of the nervous fyftem? But Dr. Tracy's communication, while it exhibits a curious fact, adds an almoft undeniable proof of the diverfity of excitability. Affuming the doctrine of varied excitability as a fact, I believe moft phyficians will think it poffible that one branch of excitability, or rather the fufceptibility of impreffion from one peculiar exciting caufe, may be deftroyed without deftroying the general excitability.

Mr. Hawkins,* in his voyage to Africa, loft his fight by viewing a veffel at a diftance through a glafs. Boerhaave† fays, fight may be deftroyed by intenfe light. But, gentlemen, I need not prove to you that a peculiar excitability may be deftroyed by a powerful impreffion of its appropriate ftimulus. Thefe things premifed—

I fuppofe there is, in every living human body, a peculiar excitability implanted, upon which variolous matter, and almoft only that, can act. This peculiar excitability I fhall term variolous excitability. In inoculation variolous matter is introduced, and commences its action. The firft action refulting feems to be an increafed, but peculiar action of the fecerning veffels: a puriform matter is formed, which, when oxygenated, becomes variolous contagion: a part of it is abforbed, and carried to every part of the fyftem: a fever is produced: a new action takes place on the furface: and an eruption is formed. In the puftules variolous matter is alfo formed, which being abforbed, and carried into the fyftem, produces the fecondary fever. If the mafs of variolous excitability has been large, the more fevere would be the primary fever and eruption. The abforption might be greater; and, at any rate, would undoubtedly be amply fufficient to deftroy the variolous excitability: for if an exceffive degree of found or light can deftroy the auditory or optical excitability, why fhould not the conftant and increafing action of the contagion in the inoculated part, and the abforption of matter fufficient to give the difeafe to fifty thoufand people, deftroy the variolous?

* Hawkins's Voyage.

† Lectures, § 574, No. 10.

Hence, alſo, we perceive that the action of contagion, in the vicinity of the inoculated part, and of that which is thence abſorbed into the ſyſtem, by deſtroying a very conſiderable portion of variolous excitability, would inevitably diminiſh the action of the matter abſorbed after the eruption; conſequently the ſecondary fever would be milder than by natural contagion.

# REVIEW.

Art. I. *The Magnetic Atlas, or Variation Charts of the whole Terraqueous Globe; comprehending a Syſtem of the Variation and Dip of the Needle, by which, the Obſervations being truly made, the Longitude may be aſcertained. Third Edition, with Additions. By* John Churchman, *Member of the Ruſſian Imperial Academy. New-York.* Gaine *and* Ten Eyck. 4to. pp. 82. 1800. With three Maps.

READERS of the periodical publications of America have, during the laſt twelve or thirteen years, frequently ſeen the name of the author of the Magnetic Atlas. The members of ſeveral of the learned ſocieties, of ſome of the State Legiſlatures, and of Congreſs, have been informed of the ſcientific labours of Mr. Churchman, and of the method he has propoſed to determine the longitude of places. None of our philoſophical friends need to be informed that he ſtarted, with other competitors, for the fame and emolument of correctly and eaſily finding, at ſea, the degree of a meridian line on any parallel of latitude.

For this purpoſe Mr. C. turned his attention to *Magnetiſm*, and perſuaded himſelf the phenomena of that curious ſcience, if rightly interpreted, would furniſh a true ſolution of the problem. From the obſervations he made upon the variation of the magnetic needle, he thought its direction eaſtwardly and weſtwardly of the due north point depended upon a certain principle, by the operation of which all its ſeemingly wavering and unſtable movements were regularly produced. If, then, the motions of this delicate inſtrument could be demonſtrated to be influenced by ſome uniformly-operating agent, and if it could be made evident what this agent was, where it exiſted, and by what rules it acted, there would, he thought, be enough done to eſtabliſh a theory of magnetic variation, applicable to various uſeful purpoſes in geography and navigation. But there was great difficulty in this. Indeed, in many reſpects, the difficulty was inſuperable: for, in the preſent ſtate of human knowledge, there were not facts enough collected to form ſuch a theory; nor, in the preſent ſtate of human ability, could ſuch facts be immediately aſcertained and brought together.

Hence it happened that the author was obliged to leave the low and tedious *poſteriori* road, and to travel, by the more high and ſhort *priori* path, to this goal. He was under a neceſſity to conjecture what it was not in his power to explore, and to offer probability where it was impoſſible for him to arrive at certainty. This, therefore, may be conſidered as Mr. C.'s hypotheſis to account for the variation of the magnetic needle. He ſuppoſes, if we comprehend him, that the planet we live on, beſides the two points of its axis called the north and ſouth poles, has two magnetic points, or poles, which are conſiderably diſtant from the other. Theſe magnetic points move round the poles of the earth at different periods. The northern magnetic point moves quicker, and the ſouthern ſlower than the earth; whence the *apparent* revolution of the northern is from weſt to eaſt, while that of the ſouthern is in the oppoſite direction. And to the attraction exerted by theſe moveable magnetic poles are the variation and dip of the needle to be referred.

But here new difficulties aroſe. The exact latitudes of the ſuppoſed magnetic poles were not well known. More obſervations were wanting to fix their firſt and laſt meridians: and it was deſirable to have aſtronomical obſervations made on the ſpots. Theſe, he imagined, might be found by ſailing in high latitudes, "until the horizontal needle became indifferent to any particular direction," or "by the inclination of the dipping needle."

Perhaps, however, we might do injuſtice to Mr. C.'s ingenuity in explaining his doctrine of magnetic points and poles: we ſhall, therefore, let him ſpeak for himſelf (p. 31.)

"*Definitions and Corollaries.*

"*Definition* I. The two points D and E, which give an univerſal direction to the magnetic needle, and repreſented in the ſphere drawn round the centre C, fig. 1, may be termed magnetic points.

"*Def.* II. That magnetic point D, which is ſituate in the northern hemiſphere, at a certain diſtance from the north pole of the earth, may be called the northern magnetic point.

"*Def.* III. That magnetic point E, which is ſituate in the ſouthern hemiſphere, at a certain diſtance from the ſouth pole of the earth, may be called the ſouthern magnetic point.

" *Def.* IV. The half of a great circle, drawn from one pole of the earth to the other, through any given place, is the terreftrial meridian of that place.

" *Def.* V. All the curves which meet in the magnetic point, on either of the charts, are the magnetic meridians.

" *Def.* VI. The angle contained between the magnetic meridian and the meridian of the earth, in any place, is the variation of the compafs for that place.

" *Def.* VII. The time in which either magnetic point revolves round the pole of the earth, from a conjunction with any fixed ftar, until its return to the fame again, may be termed its fidereal, or real revolution.

" *Def.* VIII. The time which either magnetic point requires, from its leaving any one meridian of the earth, until its return to the fame again, may be termed its periodical, or apparent revolution.

" *Def.* IX. A line drawn through the different parts of the globe, where the magnetic needle points due north, is the line of no variation.

" *Corollary* I. The line of no variation changes its place as the two magnetic points change their places.

" *Cor.* II. The line of no variation alters its curvature in proportion to the different pofitions of the two magnetic points.

" *Cor.* III. Whenever the two magnetic points are neither on the fame, nor on oppofite meridians of the earth, then thofe parts where a meridian of the earth makes a tangent to a magnetic meridian, there the line of no variation paffes.

" *Def.* X. A point G, diametrically oppofite to the fouthern magnetic point E, may be termed the northern magnetic nadir.

" *Def.* XI. A point H, diametrically oppofite the northern magnetic point D, may be termed the fouthern magnetic nadir.

" *Cor.* I. If the two magnetic points were at equal diftances from the two poles of the earth, and on oppofite meridians, they would be diametrically oppofite to each other.

" *Cor.* II. If the two magnetic points were diametrically oppofite to each other, the magnetic meridians would all be arches of great circles.

" *Cor.* III. As the two magnetic points are neither at equal diftances from the two poles of the earth, nor, at prefent, on oppofite meridians, they are not diametrically oppofite to each other. Hence none of the magnetic meridians, except the firſt and the laſt, are arches of great circles.

" *Cor.* IV. The diſtance between the magnetic points and the magnetic equator is different on different ſides of the globe.

" *Def.* XII. A great circle ICK, drawn every way equally diſtant from and between the two magnetic points and the two magnetic nadirs, will be the magnetic equator.

" *Def.* XIII. Thoſe two oppoſite points LM, ſituate ninety degrees from the magnetic equator ICK, are the poles of the magnetic equator.

" *Cor.* I. The magnetic equator, as well as the firſt and laſt magnetic meridian, continually changes its place.

" *Cor.* II. The magnetic equator divides the globe into two equal parts.

" *Cor.* III. Every circle, dividing the globe into two equal parts, is a great circle.

" *Cor.* IV. Every great circle has two poles.

" *Cor.* V. The two poles of every great circle are diametrically oppoſite to each other.

" *Cor.* VI. Hence the two magnetic poles, being diſtinct from the two magnetic points which influence the direction of the needle, are nothing more than the poles of the magnetic equator.

" *Def.* XIV. A right line DNE, drawn from one magnetic point to the other, may be called the magnetic pointer axis.

" *Def.* XV. A right line LCM, drawn from one magnetic pole to the other, may be termed the magnetic polar axis.

" *Def.* XVI. A right line GOH, drawn from one magnetic nadir to the other, may be called the magnetic nadir axis.

" *Cor.* I. The magnetic polar axis, and no other, paſſes through the centre C of the earth.

" *Cor.* II. The magnetic polar axis equally diſtant from and between the magnetic pointer axis and magnetic nadir axis, all of which are parallel to each other; but,

" *Cor.* III. As the two magnetic points are not diametrically oppoſite to each other, the diſtance between the magnetic points and the magnetic equator is different on different ſides of the globe.

" *Cor.* IV. As the two magnetic points move with unequal velocities, the diſtance between the magnetic pole and the magnetic point undergoes a continual alteration.

" *Def.* XVII. As the magnetic equator divides the globe into two equal parts, for diftinction, one half may be called the northern, and the other the fouthern magnetic hemifphere.

" *Cor.* I. In each magnetic hemifphere the magnetic pole is, at any given time, equally diftant from the magnetic point and the magnetic nadir.

" *Def.* XVIII. A magnetic needle, fufpended on a pin paffing through its centre in a horizontal direction, is a dipping needle.

" *Cor.* I. Magnetic powers of equal force having equal influence at equal diftance, as the magnetic equator is equally diftant from each magnetic point, if the dipping needle ftood horizontal on the magnetic equator, this would prove the influence of each magnetic point to be equal.

" *Cor.* II. If the influence of each magnetic point were equal, the magnetic meridians would all be circular curves.

" *Cor.* III. If the magnetic meridians were all circular curves, they might be confidered as arches of regular polygons of an infinite number of fides, and the horizontal needle would always reprefent one of thefe fides.

" *Cor.* IV. Although none of the magnetic meridians, except the firft and laft, are circular curves, the horizontal needle makes always a tangent to the magnetic meridian.

" *Cor.* V. In the northern magnetic hemifphere the dipping needle gives north dip, and fouthern fouth dip, proportionally to the diftance from the place where it ftands horizontal.

" *Def.* XIX. The diftance between the northern magnetic point and the north pole of the earth may be called the north polar diftance.

" *Def.* XX. The diftance between the fouthern magnetic point and the fouth pole of the earth may be called the fouthern polar diftance.

" *Def.* XXI. An arch of a great circle DKE, paffing from one magnetic point to the other, through each magnetic nadir, and from which all the other magnetic meridians are numbered, may be called the firft magnetic meridian.

" *Def.* XXII. The oppofite arch DIE, of the fame great circle, 180 deg. from the firft, may be called the laft magnetic meridian.

" *Def.* XXIII. Lines drawn through thofe parts of the earth where the magnetic variation is equal, after the manner of Dr. Halley, are called Halleyan lines.

" *Def.* XXIV. The mean time, taken by the fun, from its leaving one meridian of the earth until its return to the ſame again, being 24 hours, as the mean time of the rotation of the earth on its axis, from weſt to eaſt, is determined and known to be 23h. 56′ 4″, this laſt-mentioned time is called a ſidereal day."

Having thus defined and explained his meaning, the author proceeds to illuſtrate further, by a ſeries of problems, eighteen in number, ſome of them to be reſolved by calculation, and others by his chart. To theſe he has added a table of the place of the northern magnetic point, as found to perform a revolution round the north pole of the earth at the rate of 19′ 42″ 29‴ of longitude each year, and exhibiting the correſponding variation of the compaſs, in certain years between 1622 and 1794, by calculation and obſervation. For the particulars of theſe, too long for inſertion here, we muſt refer to the work itſelf.

Finding, ſtill, that objections were ſtated to the *practicability* of his ſcheme, even if true, particularly by reaſon of the difficulty of diſtinguiſhing, at ſea, between *true* and *falſe* variations, Mr. C. ſums up, and replies to the objections, thus: (p. 50).

" *Objection* 1ſt. The ſame compaſs has been ſaid to give a different variation, from no other cauſe than putting the ſhip's head a contrary way.

" *Anſwer.* This might readily happen, if there was more iron near the compaſs on one ſide of the ſhip than on the other. The following remedy is propoſed for this difficulty. Let there be fixed a true meridian on ſhore, but near the ſhip, out of the reach of the attraction of iron: here let the variation be taken on this meridian; then, before ſhe ſails, let the variation be taken on board the ſhip, with her head turned, if occaſion ſhould require, on every point of the compaſs: by noting the difference between the true variation on the true meridian, and the falſe variation on board, a table of difference may be conſtructed, which may ſhow the allowance neceſſary to be made for falſe variation throughout any voyage, while the iron remains in the ſame ſituation. Or, if the azimuth compaſs is firmly fixed to a three-legged ſtaff, about five feet above the deck, it will then be nearly out of the reach and influence of the iron.

" *Objection* 2d. The ſame compaſs, removed a few miles, but at a different time of the day, has been ſaid to give variations differing from one another.

" *Anſwer.* As it is impoſſible to move, either on the ſame meridian or parallel of latitude, without having a different variation, it is not ſtrange if there ſhould be a ſenſible difference in a few miles: beſides, if the obſervations are made at different times of the day, the ſmall diurnal variation, which ſeems reducible to certain fixed laws, will require to be allowed for.

"*Objection* 3d. The ſame compaſs, on the ſame day, and in the hands of the ſame obſerver, has been ſaid to give variations differing from one another, on board the ſame ſhip, when under ſail, and when at anchor in a road-ſtead.

"*Anſwer.* A ſhip being under way muſt certainly change her ſituation: if the variation was not different in different places, it would be hard to know the ſituation of the place by the variation; therefore, one anſwer may apply to both the ſecond and third objections.

"*Objection* 4th. Compaſſes, made by the ſame artiſt, at the ſame time and place, but on board different ſhips, have been ſaid to differ in the variation.

"*Anſwer.* This might ariſe from a greater quantity of iron in one ſhip than another, placed in ſuch a ſituation as to give a falſe variation to the needle.

"*Objection* 5th. The ſame compaſs on board the ſame ſhip, and within a few miles of the ſame ſituation, but at different times of being in ſuch ſituation, is ſaid to have given different variations.

"*Anſwer.* The two magnetic points being known to perform revolutions, the variation muſt of conſequence continually alter more or leſs in every part of this globe; therefore, the different variation may readily be accounted for, as well from the difference of time as the different ſituations of places.

"*Objection* 6th. Different compaſſes, at the ſame time, on board the ſame ſhip, and, in every reſpect, under the ſame circumſtances, are ſaid to have given variations differing from one another.

"*Anſwer.* Different compaſſes, if true, are found to agree with one another on ſhore. I knew an inſtrument-maker, in particular, who had a meridian on ſhore, and made many circumferenters. He made a rule never to turn one out of his hands till he proved it by his meridian. By this method all his inſtruments would agree one with another.

"Captain Cook, when he obſerved the tranſit of Venus at the Iſland of King George III. or Otaheite, although he found, in ſome inſtances, that different inſtruments gave different variations, yet, in the account of his voyage, he writes, "the ſame needle agrees with itſelf in ſeveral trials one after another." This ſeems to prove what dependance may be placed upon a true needle. The cauſe of different inſtruments diſagreeing muſt then be occaſioned by a fault in the workmanſhip.

"Hitherto it has generally been thought uſeleſs to try to obtain the variation with a great degree of accuracy, merely for the purpoſe of ſteering the courſe of a ſhip; but, in order to make the variation ſcheme uſeful in finding the ſituation of a ſhip at ſea, it will be neceſſary, in order to counteract the motion of the waves, to make a number of obſervations with great care, and take a mean for the true variation. In this reſpect a little practice will point out the path towards perfection.

"It is well known, that on land there is no difficulty in determining the longitude by Jupiter's ſatellites: if the true ſituation of any coaſt, and the ſituation of the two magnetic points, are known, the true variation may be found by calculation: ſo that, if bodies of iron ore, upon the ſea-coaſt, ſhould even influence the needle, the difference between the variation, by calculation and obſervation, will conſequently be the allowance for falſe variation. By this method the variation may be corrected with a little care.

"It is probable the magnetic obſervations, in Capt. Cook's laſt voyage, are ſtill as accurate and extenſive as any other yet publiſhed; but as the variation of the compaſs is ſubject to change, the length of time between Capt. Cook's laſt obſervations, and the time for which the charts are conſtructed, will cauſe ſome difference, unleſs the proper allowance is made."

Mr. C.'s charts are conſtructed in ſuch a manner, that if the blank gores were cut out, the remainder would fit and cover a globe 48 Engliſh inches in circumference. This method of projecting the ſphere, he thinks, with the magnetic meridians, will be found to preſerve the true proportions of each country, and, probably, ſhow the curves formed by the magnetic meridians, better than Mercator's projection, on which the Halleyan lines are delineated; and another advantage of Mr. C.'s projection is, that it may anſwer the double purpoſe of charts and globes. But, for a proper underſtanding of them, they ought to be carefully inſpected.

The author is of opinion, that not only magnetic needles, but the waters of the ocean, are influenced by the rotation of the magnetic points. He is inclined to believe a ſwell of that great maſs of fluid accompanies the magnetic point as it revolves, and cauſes high tides and inundations on the parts of the earth adjacent to its meridian lines, and a proportional receſs of the ſea from the oppoſite ſides; cauſing, thus, alternate incroachments of the ocean upon the land, and of land upon the ocean. This he computes to amount to about two millions of acres yearly. When we ſhall become fully poſſeſſed of what is knowable on this ſubject, the periods of deluges may be calculated with as much certainty as the return of comets (p. 64). But he offers this merely as a ſpeculation.

Prefixed to the work is an abſtract of the hiſtory of magnetic diſcoveries and inventions; and in an appendix the readers will find ſome extracts of letters and regiſters, from ſome of the diſtinguiſhed men and learned ſocieties in America and Europe, who have written to the author on the ſubject of his book.

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ART. II. *A New Phyſical Syſtem of Aſtronomy; or, an Attempt to explain the Operations of the Powers which impel the Planets and Comets to perform Elliptical Revolutions round the Sun, and revolve on their own Axis: in which the Phyſical Syſtem of Sir* Iſaac Newton *is examined, and preſumed to be refuted. To which is annexed, a Phyſiological Treatiſe; in which the firſt Stage of Animation is conſidered, and the Means ſhown by which Circulation is performed in the firſt Rudiments of the incipient Animal, before the Veſſels are completely organized, &c. together with an Explanation of the General Laws by which the Animal Economy is governed; and particularly the Mode whereby the Operations of the* Vis Medicatrix Naturæ, *or the unaſſiſted Powers of Nature, are exerted to obviate and cure Diſeaſe. Alſo, ſucceſsful Methods of curing Cancerous Ulcers, the Quartan Ague, Putrid Fevers, ſtopping Mortifications, and extracting Froſt, ſo as to leave the frozen Member perfectly well. By* Joſeph Young, *M. D. of New-York. New-York.* Hopkins. 8vo. pp. 188. 1800.

THE numerous relations and dependencies of Aſtronomy, beſides the intrinſic grandeur of the ſubject, have always made it be regarded, among civilized nations, as an important branch of reſearch. Conſidering the immaturity of our ſtate of ſociety in America, it will not be expected that our countrymen ſhould generally keep pace with the aſtronomers of the old world. But, on the other hand, we cannot admit that America is juſtly chargeable with deficiency in the cultivation of this ſcience, if allowance be made for the peculiarity of its circumſtances. At the head of a reſpectable liſt of American aſtronomers, who have recently diſtinguiſhed themſelves, ſtands Rittenhouſe, who, though not equally fortunate with the European Herſchell, in the extent and brilliancy of his diſcoveries, was probably not inferior to him in the vigour of a ſelf-taught mind, and in the uſe he made of the ſlender advantages which his circumſcribed ſituation afforded.

The author of the aſtronomical ſyſtem under conſideration, in his attempt to confute the hypotheſis of Sir Iſaac Newton, has undertaken an arduous taſk, in which much learning and ingenioufneſs have been frequently exerciſed—but, according to the prevailing opinion, without any great ſhare of ſucceſs. We think the cleareſt view of Dr. Young's hypotheſis may be obtained from the following extract:

" As the ſun is, without doubt, the primum mobile, or firſt mover of this ſtupendous ſyſtem, it behoves us to inveſtigate the means or powers by which he is actuated, and cauſed to perform a revolution on his axis once in twenty-five days and ſix hours. I ſhall, in the firſt place, give my opinion of this matter, and then corroborate my conjectures with a recital of ſuch experiments and obſervations as the nature of the ſubject will admit of. In the firſt place I ſhall venture to aſſert, that the whole univerſe is full of elaſtic, repulſive matter, denominated electricity, which is moſt probably compoſed of oxygen and caloric. When cold, it is more condenſed and leſs active, and unites freely in the compoſition of many ſolid bodies, and remains for ſome time inactive; but when acted upon by friction, colliſion, or heat, it immediately aſſumes its priſtine qualities, and is the ſecondary cauſe of all the motion in the univerſe.—In the next place, I ſuppoſe the body of the ſun to conſiſt of ſolid incombuſtible matter, formed in ſuch a manner as freely to admit the more condenſed electric matter (by which he is ſurrounded and ſtrongly compreſſed) to enter, at his poles, into a large cavity in his centre, where, being heated and expanded to the greateſt poſſible degree, it is expelled, with amazing velocity, to the circumference, through numberleſs curving pores, all uniformly bending weſtward from the centre. And as it is a known property of bodies in motion, and of the rays of light in particular, to move in ſtraight lines, it is evident that the power of every particle of the igneous matter exploded from the centre through theſe curving pores, muſt be directed againſt, and exert their force upon the eaſtern ſides of the canals through which they move; which cauſes the ſun to revolve on his axis eaſtward. That this is an invariable law of nature, may be demonſtrated by conſtructing a wheel on theſe principles, which may be actuated either by ſteam, electricity, common air, water, or fire. It was only neceſſary for the omniſcient architect to conſtruct the ſun in ſome ſuch manner, of ſuch materials as would withſtand the action of the fire; and, firſt, to give the internal cavity ſuch a degree of heat as to cauſe the exploſive igneous matter to move, with great celerity, from the centre to the circumference of the globe; which impulſe being at all times equal, as both the quantity and quality of the combuſtible matter with which he is ſupplied is invariably the ſame, the periods of his revolutions muſt alſo invariably be the ſame. And as he is continually pouring forth oceans of fire from his equatorial and tropical regions, he muſt receive an adequate ſupply at his poles, of electric matter in a ſtate of extreme cold and condenſation, otherwiſe a perfect vacuum would ſucceed, and the ſun be extinguiſhed; and, conſequently, light, life, heat and motion would ceaſe, and be no more. The cold air flowing into an air-furnace, may ſerve to convey ſome idea of this grand operation. But the chief objection to this hypotheſis ariſes from the difficulty of conceiving how the ſun can be ſupplied with a ſufficient pabulum to ſupport ſuch an immenſe waſte of fire for ages, eſpecially when this pabulum is ſaid to conſiſt only of the matters contained in the common air, while we daily experience the neceſſity of ſupplying our fires with freſh quantities of more ſubſtantial fuel, without which they are ſoon extinguiſhed. But this objection will vaniſh, when we conſider that matter is indeſtructible, that no being, except the one who created it, can annihilate one ſingle particle of it: it may be decompoſed and recompounded millions of times, but the ſame quantity of matter ſtill exiſts; conſequently there is the ſame quantity of fire exiſting now as at the creation, and no more.—Let thoſe who find difficulty in conceiving by what means the cold condenſed air, ruſhing impetuouſly into the poles of the ſun, ſhould be inſtantly converted into real active fire, and diffuſed through the regions of ſpace, only conſider, that the electric matter, diſperſed through the regions of our atmoſphere, requires only rapid motion to convert it into the most tremendously active fire with which we are acquainted. And even the trifling quantity that we can collect from the air, by means of our diminutive machines, is sufficient to teach us how this grand operation is performed in the immense body of the sun, which is a mass of solid matter of eight hundred and ninety thousand miles in diameter, heated throughout to the most intense degree, surrounded and strongly compressed, especially at his poles, with igneous matter, in a condensed, latent state, that only requires to be excited into rapid motion, to exhibit every appearance, and assume every quality of fire. This operation may be termed the respiration of the sun; and, if he should ever cease to respire, he will also cease to revolve, and be extinct: but when this matter is decomposed by the violent heat and agitation in the body of the sun, and expelled, with extreme velocity, from his equatorial and tropical regions, the caloric forms rays, which afford light as long as they continue to move with great velocity in straight lines, but cannot exhibit all the phenomena essential to fire, until it is again united to the oxygen, or some other acid gas. Among the many reasons which induce me to believe that the body of the sun is composed of solid, incombustible matter, are, first, that no permanent collection of atmospheric matter can subsist without some solid body to attach itself to, because active repulsive matter, without such nucleus, would expand and diffuse itself abroad until it was equally distributed; and our system would be reduced to a condition similar to that of an animal deprived of both heart and lungs. Secondly, all pneumatic, aquatic, and pyrotechnic machines, are composed of solid matter, which is, in all cases, passive, and are so constructed as to be actuated by fluids, which are, in all cases, the instruments in producing motion, as there is no case in which solids generate or continue motion independent of the impulse or energy of fluids. And were it not for this admirable mode of collecting such immense quantities of condensed latent igneous matter, rendered almost infinitely subtile, active and penetrating by heat, and diffusing it through space, to be recompounded, condensed, and returned to the sun, in constant succession, all motion would soon be lost, and the planetary orbs would cease to revolve.

"I have, then, supposed the earth laying entirely at rest, at the tropic of Capricorn, on the 21st day of June, with its atmosphere perfectly still and inactive, until the rays of the sun, by their energy and influence, began to heat, rarefy, agitate, and render it actively repulſive, when, by a law already mentioned, to wit, that the ſtrongeſt atmoſphere will always repel the weakeſt to the oppoſite ſide of the body to which it belongs, where that of the earth would form a long dark cone or tail, which would re-act with a force proportioned to its quantity of matter, and degree of its excitement; and, when a ſufficient quantity of the earth's atmoſphere had been excited and propelled to the oppoſite ſide, to overcome its vis inertia [*inertiæ*], the earth would begin to move on ſlowly to the eaſtward, in the line of the ecliptic, moſt probably in a direct courſe to the centre of the ſun; but, as it gradually approached the ſolar equator, it became more expoſed to the action of his direct rays, ſent off in great abundance, and with more velocity from his equatorial than his tropical regions, where the earth was ſuppoſed to begin its firſt revolution. In conſequence of this increaſing degree of heat, a greater quantity of the earth's atmoſphere would be excited, and rendered more repulſively active, to re-act and antagonize the vertical rays of the ſun, which prevents it from proceeding to the ſun, and gradually propels it to a greater diſtance, accelerating its motion at the ſame time, until it arrives at that limit where repulſion and appulſion are exactly equal; and where, by the oppoſite actions of theſe two powers, the earth is not only impelled in its annual circuit, but alſo aſſiſted in its diurnal revolution; for, as it muſt now move in a curve line, the reſiſtance of the medium through which it paſſes will bend its atmoſpheric cone back weſtward, condenſing its eaſtern ſide to the greateſt degree, which will cauſe it to act with moſt power on that ſide of the earth which is ſucceſſively preſenting a cold, denſe atmoſphere to the ſun, to be heated, rarefied, and rendered actively repulſive; which becomes a powerful agent in promoting the earth's diurnal rotation. As theſe impulſive powers, which were capable to begin theſe revolutions, are conſtantly acting with undiminiſhed influence, they will be continued, notwithſtanding the oppoſition the moving bodies may be ſuppoſed to meet with, in paſſing through a reſiſting medium; which it is impoſſible that any projectile ſhould do, let its original force be ſuppoſed to be the greateſt poſſible."

Different opinions have been entertained as to the cauſe of the motions of the bodies which compoſe the ſolar ſyſtem. While ſome have conſidered them as *projected* by the hand of the Almighty, from a given point, and moving through *pure* ſpace their deſtined rounds, in equipoiſe between the central forces—others have contended that a *perpetual exertion* of that power which firſt created them is neceſſary to keep them in their orbits, and enable them to conſummate their periods; and that this is effected by motions inceſſantly communicated to them through the medium of the matter which fills up the ſpace between the ſun and the remoteſt of the ſtars.

The diſputes concerning theſe two doctrines formerly agitated the ſchools with great warmth; the former involving the notion of a *vacuum*, and the latter contending for the exiſtence of a *plenum* in nature. The advocates for the opinion of projection were obliged, by their hypotheſis, to ſuppoſe the celeſtial bodies moved through empty or *unreſiſting* ſpace, to avoid retardation, and, finally, a total ſtoppage of their courſe; while their opponents, who affirmed that all ſpace was full of created matter, were forced to find, or imagine, ſome qualities in this matter enabling the planets and comets to travel through it, and to aſſiſt them in their paſſage.

The idea of a planet ſet in motion like a projectile, and made to deviate from its rectilinear direction into an elliptical curve, by an attractive power or influence termed gravitation, is a leading trait of the Newtonian philoſophy, and is generally adopted, as being, at once, highly probable, and correſponding well with the phenomena. We ſay *generally* adopted—for there exiſted, at the time of its publication, and there have exiſted, from time to time, ever ſince, ſeveral men, of literary and ſcientific minds, who have not merely doubted this ſolution of the motions of the planetary orbs, but have openly oppoſed it, and boldly called in queſtion its truth.

Perhaps the moſt violent of theſe was the noted Hutchinſon, a third edition of whoſe books was publiſhed in 1748. Irritated at the prevalence of Newton's principles, and envious of his extended fame, he attempted the overthrow of the whole ſyſtem of that wary and illuſtrious philoſopher. With the view of enſuring ſucceſs to his undertaking, Hutchinſon declared the doctrine of vacuum, projection and attraction, to be *unſcriptural*, and, therefore, untenable and abſurd. To exhibit the more glaringly the wickedneſs and folly of the *Principia* of Newton, he publiſhed a large, learned and formal work in contradiction of it, which he called *Moſes's Principia*. In this he ſtrove to convince his readers that the account of the creation, given by the Jewiſh legiſlator, was not intended ſolely for hiſtorical, pious, or moral uſe, but was, indeed, a moſt complete and comprehenſive ſyſtem of natural philoſophy. This ſyſtem he pretended to detect and unfold with a vaſt parade of words from the Hebrew language and its dialects, in expounding which he differed as widely from other tranſlators as from the contemporary philoſophers. Philoſophical doctrines, derived from the Bible, were thus to cruſh all oppoſition, and the vulgar and profane book of Newton be conſigned to neglect and contempt.

The better to accompliſh this, Hutchinſon, we ſaid, found it expedient to interpret the books of the Old Teſtament in a manner very different from other expoſitors. Theſe he calumniated as not entering into nor comprehending the phyſical meaning of the text. A literal and ſpiritleſs tranſlation had marred the ſublime ſenſe of the original; and the perſons who made verſions of them into other languages were as deſerving of reprobation as were that other claſs who dared to philoſophize by experiment and induction. He, therefore, roundly affirmed, that "the principal buſineſs of Moſes was to determine natural philoſophy," and that the firſt part of revelation, as expreſſed in Geneſis, "was written to cure the madneſs of the naturaliſts and ſtar-gazers." (2 Hutchinſon's Works, Introd. p. 2). For their own "ſtrange whims" they had rejected ſcripture; while he, rejecting their dreams, would endeavour to lead them back to ſcripture again. Furniſhed, thus, with various Rabbinical learning, and aided by the Miſchna and the Talmud, Hutchinſon laboured to prove the irreligion and nonſenſe of the Newtonian philoſophy.

It is not an eaſy taſk for a reader to gather from his erudite, obſcure and diffuſe writings, what he preciſely means. The following is, we believe, a tolerable compendium of it. All things are contained in the ſubſtance of God, and his ſubſtance extends to infinite ſpace. Heaven and earth, ſpace and matter, are created things, and conſiſt of ſolid atoms; thoſe of earth adhering in bodies or denſe fluids—thoſe of the heaven in orbs, darkneſs, fire, light and clouds. The univerſe is *full* of theſe ſolid atoms: in other words, creation is a *plenum.* The matter of the heavens is fluid; it is alſo finite, and has circumferential limits or extremities, though it extends through all created ſpace, from the ſun, its centre, beyond the remoteſt fixed ſtars. This matter of the heavens conſiſted of *ſpirit*, or *air*, *light* and *fire*, as three of its principal modifications. The ſun is the fire-place which ſets all this matter in motion, melting, expanding, and throwing it off to the moſt diſtant confines of creation, where it is cooled, conſolidated, and preſſed back again, to be melted anew, and ſent forth a ſecond time; and ſo on. The ſolid atoms are of different ſizes and figures; ſo that, when one portion of them congeals, or forms into grains, there are pores among them large enough to permit atoms of a ſmaller ſize to paſs freely through. The condition of the matter of the heavens, under the action of fire at the ſun, was *chumah*; the ſtreams of light from the ſun, moon and ſtars, were *aſhteroth*; and the grains of air returning from the circumference of the heavens to the the ſun, was *baalim*. Concrete matter, however, is often ſo conſtituted as not to be permeable very eaſily, but to reſiſt. The ſeveral ſorts of atoms compoſing the fluid matter which occupies immeaſurable ſpace, are the moving powers by which God acts upon and regulates the machinery of the univerſe. The more compact or unyielding modifications of it conſtitute the great orbs, or machines, to be urged along by their impulſe. The latter are the *chariots*, and the former the *drivers*. When, therefore, light, impelled by the ſun, ſtrikes the ſide of ſuch a body as the earth we inhabit, it excites heat in that part, and the ſpirit, or air, being rarefied, or made to recede thereby, motion is communicated to the whole orb. The motion thus begun, is promoted and continued by the vaſt and inceſſant preſſure of the dark, cold and denſe matter on the oppoſite ſide. And thus the globe being ſtarted by the leſſening of preſſure on one ſide, and the augmentation of it on the other, its diurnal and annual revolutions were ſoon impreſſed upon it by a little variation of the forces. The like reaſoning he applied to the moon, and to all the other planets and their ſatellites. By the operation of light, thus ſent out from the ſun, and acting upon the other fluid matter of the heavens, and upon the celeſtial orbs, they become enlightened, warmed or inflamed. Spirit, or air, puſhed in with irreſiſtible compreſſion, and motion, rotation and progreſſion were accounted for, without having recourſe to ſuch miſerable terms as projection, gravitation, or attraction.

Thus Newton was charged, by Hutchinſon, of advancing philoſophical doctrines repugnant to revelation and the principles of Moſes. The impiety of his ſyſtem was exhibited at great length, as volume after volume grew under the pen of his indignant adverſary, who gloried in tracing it "upwards, and ſhowing from what poor conjectures and ſilly ſtories it took its root, which, by often telling, came almoſt to be believed." He even gave out that he would, from "divine authority," make every believer aſhamed of it. The denunciation of discoveries in science as heterodox, which had been so cruelly exercised against Gallileo, had so far lost its fashion or influence, that it was unable to stir up intolerance or persecution against Newton. Later attempts, which have been made to retard the progress of experimental philosophy by similar means, have sometimes raised a noise for a short time, but have commonly wrought no dangerous or lasting changes in public opinion.

We have given this concise account of the opinions of Hutchinson, because the author of the treatise now before us seems either to have perused his publications, or, independently of them, to have fallen into a somewhat similar train of thought. Without pressing the analogy too close, Dr. Young, in this astronomical performance, which is anti-Newtonian, takes pretty nearly the same ground of opposition which had been occupied by Hutchinson.

Dr. Y.'s hypothesis, on several accounts, seems to be entitled to the praise of ingenuity. But we object to it principally on two grounds—1st, because it takes for granted many principles wholly unsupported by proof; and, 2dly, because, even admitting the truth of his suppositions, they are wanting in point of unity and mutual relation, and do not exhibit a scheme of the motions of the heavenly bodies so coherent and systematic, or of such universal application, as one would expect to find in these vast operations of nature, or as have been actually displayed in the hypotheses of preceding astronomers, and particularly in that which it is the author's object to refute.

On the first objection it is not necessary to enter into any detail. It must be obvious that the whole account of the structure of the sun, however plausibly imagined, together with all the operations consequent upon such a structure, is merely matter of supposition, unsupported by proof.

As to the second objection, it will be proper to be more particular. As soon as the Copernican system began to prevail, it became an object of importance to ascertain the operation of that unknown chain which holds together such a number of immense bodies in so harmonious an arrangement. Kepler was successful in this pursuit. He discovered that *the right line joining the sun and any planet described areas proportioned to the times*; that *each primary planet described an ellipse, having the sun in one focus*; and that *the squares of the periodic times of the different planets were proportioned to the cubes of their mean distances from the sun.*

By the eſtabliſhment of theſe laws, the way was prepared for the more important diſcoveries which were ſoon to follow. But, on the hypotheſis of our author, the value of the diſcovery of Kepler's ſublime proportions ſinks to nothing.

Deſcartes, without availing himſelf of the diſcoveries of Kepler, contrived a ſyſtem to explain the connected and harmonious movements of the heavenly bodies. That ingenious and fanciful philoſopher, though little ſcrupulous in the admiſſion of fundamental principles without proof, erected, upon ſuch principles as he choſe to adopt, a conſiſtent theory, which embraced a great number of phenomena. Grant him but his vortices, and the planets will revolve round the ſun with perfect order. But though this theoriſt connected the motions of the heavenly bodies more happily than had been done before, he did ſo only when they were conſidered in the groſs; for his principles failed when examined in the detail. Yet the harmony of ſuch imaginary vortices is more eligible than an hypotheſis which offers no adequate bond of union.

It was reſerved to Sir Iſaac Newton to conſtruct a ſyſtem whoſe parts are all more perfectly in uniſon than thoſe of any other philoſophical hypotheſis. Admit his firſt principle, the univerſality of gravity, and that the force of it decreaſes as the ſquares of the diſtance increaſe, and all the phenomena, which he combines by it, neceſſarily follow. No quality of matter, except inertneſs, is more familiar than gravity. The law, alſo, by which it is ſuppoſed to diminiſh, as it recedes from its centre, is analogous to the propagation of light, heat, &c. On the principle that *all matter gravitates to all matter*, we underſtand why the centres of the revolutions of the planets are not preciſely in the centre of the ſun, but in the common centre of gravity of the ſun and the planets. The mutual attraction of the planets for each other, on the ſame principle, accounts for many other irregularities in their motions, eſpecially for thoſe of Jupiter and Saturn, which are conſiderable when thoſe planets are nearly in conjunction with one another. The queſtion here unavoidably returns, how we ſhall explain theſe irregularities of the planetary motions upon Dr. Y.'s hypotheſis?

But if the hypotheſis of our author could be applied to explain the complicated motions of the primary planets, it remains to be inquired, whether it would equally embrace the phenomena of the ſecondaries? Of all the irregularities in the heavens, thoſe of the moon had occaſioned the greateſt perplexity to aſtronomers before the time of Newton: to theſe irregularities, however, if poſſible, his theory more accurately correſponds than even to thoſe of the primary planets. Here Dr. Y.'s ſyſtem ſeems evidently to fail. If the ſun, conſtructed in an appropriate manner, emits vaſt quantities of electric fire, to impel the planets in their revolutions round his orb, how does the earth impel the moon in a manner altogether analogous, though poſſeſſing no ſimilarity of ſtructure for the purpoſe of accompliſhing ſuch an impulſe? And this may equally apply to the other ſatellites.

Many other objections occur in conſidering the details of our author's hypotheſis, which, at preſent, we forbear to enumerate. But how much ſoever our opinions on this ſubject may differ from his, we revere his warm attachment to ſcience, we wiſh to participate that glow of delight which he ſeems to enjoy in aſtronomical ſtudies, and we are entirely perſuaded that his love of truth will always induce him to receive it, from whatever quarter it may come, when offered with conviction to his mind.

The remainder of the work is devoted to phyſiological and medical inquiries and precepts; the conſideration of which ſhall be reſumed in our next number.

*(To be continued.)*

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ART. III. *Obſervations on the Influence of the Moon on Climate and the Animal Economy; with a proper Method of treating Diſeaſes when under the Power of that Luminary. Philadelphia. Folwell.* 8vo. pp. 24. 1798.

THAT the ſatellite accompanying the planet which we inhabit, and performing revolutions around it in definite times, had an influence extending beyond its own body, and reaching to this earth and its productions, is an opinion of conſiderable antiquity. Human beings, in the rudeſt ſtates of ſociety, have often been known to aſſemble and celebrate the Neomenia, or New Moon. That orb has been cuſtomarily looked to, by the cultivators of the ſoil, as poſſeſſing great power over the atmoſphere, cauſing changes of the weather, and, by modifying heat, cold, moiſture and dryneſs, ſenſibly affecting the conſtitutions of plants and animals. By the alchemiſts, the moon, or Luna, gave a denomination to ſilver, then reckoned the ſecond of metals, as the ſun, or Sol, lent his name to deſignate the firſt of them, or gold; and hence luna cornea, lunar cauſtic, and ſome other preparation of ſilver, ſtill retain the titles ſignificant of their derivation. Among the moſt ancient nations, a connection was formed between the phaſes of the moon and the exerciſes of religion; and even in the Chriſtian Church, the moveable feaſts and faſts are ſtill regulated by the motions and periods of that variable neighbouring globe.

From the ſuppoſed action of our ſecondary planet upon the beings, animated and inanimate, on its principal, the imagination of man roved to the other ſpheres belonging to the ſolar ſyſtem, and aſcribed to each of them, to whom they had given names of heathen deities, an influence on the affairs of this world, and eſpecially upon human creatures. Not ſatisfied, however, with planetary influence, Fancy ſtretched her wings beyond their furtheſt orbits, and pretended to have diſcovered that celeſtial energy was conveyed to the earth from the diſtant abode of the fixed ſtars. The names of the animals which had been applied to the conſtellations of the zodiac exceedingly aided this belief, and as Mars dwelt with Taurus or Leo, or Venus paſſed ſome of her time with Sagittarius or Capricorn, could a terreſtrial conjurer predict much of warfare and of love, and unfold a vaſt deal concerning anger brooding in the head, and jealouſy rankling in the heart.

On this foundation the fallacious hypotheſis of *judicial aſtrology* was erected; a vain and deluſive art, which, by calculating the poſitions and aſpects of the planets at the time any perſon was born, affected to tell what good or evil fortune awaited him through life. This calculation of nativities, and the delineation of their horoſcopes, have become unfaſhionable, and have been generally deemed fooliſh, ſince aſtronomy, from a collection of deſultory facts, has been improved to a ſcience. But a miſerable relic of it ſtill exiſts among us, and diſgraces and disfigures ſome of our moſt popular pamphlets. We fear it will be hardly credited in Europe, and in the diſtant parts of America, that in the city of New-York, famous as it is for enterpriſe, genius, learning and talents, the almanacks teach the people who read them, that each conſtellation in the zodiac preſides over a particular part of the animal body. *Aries* thus governs the head, *Piſces* the feet, *Libra* the ſmall of the back, &c. and when the influence of each conſtellation is increaſed by the conjoined influence of the moon, when her place is within that conſtellation, the organ, limb or bowel which they ſuperintend is particularly affected and endangered. This miſerable doctrine, propagated in publications more generally ſpread among the people than perhaps any other kind of books, has ſuch ſway in many parts of the country, that a citizen will not caſtrate a lamb or a pig, nor ſuffer himſelf nor any of his family to be bled from the arm, without inſpecting the almanack in the firſt place, to find what the philomath who compiled it has certified about the aſtral and lunar influence on the body for that day. Theſe viſionary notions are expreſſed in ſymbols, or myſtic characters. Arranged around the figure of the human body, at the beginning of our annual calendars, they indicate the parts ſubjected to particular zodiacal ſigns; and, by aid of monthly columns adapted to the purpoſe, ſhow alſo in what region the ſign is at any given time! Theſe, with trines, and quartiles, and ſextiles, and ſimilar aſtrological nonſenſe, are not only tolerated from year to year, but, from long habit, regularly expected as a moſt important part of theſe periodical productions.

But to proceed to the piece before us.—Since the moon's attraction has been found to aſſiſt in cauſing the tides of the ocean, it has been believed, upon ſimilar conſiderations, that it likewiſe occaſions periodical movements or tides in the atmoſphere. And if the whole maſs of water and air were thus ſubjected to its influence, it was ſcarcely credible that many other things, and among them the bodies of animals and of man, ſhould not be, in ſome degree, operated upon by the ſame power. Under ſuch perſuaſion, *lunacy* has become but another name for *inſanity*, and the word *moon-ſtruck*, when applied to madneſs, has been deemed a well-choſen epithet.

Since the publication of the eſſay *de Imperio Solis et Lunæ*, by the learned Mead, many medical obſervers have turned their attention to the ſubject; and none have written with more confidence than Kirkland, on the lunar influence upon pregnant women, and Balfour, concerning its operation on febrile diſtempers.

The writer of the preſent "Obſervations" is a firm believer in lunar influence, and has brought together a conſiderable number of facts and remarks to ſupport his opinion. We ſelect the paſſages on the influence of this planet on climate, and on perſons in health, as ſpecimens of his compoſition and reaſoning:

"About forty-eight hours previous to, and ſucceeding the new and full moon, all nature appears to be affected; a warm ſouth-weſt wind generally prevails; the barometer ſinks to 29 and $28\frac{1}{2}$; and the thermometer rifes from 15 to 25 degrees: a cold, denfe and heavy air from the north-eaft rufhes in to fupply the place of this rarefied air, which continues to blow fometimes two or three days, attended with thick clouds and rain, obfcuring the whole atmofphere, and often does confiderable damage along the coaft and wharves. It was one of thefe ftorms that prevented Dr. Franklin from obferving an eclipfe of the moon in the year 1760.

"Within the periods, or on one of the two days which immediately precede and follow the new and full moon, high winds, ftorms, hurricanes, tempefts, tornadoes, and earthquakes, are always expected; or, if a ftorm or tempeft is then in being, fhe moft commonly moderates it. Within the periods, our tides in the Delaware generally rife from one to two feet higher than in the intervals. This is fo well known, that fome of our fhip-carpenters wait for the periods before they launch their veffels.

"I believe the water, when the moon comes towards her meridian, is at its greateft height; becaufe the atmofphere, from the elevation of the column of air directly under her meridian, is diminifhed in weight and preffure, and not more depreffed, according to Dr. Franklin, who fays, 'the tide is a wave, and a wave a tide in miniature; and that the wave follows her two hours after fhe paffes the meridian.'

"The United States are moft fubject to inundations at the new and full moon; which is to be accounted for by the high winds, occafioning the fea to flow in the rivers with a ftrong current, which check the tides, and caufe them to overflow the low lands. The lakes on our continent are, likewife, it is well known, influenced by this luminary.

"*Of the Influence of the Moon on People in Health.*

"The influence of this planet on the animal economy has been remarked by many authors, from the venerable Hippocrates to the ingenious Darwin, and particularly by the Arabian phyficians; by Galen, Baglivy, Van Helmont, Ballonius, Ramazzini, Pitcairn, Mead, Sir Hans Sloan, Floyer, Grainger, Gregory, Balfour, Mufgrave, Lind, Wilfon, Mofely, Leake, Tyfon, Wade, Jackfon, Laing, and the late Dr. Smith, of New-York.

"Within the periods, the pulfe is generally more quick and tenfe than in the intervals, and refpiration is more free and eafy: hence an agreeable fenfation of heat is perceived, and vigour is imparted to the whole fyftem.

"Persons in health appear to drink more at the full and change; a plethora is induced in the system; the appetite of thirst is much increased, and, perhaps, one-third less of the usual quantity of liquor is required to make a man drunk at this time than in common. This has been particularly observed by the friends and acquaintances of Mr. J— R—n, of this city.

"The appetite for animal food is not increased; the determination to the alimentary canal is diminished, while that of the insensible perspiration of the body is much increased; the quantity of fluids in the vascular system is more considerable.

"Impressions made on the senses excite quicker sensations and reflections. The secretions are increased; and hence I have often observed mothers and nurses, in general, who are sucking children, afford more milk at this time.

"The young and old, from their accumulated excitability, are more sensibly affected than the middle-aged. A Mr. Ross, rope-maker, of this city, has a daughter, seven years old, who enjoys a good share of health, except at the periods, when she falls in a syncope, which lasts ten or fifteen minutes. When she recovers from this state of insensibility, she enjoys her usual good health until the periods return, when, unconscious, she is seized as before.

"In Hartford, State of Connecticut, Dr. T. was found dead in the street. He was going from his neighbour's to his own house, January 31, 1794, and on the same day, hour and minute, the sun was in an eclipse, with a new moon.

"On the mind it produces the most powerful effects; as an equanimity of temper, a disposition to cheerfulness, and an aversion to anger in people of irascible dispositions. Perhaps there may be discovered in the atmosphere a mixture of airs, at the periods, favourable to the intellectual faculties. In this state of the mind, physicians visit their patients and relations, their friends labouring under contagious diseases, and are not so liable to receive infection."

The author then proceeds to treat of the influence of the moon on diseases, and has stated many facts to show that the human constitution is invaded by various distempers within what he calls "*the periods.*" And truly it is not wonderful that this should happen; for, as the periods comprehend two days before, and as many after the *new* moon, and two days before, and as many after the *full* moon, making eight days in the whole, which are considerably more than one quarter of a lunation, we might reasonably expect, upon the common calculation of chances, that more than one-fourth part of the diforders of the human frame, and more than one-fourth of the deaths, would happen *within the periods*, if the lunar influence was entirely out of the queftion. We have not the leaft doubt of the commencement and termination of the many difeafes enumerated by the author within the periods; but there does not appear to us to be that logical deduction of thefe from the phafes of the moon, at the full and change, that is neceffary to convince his readers of their catenation and dependance as caufe and effect. There may be, and often is, coincidence without caufation.

Upon the whole, though we are not difpofed to deny the reality of the moon's influence, yet we apply to it the obfervation made by a great man on the fubject of witchcraft, "that though, *in general*, he admitted it, yet he knew of no *particular* inftance of it."

If we were difpofed to fuggeft a hint to the author on this fubject, it would be that he turn his attention, in his future purfuits, to the moon's radiance, or the *light of the moon*. There is a perfuafion among the fifhermen, along the coafts of Afia, Europe and America, that the *lunar light* peculiarly and rapidly promotes the putrefaction of fifhes. And fo fully are they fatisfied of this, that they confider the rays of the moon more pernicious to the aquatic game they have caught than the fhining of the fun. In common language, the *increafe* and *decreafe* of the moon are fpoken of as if thefe terms referred to *its magnitude*. But the moon's magnitude, in all her pofitions, remains unaltered, and it is *her light alone* which fuffers enlargement and diminution. To this object the attention of the author, and of other philofophical obfervers, may be directed with a profpect of ufefulnefs and advantage, though triflers and fciolifts may difcourage them by remarking, that the grave fubject of their refearches is nothing but a *matter of moonfhine*.

ART. IV. *The Valedictory Lecture delivered before the Philosophical Society of Delaware. By Dr.* John Vaughan, *Member of the ſaid Society, &c. &c. Wilmington.* Wilſon. 12mo. pp. 36. 1800.

AN aſſociation of citizens, at Wilmington, in Delaware, for the purpoſe of cultivating experimental phyſics, and of applying the principles thereof to uſeful arts and practical ſcience, was announced in our vol. iii. p. 306: and, in p. 406 of the ſame volume, we informed our readers that Dr. Vaughan had been prevailed upon to give a courſe of philoſophical inſtruction to the members and others; and, at his commencement, had publiſhed a Syllabus, of which we there made reſpectful mention. Since that time, it appears that he has been ſeriouſly engaged in the performance of the buſineſs aſſigned to him; and the piece now under conſideration is the concluding diſcourſe, wherein he recapitulates the principal ſubjects on which he had been employed,

The Society had requeſted him to exhibit "a ſeries of lectures and experiments, on electricity, pneumatics, and chemiſtry;" and, having done ſo, he has dedicated the farewell addreſs to the ladies, or that part of them whom he calls "the Female *Inquirers* of Wilmington."

Dr. V. conſiders electricity, heat and light, as modifications of the ſame principle, and that what is the matter of heat in ſummer becomes electricity in the winter. He takes a retroſpect of the phenomena of lightning, and of thunder-ſtorms, with the hiſtory and uſefulneſs of metallic rods. He anſwers the objections brought againſt them as attracting electric matter, and thereby doing more hurt than good. The aurora borealis, in all its forms, is aſcribed to electric ſtreams or flaſhes, paſſing from cold to warm ſtrata of air; and terreſtrial electricity, he thinks, may give riſe to earthquakes. In moſt of this he adopts the more reſpectable opinions of our times. But he is not content with aſcribing a conſiderable part of theſe great operations to electricity, but boldly refers the effects wrought upon animal nerves and muſcles by contiguous zinc and ſilver, and upon parts under the influence of pain, by cuſpidated pieces of braſs and iron, to the ſame agent.

Whether the metallic influence called *galvaniſm* is electrical or not, we feel no diſpoſition, at preſent, to diſpute. But the effects wrought by the *tractors* have been attributed, with great appearance of truth, to the change they work on the ſkin as a ſentient organ, whereby they operate, in the relief and removal of pain, in a manner analogous to that by which *ſcratching cures itching*. In this way they have very often done good, and we have frequently known pain to ceaſe by the irritation of cuticular ſurface, produced by their repeated ſtrokes. Yet the phenomena ſeem not to us to be electrical; nor did the original patentee himſelf inſiſt primarily that they were ſo. The illuſtration of the operation of the tractors by ſcratching is derived from the deceaſed inventor himſelf, who was of opinion that the claws of quadrupeds, and even the nails of the human fingers, were beneficial in removing pains upon the ſame principle that their imitations in metals are. But this is not the only matter concerning which we differ from Dr. V. We obſerve he, like many others, has been deceived by the terms of a publiſhed account of a billet from the Secretary of the Royal Society of London. That learned body never made any acknowledgment of the efficacy of the tractors. They never paſſed any ſpecific vote of thanks for communications relative to theſe inſtruments. The facts were ſimply theſe: The author of a book on the effects aſcribed to theſe ſharpened pieces of metal, and of a controverſial diſcuſſion concerning their influence, had ſent a copy of his publication to the Royal Society, for their information and acceptance. In conſequence of this act of generoſity, the Secretary returned the anſwer cuſtomarily made to the donor in all ſuch caſes, that the preſent was received, and the Society thanked him for it. This was no more than common politeneſs, and to ſuch an acknowledgment he would have been entitled as readily for a two-headed ſnake, or a bird of paradiſe, as for the gift he ſent.

On the *pneumatic* part of his courſe, Dr. V. after treating of *heat* and of *water*, proceeds to the conſideration of *air*, on which he thus expreſſes himſelf. We inſert the paſſage as a ſpecimen of his compoſition and matter.

" The pneumatical and chemical properties of air were diſcuſſed in connection; hence the term pneumatic chemiſtry. The ordinary effects of the atmoſphere by which we are ſurrounded, are to preſerve a balance of power in the ſyſtem; to furniſh oxygen for the ſupport of animal life and combuſtion; to preſerve liquids in proper conſiſtence, &c. &c. The preſſure of the atmoſphere is computed at 15lbs. on every ſquare inch of ſurface; ſo that a common-ſized man bears a weight of 28,000lbs. for his common burthen. This enormous preſſure is counteracted by the air within the ſyſtem.

"Mr. Boyle tells us, that the ſtratum of air next to the ſurface of the earth is compreſſed into one-thirteen-thouſandth part of the ſpace it would occupy if it were at liberty; and yet it may be compreſſed into one-ſixtieth part of that ſpace: therefore air may be condenſed 780,000 times.

"Dr. Gregory obſerves, that if a globule of air, of one inch in diameter, had as great an expanſion as it would have at the diſtance of the ſemi-diameter of the earth (3985 miles) from its ſurface, it would fill the planetary regions as far as the ſphere of Saturn, which is 916,500,000.

"The height of the atmoſphere is eſtimated at 50 miles, and 1204 inches, or 100$\frac{1}{3}$ feet of air is equal to one-tenth of an inch of mercury; conſequently the mercury of a barometer falls one-tenth of an inch for every hundred feet of aſcent. Hence the altitude of mountains, and other heights, may be meaſured by a barometer.

"The velocity of wind is from twelve to fifteen miles an hour; ſometimes it is fifty miles.

"The component parts of the atmoſphere are oxygen and nitrogen—in the proportion of 28 parts of the former to 72 of the latter, in 100 parts of air.

"The primary gaſes are, oxygen, nitrogen (or ſepton), hydrogen, and carbonic acid gas.

"Oxygen is the principle of combuſtion, the eſſentiale of animal life, the principle of acidity, and a conſtituent of water.

"Nitrogen, or ſepton, is a conſtituent of atmoſpheric air, and of alkalies, and is fatal to animal life. Its properties, however, are not clearly underſtood. Dr. Mitchill, of New-York, has lately given it the appellation of *ſepton*, and conſiders it concerned in the production of peſtilential diſeaſes. The ingenious profeſſor has received great applauſe from his publications on this intereſting ſubject, and opened a new field for philoſophical diſcuſſion. His recommendation of the uſe of alkalies in fevers, and his propoſed reforms in the police of our cities, deſerve attention. If his doctrine be ultimately ſanctioned by experience, our calcareous ſtreets and houſes will be laſting mementos of his genius; and become the peaceful habitations of humanity, freed from the devaſtation of peſtilential fevers.

"Hydrogen is a conſtituent of water—is inflammable with vital air—has a garlic ſmell—and is unfit for reſpiration. The unfortunate Pilatre du Rozier inſpired this air, and ſet it on fire during the expiration, which forms a very curious jet of flame. He alſo reſpired a mixture of one-ninth of atmoſpherical air with very pure hydrogenous gas; but when he attempted to ſet it on fire, it exploded with ſuch violence that he imagined all his teeth were blown out.

"This air is eaſily obtained, by putting diluted ſulphuric acid on filings of iron.

"Carbonic acid gas, or fixed air, is formed by the union of oxygen with carbon. It extinguiſhes flame, is noxious to animals, and combines with alkalies. It is an ingredient in moſt mineral waters, and is the uſual teſt for detecting the preſence of lime in waters.

"It is this gas which produces ſo many unhappy accidents at the opening of cellars and wells which have been cloſed for a conſiderable time; and many lives might be preſerved by a little preliminary caution. A perſon ſhould never deſcend into a well or cavern without firſt introducing a lighted taper or candle; and if the flame be not extinguiſhed, he may deſcend with ſafety, as the ſame principle ſupports life and combuſtion; but if the flame be extinguiſhed, he muſt ſuſpect the preſence of carbonic acid gas, or ſome air unfriendly to life. Quick-lime ſhould then be thrown into the well, and repeated until the whole of the fixed air is neutralized, or combined with the lime, forming common chalk, which may be aſcertained by the burning of a taper.

"This gas is heavier than atmoſpheric air, and, conſequently, grovels along the ſurface of the earth; and remains in wells or privies, where it is formed, until expelled by artificial means. It is produced, in great abundance, by the fermentation of vegetable ſubſtances, and is emitted from ſome caverns and lakes. The Grotto del Cano, near Naples; the wells of Perolls, near Montpellier; and the famous Lake of Averno, in Italy, afford this gas in perpetual volumes."

So do the Saratoga and Ball's-Town ſprings, in the State of New-York.

In the *chemical* part, acids, alkalies, earths and metals are enumerated, ſome experiments interpoſed, and then ſucceeds an animated and pathetic peroration, in which the Lecturer reſigns his commiſſion to the Society, and compliments the female part of his audience for their praiſe-worthy example, in having overcome the tyrant Cuſtom, by attending the lectures, and in having manifeſted an ardent zeal in the purſuit of ufeful knowledge. We concur with Dr. V. in his fentiments on making female education more extenfive and folid than it generally is at prefent; and when we reflect how deeply health, pleafure and economy are concerned in the philofophy of houfe-keeping, we are convinced that many things would be better ordered in practice than we find them, if our fair countrywomen were fomewhat better chemifts.

# Medical and Philoſophical News.

## DOMESTIC.

### *Experiments proving the Acid Quality of the* Pus, *or Matter formed on the Surface of Venereal and Cancerous Ulcers.*

THE fluid ſecreted on the ſurface of malignant or ill-conditioned ulcers has frequently been ſaid to become oxygenated, after expoſure, for ſome time, to the atmoſphere.—The benefit derived from alkaline remedies, as ſtated in p. 149, countenances that ſuppoſition. Further light is thrown upon the ſubject by the following experiments. They prove the exiſtence of an acid in foul and corroding ulcers. If this acid is abſorbed, it may be evidently the exciting cauſe of fever in the individual; if it evaporates, it will infect the ſurrounding air, and may poiſon others.

*From the Apothecary of the New-York Hoſpital.*

"Dear Sir, "*November* 28, 1800.

"I ſend you an account of the experiments made by my colleague, Mr. Brouwer, the Houſe Surgeon, and myſelf, at your requeſt, upon purulent matter. I am happy to find the reſult confirms your opinion, that pus is often in an *acid* ſtate. Of the ſubjects choſen to make the experiments upon, three were labouring under ſyphilitic ulcers, as chancres and buboes; two with ſore legs; and one with a recent wound on the head. In the ſores of theſe perſons, papers, tinged with the juice of litmus, were placed. Upon examination, ſeveral hours after, we obſerved that two of the papers in the venereal ſores had changed to a deep red. The paper in the third venereal ulcer had not changed its colour, but its texture appeared to be much eroded and diſſolved by the action of the pus. Of the two papers in the ſore legs, one only was changed red; the other had undergone no perceptible change; nor had the paper in the recent wound on the head ſuffered any material change.

"In order to aſcertain that the redneſs of the papers was not owing to any hæmorrhage from the ſmaller veſſels of the fore, we dipped them in a solution of the carbonate of soda, when they resumed their original colour. With respect to those two cases where the experiment did not succeed, I beg leave to observe, that one of them (the sore leg) was nearly well; the surface of the sore being but small, and the pus well digested. The other was the case of a recent, and but a small wound in the head, in which the pus was also well digested. These last cases seem to confirm another opinion of yours, that pus is not an acid when first secreted, or when it is well digested.

"Another observation I wish to make, that, for some days previous to making the experiment, the sores had no other dressing applied to them but the ung. simp. of the shops; and, after the papers were applied, nothing but dry lint was put on.

"Looking over Hoffman's works, I find, in the fourth volume of his Medicinæ Rationalis System. chap. iv. sect. 6, where he treats of ulcers, that it was the common opinion of physicians in those days, that pus was an acid, though he is inclined to consider it as the product of putrefaction. Wishing you success in your laudable endeavours to promote medical science, I have the honour to be,

"With respect and esteem,

"Your humble servant,

"H. C. KUNZE,

"*Apothecary to the House.*

"To Dr. MITCHILL.

"*P. S.* Since writing the above, I have the pleasure to inform you the experiment has again succeeded. The litmus paper was left only four hours in an ulcer on the leg, and was changed to a red colour."

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*From the Practitioner in Cancerous Diseases, mentioned in Med. Rep.* vol. iii. p. 302.

"SIR, "*New-York, Dec.* 30, 1800.

"It has been lately suggested to me, that there existed an acid in the discharge secreted from cancers and inveterate ulcers, either at the time, or very soon after the secretion. And, having a number of patients of both descriptions, I noted the following cases with some care:

"S. R. a woman aged forty-eight years, had a cancerous tumour in her left breast five years, and in an ulcerated state two years. I applied the litmus paper inside of the dressing, and examined it three hours after, when I discovered some slight shades of red. I let it remain twenty-four hours, and the red had considerably increased. I then let the dressing remain two days, and applied the paper to the pus, while warm, on the dressing, and found it instantly changed with different shades of red.

"J. M. a man aged forty years, had laboured under a cancerous affection of his lower lip for three years. The lip was almost destroyed, and his system much debilitated. In this case I applied the litmus paper immediately to the part affected, without any evident change. I left it on the part twenty-four hours, and it was not only changed red, but a great part of the paper destroyed. I also applied the paper to the matter in three hours after dressing, and it changed instantly reddish.

"I repeated the experiment in a variety of other cancerous cases, with nearly the same effect as before stated.

"I tried the same experiment on the purulent ulcer, without discovering any visible change on the paper. I tried it also on the scorbutic ulcer, without any evident change.

"I am, with due respect,

"Your very humble servant,

"SAMUEL TORBERT.

"To Dr. MITCHILL."

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These experiments open wide and distant views of this important subject. The discharge of an ulcer is prone to grow sour: this sourness comes on by exposure to the air: where pus is good and laudable there is none of that quality: when its condition is worst, there is the greatest proportion of acidity. During this process there must be a decomposition of oxygenous gas; and the caloric extricated on the occasion may produce, in part, the burning and smarting sensation of some ulcers. The connection of fever with this form of ulceration is remarkable. The virus, acquiring its activity from oxygen, may injure the patient by absorption; or, where many patients are crowded a long time together, may rise by evaporation, and, like other acid pestilential gases, spread mischief around. Alkaline lotions, dressings and fumigations, are the proper extinguishers of all these noxious productions.

## ELEMENTS OF THE FIXED ALKALIES, OF LIME, AND OF MAGNESIA.

M. Guyton (Morveaux), we are informed, has read to the National Inftitute of France an account of fome experiments made by himfelf and M. Deformes, of the Polytechnic School, on the conftituent ingredients of pot-afh and foda. The refult of thefe nearly correfponds with the opinions we gave concerning thefe fubjects in p. 189 and 203. Mitchill's experiments had proved, that wood, decompofed *by putrefaction* in the American forefts, contained no alkali, but *an acid.* Pot-afh, therefore, does not pre-exift in the timber, as Rouelle fuppofes, but is formed during combuftion: and its conftituent parts feem to be carbone and azote (the latter being fuppofed to be a compound of hydrogen and oxygen); p. 204. M. Guyton's experiments lead him to conclude that pot-afh is a compound of *lime* and *hydrogen*, and that lime itfelf is compofed of *carbone*, *azote*, and *hydrogen*; confequently pot-afh, according to this, is made up of hydrogen, carbone and azote.—But, in p. 192 & feq. we ftated the experiments of Prieftley and Girtanner, to fhow that *azote* was a compound of oxygen and hydrogen; whence it is to be inferred, that, on a ftrict analytical inquiry into the whole fubject, pot-afh confifts of carbone, hydrogen and oxygen; and lime is no more than a different modification of the fame ingredients.—M. Guyton alfo confiders foda to be a compound of MAGNESIA and hydrogen, and that magnefia itfelf is compofed of *lime* and *azote*; confequently foda, according to this, is made up likewife of hydrogen, carbone and azote; or, in more fimple language, of carbone, hydrogen and oxygen, in proportions differing from both pot-afh and lime; and magnefia is but another, and a varied form of the fame conftituent particles. Thus pot-afh, foda, lime and magnefia, are fhown to be the products of fimilar claffes or affociations of atoms or elements, varying only in their quantities and forces of attraction.

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## INTERPRETATION OF FACTS CONCERNING LIME.

" It is generally thought," fays Prieftley, " that the fixed air contained in fallen lime has been attracted from the atmofphere, in which it is faid to float in a loofe, uncombined ftate. But, from no other experiment that I am acquainted with, can it be proved, that any fixed air neceffarily exifts in the atmofphere; and lime or lime-water will become faturated with it in all fituations." (Doctrine of Phlogifton eftablifhed, p. 63). And "a portion of atmofpherical air, expofed fome time to lime or lime-water, is fenfibly lefs pure than before." An antiphlogiftian might now explain thefe facts, and all others of the fame kind, by faying that the fixed air is formed from the carbone and oxygen of the lime, or from the carbone of the lime and the oxygen of the atmofphere.—M. B. G. Sage, Director of the firft School of Mines in France, has lately endeavoured to fhow by what procefs *animal*, or abforbing earth, is converted to *calcareous earth*, or *lime*; and he affirms, that the lixiviated afhes of burnt bones afford *foda*. Thefe declarations violate no probability, fince the carbonic, hydrogenous and oxygenated particles may be conceived to be fufceptible of thefe, and, indeed, of many other modes of combination.—Teftaceous animals have been fuppofed to borrow, *ab extra*, the lime of which their coverings or habitations were formed. On the prefent view of the fubject, this doctrine is both untenable and unneceffary. The compound calcareous matter which furrounds an egg, or forms a conck-fhell, or conftitutes the bafis of a bone, may fairly be comprehended as formed from its elements, by appropriate functions of the living body analogous to other fecretions. Thouvenel witneffed the converfion of *wafhed chalk to pot-afh*, in his experiments upon feptic vapours; and Chaptal teftifies a fimilar change of a *well-wafhed chalk to pot-afh*, by expofure to the putrid exhalations of bullock's blood. (Chaptal, Elements, art. Soda). And fuch a tranfition now appears very eafy.—Cannot the ufe of lime-ftone, in reducing iron-ores, in producing the oxyd and gafes of lead, and in various other proceffes, be now much better underftood than heretofore?

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### USE OF ALKALIES IN SURGERY.

Since the publication of the method of curing *primary* venereal ulcers by fluid carbonate of pot-afh (Med. Repof. vol. ii. p. 217, firft edition), we find notices, in the Medical and Phyfical Journal of London, and in Blair's Effays on the Venereal Difeafe (vol. ii. p. 310), that the fame remedy has been fuccefsfully tried in that city. In p. 149, fome trials are related of it in *fecondary* ulcerations of the fyphilitic kind, and in other *difeafes of the fkin*. It is remarkable that Dr. Blane's obfervations on the ufe of alkalies in *cutaneous eruptions* (2 Med. and Chirurg. Tranf.) tend to the enlargement of the fame practice. Since thofe events, numerous experiments, in the New-York Hospital, have proved that the pus of ulcers, after a few hours exposure to the air, is acid, and tinges litmus paper red. And a case has been communicated by Dr. Hillier, of Sparta, of actual effervescence on applying carbonate of pot-ash to a very foul ulcer!

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SODA FORMED FROM ITS ELEMENTS IN THE LIVER.

In p. 189 and 203, cogent reasons were assigned, to show that both pot-ash and soda were compound bodies, and had no pre-existence in the vegetables which afforded them on burning. But, though incineration is the *ordinary* process by which both of the fixed alkalies are produced, it is, perhaps, not the *only* one in nature by which they may be formed. With regard to soda, at least, it seems to be certain that it is an ingredient in the gall of all animals which, as yet, have been the subject of experiment. Of many of these, dogs, neat-cattle, swine, sheep, and the other domestic animals, who share with man a portion of the muriate of soda, or sea-salt which he consumes, it may be said they derive the soda of their bile from the decomposition of that neutral salt, as was conjectured by Dr. Mitchill, in our vol. ii. p. 295, first edit. This may, indeed, be the case with creatures who are freely supplied with that article, or with food containing it. Though, in opposition to this, it may be said, that inasmuch as sea-salt is a substitute for gall in the alimentary canal, the liberal use of it with food might be expected to render the biliary secretion less necessary. Be that as it may, it is well known, that in the high tracts of the American continent toward the north-west, where there are few or no salt-springs, that the native red-men eat their food without that condiment. And travellers of our own complexion, who have penetrated the forests far enough beyond the Lake of the Woods, have related, on their return, that the want of salt, to season their meat and fish, was more distressing to them than any thing they had to endure. The bile of such human beings, and of the wild animals dwelling there in the wilderness, must derive its soda from some other source than sea-salt taken into the body. And so, indeed, must that of the stall-fed ox, who, perhaps, may receive an ounce or two of salt to lick once a week or two; while the copious stream of bile which his digestion requires is furnished with a steady and never-failing supply of soda. The liver is the organ which prepares this alkali, not by straining it off from the blood (for there was none contained in the blood), but by forming it synthetically from its simple ingredients. That large and important viscus may, therefore, be defined to be " the manufactory of soda for the ordinary supply of the constitution." And this, which has usually been called the *mineral*, may henceforward, with equal propriety, be termed *animal alkali*.

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LUMINOUS APPEARANCE OF OCEAN-WATER OWING TO ANIMALS.

In a memoir on the light emitted by the water of the ocean, written by Dr. Mitchill, the author has expressed his conviction, that this phenomenon is *universally animalcular*. He has discovered several species of the Medusa which emit light, and some others of the Mollusca. He has made observations on their structure and functions. The emission of light is connected with the circulation of the *arterious* blood, and is not perpetual, but intermitted, and seemingly performed *ad arbitrium*. It goes on *during the day* as well as by night, though then not ordinarily distinguishable, on account of the greater light afforded by the sun. These creatures seem capable of living in water of all common temperatures above the freezing point. Mr. Mitchill's observations were made on the salt-water of the Atlantic, upon the shore of Long-Island.

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CHEMICAL SOCIETY OF PHILADELPHIA.

Among other communications lately made to this association of the votaries of science, is a series of Geological Essays, by Mr. George Lee. Though we have not heard that the author has given the geology or mineralogy of any part of the United States not heretofore described, yet we learn that, like Mr. Kirwan, he is a spirited supporter of the Neptunian theory of the earth, and a firm believer in the Mosaic account of the deluge and its consequences.

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TRAVELS IN THE NEIGHBOURHOOD OF THE MISSISSIPPI.

Many places on the banks, and in the vicinity of this western limit of the United States' territory, abound with lime-stone, in which there are numerous impressions of shells and other animal relics. Those are plain and frequent in the tract between the mouth of the Ohio and the junction with the Missouri, as well as on the Ohio, and in the lower country, as one descends toward the Gulf of Mexico. Mr. Stephen Ayres has brought specimens of these petrifactions, collected by him, in his tour through that country, in the courſe of the year 180Q. In his manuſcript journal, which we have ſeen, mention is made of the ſalt-ſprings and works in the country bordering on the Miſſiſſippi, and of pumice-ſtone found floating on the waters of the Miſſouri. Pieces of this pumice-ſtone which are in our poſſeſſion, and which now readily ſwim in water, were taken up fifty miles above the mouth of the river, and lead to a conviction of the exiſtence of volcanoes in the neighbourhood of its ſuperior ſtreams. Theſe probably iſſue from that chain of mountains which, ſtretching N. and N. W. from the Cordelieras in South-America, form the inſurmountable barrier of Darien, which repels the intra-tropical currents and ſurges of the Atlantic, and, in higher latitudes, dividing the waters which fall into the Pacific from thoſe which run into the Miſſiſſippi, conſtitute the immenſe and unexplored mountains which may be called the "Northern Andes." We underſtand the Miſſouri is conſidered by the Britiſh and Spaniſh governments as the territorial line, defining the limit where the dominions of the former, extending from Canada and Hudſon's Bay, and of the latter, reaching from Florida and New-Spain, meet, and circumſcribe and compreſs the United States. The policy of two powerful and hoſtile nations has not, that we know, given riſe to any expedition whereby the ſources of this vaſt river might be viſited, and the adjacent regions explored:—As to the ſalt-ſprings, Mr. Ayres is of opinion, the quantity of ſalt in the weſtern country he has viſited is very great; that a large ſpace of land, now bare, was formerly overflowed by means of dams of rocky and mountainous matter below, which have ſince given way; that the ſaltneſs of the lakes, anciently ſo formed, might have enabled the teſtaceous creatures, whoſe remains are ſo abundant, to have lived in them; and that their exiſtence there may be thus accounted for, without deriving them from the ocean.

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## INSECTS IN ABUNDANCE NOT NECESSARILY CONNECTED WITH SICKLY SEASONS.

In deſcribing peſtilential ſeaſons, it has been very common to notice the innumerable ſwarms of inſects. Some obſervers of the phenomena attendant on times of ſickneſs have even been led to an opinion, that the growth and multiplication of theſe tribes of animals is promoted by that condition of the atmoſphere and the waters which is unfriendly to the health of man. We ſuſpect, however, this is by no means correct. The ſummer and autumn of the year 1800 was very productive of insects, in the States of New-York, Jersey and Pennsylvania; and still no corresponding degree of sickness occurred, either in city or country. Locusts were so thick in West-Jersey, and the eastern parts of Pennsylvania, as to keep up an incessant noise. In Dutchess County (N. Y.), Dr. Ricketson, who resided on the spot, describes various other kinds as uncommonly numerous, and making great ravages among the forest-trees; and, at the same time, observes, that a favourable state of health had generally prevailed.—Insects, then, may be very abundant, and no remarkable sickness exist. There is, therefore, no necessary connection between swarms of insects and pestilential seasons. But it is, nevertheless, true, that, during some periods of epidemic sickness, there have been great numbers of insects. These, however, have been merely accidental coincidences, and by no means indicate a law of nature on the subject. On the contrary, some insects are killed by pestilential air, as has been often observed of common house-flies, vast numbers of which died on the approach of the sickness in New-York, toward the latter part of the summer of 1799. For the future, physicians, and others who describe pestilential seasons, should be careful not to use the broad and unqualified term "insect," but, instead thereof, particularize the species which they observe to be prevalent at such times. They will thus express themselves with precision, and their readers will the better comprehend their meaning.

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MACHINE FOR EXPEDITING THE TANNER'S BUSINESS.

James Cox, of Rahway, in East-Jersey, has obtained letters patent for a machine of his invention, to save labour in tan-yards. It consists of sets of frames adapted to the vats, on which the hides are to be stretched, and secured in such a manner as to be at once in a situation to be acted upon by the fluid in which they are immersed, and to be easily lifted out in a body, for airing, by the strength of one or two men. Thus, in the operations of soaking in common water, in lime-water, &c. the hides are handled with very little expenditure of time or strength. Good judges are of opinion, on trial, that Mr. Cox's invention promises to be of great utility in that extensive branch of manufacture.

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*Is* MATERNAL EMOTION COMMUNICABLE *to the* FŒTUS?

Ever since the publication of Roederer's famous essay, denying the influence of the mother's imagination upon the figure and complexion of her unborn child, it has been generally fashionable, with men of philosophical understandings, to reject such interpretations as illusory and deceptive. That many of them are so nobody will deny. Fancy, imposture and credulity, joined to a propensity for the marvellous, have done wonders in this way. Still there are singular facts, which it becomes us to consider well before we renounce. The following is an instance now in the city of New-York: A woman, during pregnancy, had a conference with her husband concerning the disposal of the milch-cow which they kept. It was the wish of the wife, that the animal, which was a favourite, should be kept over to the next season; but it was the husband's opinion she should be fatted, and slaughtered for beef. No decision took place at the time, nor was there any further conversation on the subject. Some time afterwards, in an advanced stage of gestation, this woman was suddenly surprised, and inexpressibly shocked, at the sight, through a window, of the creature she valued so fondly lying dead under the butcher's hands. The circumstances which particularly struck her notice at the instant, and dwelt indelibly upon her memory, were the stumps of the fore-legs, that had just been cut off at the knee-joint, as the cow lay turned up.—After this spectacle of disgust and horror, the child was born at the usual time, BUT UTTERLY DESTITUTE OF THE FORE-ARMS AND HANDS OF BOTH THE UPPER EXTREMITIES! About half-way down the humerus there is an abrupt termination in stumps, as if the arms had been amputated above the elbows. In other respects, except some mal-conformation of the toes, this little girl is well-shaped, hearty, and still alive.—This looks like cause and effect. Modern physiologists will probably laugh at the explanation as strange and unwarrantable. So they may: but it does not follow that a remarkable event, preceding a phenomenon, has no connection with it, because human understanding has not hitherto traced the whole chain of causation. Notwithstanding the distinctness of persons between mother and child, there is some wonderful sympathy between them.

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## DESCRIPTION OF THE SARATOGA MEDAL.

After the capitulation of the British troops at Saratoga, in the year 1777, the American Congress voted to Major-General Gates, who commanded that division of the army on the occasion, a sword and a medal, in honour of his bravery and success.

The medal was ſtruck in Paris, and is of exquiſite workmanſhip. The one ſent to the General is of gold, and weighs ten half-johanneſes. On one ſide is a fine likeneſs of him in profile, ſurrounded by the words, "HORATIO GATES DUCI STRENUO;" and, at the bottom, "COMITIA AMERICANA," in alluſion, probably, to its having been voted by Congreſs. On the reverſe, Burgoyne, in the act of delivering his ſword, on the capitulation of Saratoga, occupies the foreground, about midway between the American and Britiſh forces, which are repreſented on the right and left in the rear. Above are the words, "SALUS REGIONUM SEPTENTRION." and beneath, "HOSTE AD SARATOGAM IN DEDITION. ACCEPTO, DIE XVII. OCT. MDCCLXXVII."

Since the commencement of the revolution in France, the dies by which the medal was executed have been politely forwarded to General Gates by an unknown perſon. It is thus in the power of Americans to have theſe commemorative medals multiplied to any number they may deſire.

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## CULTIVATION OF THE ENGLISH LANGUAGE.

A *Grammar*, an *Abridgment of the Grammar*, and a *Book of Exerciſes*, connected with the grammar, have, within a few years, been publiſhed in England, by Mr. Lindley Murray, of York. The author, who is an American, and a native of the city of New-York, has, more lately, edited two other works, entitled the *Engliſh Reader*, and the *Sequel to the Reader*. All theſe are performances adapted to their ſeveral ends with great taſte and diſcernment. They have, therefore, been generally commended, and have become very popular. The greater number of theſe uſeful and meritorious books have already run through ſeveral editions, of five or ſix thouſand copies each, in England, and ſeveral of them have undergone impreſſions in America. The profits of the copy-right and ſale, which are very conſiderable, are, we underſtand, not converted, by the benevolent author, to his own emolument, but the whole, conſiſtently with his original deſign, are ſteadily and invariably applied to the benefit of others. The introduction of theſe elementary books into many of the *great ſchools* in Britain, may be conſidered a favourable prelude to their reception into ſeminaries of learning in the author's native country.

### REMARKABLE PRODUCT OF THE POTATOE.

Mr. Cushing,

In your paper of June, 1799, you published an account of the great produce of one potatoe, which a gentleman in England planted in his garden, taking particular care to make it produce the most possible, which, if I mistake not, was *eighty-one pounds*.—When I read the account I did not think the produce any thing extraordinary; but, having finished my planting, I could not try the experiment until this year.—My garden being small, I could not afford any part of that for the purpose, but planted a large potatoe by itself in my field. I cut it into small pieces, to make it yield as much as I possibly could. In October I pulled the potatoes which proceeded from it, and spread them on the grass to dry, from eleven o'clock forenoon, until three in the afternoon; then weighed them, and found the produce of the one potatoe that I planted to be *one hundred and eighty-two pounds*; among which was one potatoe that I think capable of producing a considerably larger quantity.

Yours, EBENEZER STEVENS.

*Andover, Dec.* 4, 1800. [*Salem Gaz.*

### TUSK OF THE MAMMOTH.

Since the publication of the communications of Mr. Miller and Dr. Graham (p. 211 & seq.), concerning the fossil bones on the west bank of the Hudson, about eighty miles from the city of New-York, other discoveries have been made. We have been informed that the upper jaw-bone is perforated to receive a tusk, like that of the elephant. In neat-cattle the horns cover the clints, which are bony projections or excrescences from the skull; but in the skeleton of this unknown creature, the connection of this tooth or tusk was by gomphosis. Two pieces of the substance of one of these are in our possession, and they are evidently *ivory*.—This structure of the head leads towards a belief that the animal was a species of elephant.

### AMERICAN PHILOSOPHICAL SOCIETY.

*Philosophical-Hall, Jan.* 2, 1801.

At a meeting of the American Philosophical Society, the following members were duly elected officers for the ensuing year, agreeably to charter:

Thomas Jefferſon, *Preſident.*

Caſpar Wiſtar,<br>Robert Patterſon,<br>Andrew Ellicott, } *Vice-Preſidents.*

John Redman Coxe,<br>Adam Seybert,<br>Joſeph Clay,<br>Burgeſs Alliſon, } *Secretaries.*

Jonathan B. Smith,<br>William Currie,<br>Samuel Wheeler,<br>P. S. Duponceau, } *Counſellors for three years.*

C. W. Peale,<br>J. R. Smith,<br>Robert Leſlie, } *Curators.*

John Vaughan, *Treaſurer.*

John Redman Coxe, *Secretary.*

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AMERICAN ANTIQUITIES.

Figured ſtones, which formerly were employed by the Aborigines, or red-men of America, for pointing their arrows and heading their ſpears, are frequently found in the places where they formerly dwelt and hunted. They are of various ſizes, from one inch to five inches in length, and of proportional breadth. They are all formed of ſilicious ſtones, not poliſhed, but worked into ſhape by repeated ſmall ſtrokes ſcaling off the flinty matter by a concavo-convex fracture.—Along the ſea-coaſt, and iſlands of New-York, the moſt common materials of theſe *Indian piles*, as they are called, are white quartz and dark flint; though ſome are compoſed of jaſpar, or cornelian, and others even of a milk-coloured ſtone, very much like chalcedony. Their ſtone-axes, with which they uſed to girdle trees, are ordinarily of compact argillaceous ſand-ſtone.

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EXPERIMENTS *on the* PRODUCTION *of* WATERY VAPOUR *during the* PREVALENCE *of* EXTREME COLD.

December, 1800, had been remarkable for the moderate weather which had generally prevailed throughout it, eſpecially the latter half of the month. A milder temperature, at that ſeaſon, had rarely been known. Miſt and fog had been ſucceeded by rain, which, having not been hardened by cold, had rendered the walking, in the city of New-York, very muddy. Indeed, on the 24th and 25th, the face of the earth, in the maritime parts of the adjacent country, was not only bare of ſnow, but quite free from froſt. On New-Year's day, 1801, the weather, though colder, did not exceed a very moderate winter-temperature. On that night, and on the morning of the 2d of January, there was a ſlight ſprinkling of ſnow, enough to whiten the earth, but not to thicken the water: and there was not, at this time, a ſingle cake of ice floating either in the River Hudſon (or North-River), or in the Eaſt-River (or Sound). So warm had the weather been in the interior country, that the ice in the Mohawk-River, and in the Hudſon at Albany, was ſaid to have broken up.

During the night of the 2d, and morning of the 3d, the temperature became rapidly colder, and there was ſuch a ſpeedy abſtraction of caloric, that water congealed within doors for the firſt time ſince the commencement of winter. At eight o'clock on the morning of the 3d, the quick-ſilver in Fahrenheit's thermometer was as low, in the open air, as 6 deg. above zero.

At that time the *ſalt-water* of both the rivers, and of the Bay of New-York, emitted copious vapours, reſembling thoſe which hot water ſends forth into the colder atmoſphere in common caſes, and, like them, gradually evaporated and diſſolved in the air. A ſimilar exhalation proceeded from the ciſterns of *rain-water* in the city; part of which condenſing on the refrigerated wooden work above ground, and on the ſpider-webs remaining in the corners of the ciſtern-mouths, formed beautiful cryſtallizations of hoar-froſt.

To determine the relative temperatures of water and air, when this phenomenon occurred, Dr. Mitchill made experimental trials. The following are the reſults: While the mercury in the thermometer, at the ſurface of the earth, then beſprinkled with ſnow, was at 12 deg. above cypher, near the opening of his ciſtern, it raiſed to 41 deg. on being let down to the depth of eight feet in the water. Here ſtagnant freſh water, $41-12=29$ deg. warmer than the contiguous air, elevated plenty of viſible vapours. There was a fall of a little more ſnow during the morning of the 4th; and, at nine o'clock, the quick-ſilver, in the open air, had riſen to 22 deg. The heat of the ciſtern-water was ſtill 41 deg. and it continued, when the lid was raiſed, to exhibit a more faint, though ſtill a diſcernible exhalation. Freſh water, thus, may be ſeen to ſmoke when the air is $41-22=19$ deg. colder than itſelf.

The condition of ocean-water was ſomewhat different.

While the mercury was as low as 12 deg. on a fnowy plank, upon a wharf in the Eaft-River, near Dr. Mitchill's houfe, it rofe to 37 deg. on being let down to the depth of eight feet, through a port-hole in the fide of an armed brig moored there. Here current falt-water of the tide, $37-12=25$ deg. warmer than the incumbent air (though it had been fmoking all the preceding part of the day, while the mercury had been rifing from 6 deg. the point at which it ftood at eight o'clock A. M. to 12, at four o'clock P. M.), had juft ceafed to afford any more vifible vapours. Though the heat of the water in the river continued at 37 deg. on the morning of the 4th, yet, as the heat of the air on the wharf was altered to 22 deg. there was no fenfible evaporation. Air, no colder than $37-22=15$ deg. below the temperature of the falt-water, elicits no perceptible fumes from it. When the rivers and bay fmoke, the incumbent air muft be more than 25 deg. colder than the water beneath, to produce an exhalation difcernible by the eye.

Thefe experiments were made with a green-houfe thermometer, connected with a tin cafe and cup. They fhow that rain-water, when the atmofphere is 19 deg. colder than it, emits a vapour which, though fmall, is difcernible; that ocean-water does not afford vifible exhalation unlefs the atmofphere exceeds it in coldnefs by a greater number of degrees than 25; that the falt of the ocean attracts the water in which it is diffolved fo ftrongly as to require $25-19=6$ deg. more of relative cold in the air, to make it furnifh fenfible exhalations, than rain-water does; and that, confequently, during this evaporating procefs, both the kinds of water communicate caloric moft rapidly to the atmofphere, warm it, and raife its temperature, as far as they can, toward that degree at which it fhall be incapable, on account of its increafed folvent capacity, of manifefting vifible vapours any longer.

One might now almoft calculate what degree of coldnefs in air would be neceffary to raife vapour from water of a given temperature. Let it be required, for inftance, to find how low the atmofphere muft be cooled to enable vifible fteam to rife from the air-holes of the Hudfon, or the rapids of the St. Lawrence, where the fluid is rain or river water. The water is undoubtedly warmer than the freezing point, or 32 deg. fuppofe two degrees, or 34. Let D be the degree of frigidity in the air neceffary to form vifible vapour; R the heat of the water in the river; and V the point at which vapour is feen: then the problem may be folved by the following formula: R, or $34-D$, or $19 \pm V$, or 15, the degree of cold in the air at which steam would begin to be visible.

Again, let it be asked at what temperatures of air and water ought visible exhalation to be formed in the Bay of New-York, or in the ocean-water of either of its rivers? Then putting O for the temperature of the water; D, again, for the difference of temperature in the atmosphere; and V for the degree at which the exhalation could be seen; the calculation would stand thus: O, or $34-D$, or $25 \pm V$, or 9, or the highest degree at which vapour can be seen under such circumstances.

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### DIGITALIS PURPUREA.

The reputation of this powerful remedy still continues to stand high in America and Great-Britain.

In Great-Britain it is contended that, by a judicious management of this plant, variously combined, pneumonic inflammation may be obviated with as much certainty as the progress of an intermittent fever can be arrested by means of the Peruvian bark; and that, if pulmonary consumption be divided into four stages, the digitalis will commonly cure the three first, and greatly alleviate the distressing symptoms of the last. Some deduction, however, should be made in an estimate of the opinions of physicians who infer general conclusions from particular cases.

This remedy has been also often prescribed with success in *continued fevers* of various types—in *croup*—in *asthma*—in *measles*—in violent cases of *hemicrania*—and in the more severe degrees of *hæmorrhoidal* affections.

It has been also proposed, in combination with opium and camphor, as a means of preventing abortion; and we find stated a remarkable instance of its efficacy in this case, where it appeared to remove the peculiar irritability of the system, and especially of the uterus, which takes place in females disposed to that disease.

The infusion of digitalis has been likewise employed with success, externally, as a remedy for many stubborn cutaneous eruptions. It is asserted that it will subdue the itch with certainty.

As Dr. Ferriar, of Manchester, has used the infusion of digitalis, as a lotion, with success, in the inflammatory affection accompanying anasarca of the inferior extremities, which has hitherto proved one of the most intractable species of external inflammation (see Med. Rep. vol. iii. p. 428), the queſtion naturally ariſes, whether the ſame infuſion would not be a promiſing remedy, if employed as an injection in the more ſtubborn forms of virulent gonorrhœa, and, at the ſame time, given internally in caſes of unuſual irritability, and of generally increaſed vaſcular action? How far would ſuch an infuſion be admiſſible as a collyrium in any of the more obſtinate forms of opthalmia?

In this city the good effects of digitalis were lately exhibited in the following caſe: An unmarried woman, about thirty years of age, of hyſterical conſtitution, was affected with an obſtinate watchfulneſs of nearly a fortnight's duration. Her ſyſtem, at the ſame time, was unuſually irritable by the ſlighteſt impreſſions. By degrees ſhe was attacked with all the ſymptoms of hyſteria, which progreſſively increaſed in violence, till the convulſions, &c. aſſumed a frightful appearance. At length hyſteria gradually paſſed into mania, and the patient, for many days, continued altogether ungovernable by ordinary means. The uſual remedies were all ineffectually tried. Recourſe, at laſt, was had to digitalis, in the form of infuſion, which ſoon calmed the violent commotion, reduced the pulſe from a very rapid ſtate to nearly forty beats in a minute, induced ſleep, which had been ſo long baniſhed, and quickly removed every hyſterical appearance. By an accidental overdoſe of the remedy, a ſevere retching, of ſeveral hours duration, was brought on; which, however, yielded merely to the diſcontinuance of the medicine. She is now well.

Dr. A. J. De Roſſet, of Wilmington (North-Carolina), in a letter to Dr. Miller, communicates the following caſe of the efficacy of digitalis:

"In conſequence of a paragraph in one of the numbers of your Repoſitory, the mother of a numerous family has been reſtored to her children, her huſband and friends, when even hope itſelf had almoſt ceaſed to afford its cheering influence. She had, for ſome time, laboured under the ſymptoms of a rapid *phthiſis*, which had daily gained ground till ſhe was reduced to the laſt extremity. The diſcharge from her lungs was exceſſively copious, and appeared to be *pus* mixed with blood. An erect poſture was the only one ſhe could obtain any ſleep in. Every ſymptom portended approaching diſſolution. This had been her ſituation for a fortnight, as I learned from her huſband, who is a phyſician, when I ſhowed him the paragraph alluded to, giving an account of the uſe of the digitalis in that diſeaſe. I furniſhed him with ſome of the herb, which he readily agreed to make trial of, and the fuccefs of the experiment exceeded our moft fanguine expectation. The fymptoms gradually abated, and the lady now enjoys good health. It is now eight or ten months fince her recovery. The powder of the leaves was given in fubftance.

"*N. B.* During the ufe of the digitalis, the lady drank freely of the infufion of the horehound (marrubium vulgare)."

Dr. John Spence, of Dumfries, in Virginia, has juft tranfmitted, in a communication addreffed to Dr. Mitchill, fome valuable obfervations on the ufe of digitalis, accompanied with the journal of one fevere phthifical cafe in which its efficacy was very happily difplayed. The powers of this remedy in reducing the exceffive action of the arterial fyftem, in fubduing irritability, in gradually relieving the cough and purulent expectoration, and, finally, in conducting the patient to the recovery of perfect health, have been feldom exhibited in a more fatisfactory manner. A more particular account of Dr. Spence's employment of digitalis will be given in a future number.

The inquiry concerning the mode of operation of digitalis is extremely interefting. By afcertaining it we fhall be enabled more correctly to modify and regulate the ufe of this powerful agent—to extend as well as to limit the employment of it—to guard againft deleterious confequences—to felect and combine the beft auxiliaries—and to determine in what cafes it ought to be preferred or poftponed to other medicines. Some conjecture that it operates by rendering the heart and arteries lefs fufceptible of the ftimulus of the blood and other agents, or, in other words, as a direct fedative. Hence it has been ufed in Great-Britain, either in a folitary or combined form, in almoft every cafe of *increafed vafcular action.* But it is contended, on the contrary, from its fpeedily evacuating watery accumulations in many cafes of dropfy, that it muft act by a direct ftimulant operation upon the abforbents. Whether thefe oppofite actions in the animal fyftem be compatible with each other, or, if not, which of them be the true one, we leave to the decifion of future experience and obfervation.

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THE NEW GERMAN REMEDIES FOR FEVERS.

The American newfpapers have lately contained feveral paragraphs concerning certain difcoveries in the cure of febrile difeafes, by Profeffor Gottfried Chriftian Reich, of Erlangen. This is the man whom we mentioned in our vol. i. p. 262, firft edit. as having been very inftrumental in tranflating and publiſhing, in Germany, the pieces he had received from this country on the doctrine of ſepton, with additions and enlargement. He has, during the year 1800, publiſhed ſeveral works of his own. One of theſe is a ſmall octavo book, of about three hundred pages, printed at Nuremberg, and contains a deſcription of caſes of diſeaſe, amounting to thirty-eight, treated by his new remedies: the other is a duodecimo pamphlet, of 88 aphoriſms, printed at Berlin, and containing a conciſe, but ſententious, developement of the philoſophical or ſcientific principles by which he ſuppoſes fevers are produced, and of the manner in which his remedies operate in curing them. The hiſtory of theſe publications, as related by the author, is this: His thoughts having been turned to new views of the ſubject, by the peruſal of the pieces from the United States, he determined not only to ſtudy the principles which they contained, and others to which they prompted his underſtanding, but to apply his own matured opinions to practice. In proſecuting this inquiry, he reflected much upon the works of many writers, but particularly of Mitchill, Hufeland, Reil, Röſchlaub and Brown,* and made up his mind after a ſurvey and conſideration of the whole of their ſyſtems. Convinced of the utility of the diſcoveries he had made, he gave out that he was poſſeſſed of the knowledge of two excellent remedies for fevers; and the conſequence was, that the king of Pruſſia invited him to Berlin; cauſed experiments to be made by him, with them, before a committee, in the Great Hoſpital; gave him honour, promotion, and a penſion, and prevailed upon him to diſcloſe to mankind at large whatever he had found out on the ſubject. Such is the account derived from the learned Profeſſor Reich himſelf, and the books which he has obligingly ſent us. The author, whoſe letter is dated Sept. 5, 1800, is now ſettled in the capital of Pruſſia.—The grand remedies are the SULPHURIC and MURIATIC ACIDS. He thinks well of the *phoſphoric*, but fears the noxious effects of the *nitrous*† in ſome of its forms.

The following paragraphs, which contain a part of his doctrine of fever, have been rapidly tranſlated, for the immediate information of our readers:

(§ 29.) " As every diſeaſe, in general, is a particular modification of the living ſtate of the body, ſo is fever a pecu-

* Reich's Beſchreibung mit ſeinen neuen mitteln behandelten Krankheitſ-fälle; Einletung, page 9. u. ſ. w.

† Von fieber und deſſen behandlung, § 68.

liar modification of this living ſtate; and the word fever is accordingly made uſe of to denote a genus of diſeaſe which muſt be entirely different from every other.

(§ 30.) "Inaſmuch as by the term fever a peculiar form of diſeaſe is denoted, which really belongs to all thoſe diſorders comprehended under the denomination of fever: ſo far muſt all theſe diſeaſes agree with each other.

(§ 31.) "The circumſtances in which theſe different diſeaſes agree with each other, and whereby they conſtitute a fever, muſt likewiſe have ſome marks of diſtinction, ſomething eſſential, general and original, and which muſt abſolutely be preſent, in order to a diſeaſe being pronounced a fever. There muſt likewiſe be ſomething they all have in common, becauſe only upon this account the different ſpecial forms of diſeaſe which are known under the name of fever can be placed under this title, or can, with juſtice, be ranged under the generic character.

(§ 32.) "Without the preſence of this generic character no diſeaſe can be called a fever. This follows from that law in logic, that what belongs to the genus muſt likewiſe belong to the ſpecies; and that ſuch a ſpecies can no otherwiſe be conſtituted than by poſſeſſing a character common to the whole genus.

(§ 33.) "All fevers, from the ſimple ephemeral fever to the plague, as the higheſt grade of fever, are only different ſpecies of one and the ſame genus; and if fever in general is to be juſtly defined, the things common to them all muſt be noticed in the definition—that is to ſay, the generic character muſt be expreſſed.

(§ 34.) "What is, therefore, this generic character? Is the knowledge of it ſo attainable that we are immediately able to diſcover it? To a perſon who meditates it is plain enough: for though it cannot be perceived as matter, the thing itſelf not being of a material, but abſtract kind, yet it can be eſtabliſhed, with entire certainty, from the collection and order of the phenomena of fevers, and from the external diſcoverable cauſes of them.

(§ 35.) "We now remark, in an empirical manner, that every thing which diſturbs the univerſal and true union of both living principles* with one another, and with the ſimple and compound matter preſent in the body itſelf, through

* The author here refers to the eighteenth aphoriſm, where oxygen is ſaid to be the poſitive, and azote the negative principle of life.

which the variety of principles neceſſary to life are accompliſhed, and through which that which is called by me unnatural fermentation depends, creates a condition peculiar to fever.

(§ 36.) "This condition conſiſts in a change, ſometimes great, ſometimes ſmall, of all the ſecretions and excretions, which depends upon an abſolute diminution, or a diſturbance of juſt proportion, of the chemical combination of oxygen, and of its effects upon and in the body.

(§ 37.) "The generic character, or eſſence of fever, the ſymptoms of which, I preſume, are already known, conſiſts in an unnatural and general ſeparation and re-union of the moſt ſimple particles of the human body, effected by the unnatural, abſolute or relative, local or univerſal diminution of oxygen. It is ſcarcely neceſſary to obſerve, that the word unnatural does not mean any thing contrary to the laws of the general courſe of nature, which would include an abſolute impoſſibility, but that it is made uſe of to denote a certain relation to the natural ſtate of the body.

(§ 38.) "This diminution of oxygen can be effected by external and internal cauſes.

(§ 39.) "To external cauſes belong, beſides miaſma, and the impurity of the atmoſphere in general, all eruptive poiſons, all of which create a fermentation in bodies; whereby the right adjuſtment of oxygen is impaired, and the force of natural connection between it and the other elements diſſolved, by an unnatural decompoſition and recompoſition among them.

(§ 40.) "As there are many kinds of chemico-animal proceſſes in the ſound ſtate, external circumſtances, which hinder the combination required by healthy nature, may create fevers. Witneſs the phenomena of the dead chemical fermentation, and the known influence of external circumſtances, as temperature, ſtate of electricity, &c.

(§ 41.) "Internal powers, exiſting in the body, are likewiſe able to create fevers.

(§ 42.) "As in every chemico-animal proceſs the ſolids, as muſcles, nerves and veſſels, have their definite co-operation, every thing which hinders the exertion or activity of theſe parts muſt likewiſe be ſufficient to produce ſuch an effect. Impreſſions upon the mind, as well as material powers, may, therefore, have a ſhare in cauſing fevers.

(§ 43.) "The proximate cauſe, therefore, of all fevers, lies either in the prevention of the reception of oxygen, or in an unnatural application of it, or in an accumulation and evolution of carbone, hydrogen, fepton, fulphur, phofphorus, and of all other particles of the human body fuppofed to be fimple, and in the conjunction of thefe matters, among themfelves, in binary, ternary, quarternary, and quintuple forms; and with fuch matters as have their accefs externally, which we comprehend under the names of caloric, light, magnetifm, and electric matter."

He then goes on to fay, that oxygen muft be the only true remedy for fevers; but as we cannot get it quite fimple, we ufe thofe things which contain it in the pureft and moft fimple manner: thefe are acids. He fays that he ufes acids in all kinds of fevers, by whatever name they are known, and he is confident they will cure in the moft eafy and beft manner, provided only there is no deftruction of the organization of any part. "I at firft," continues he, "for a long time, made ufe of the SULPHURIC ACID; but finding that it was not relifhed by the fick, that it did not part with its oxygen quick enough, and that it often felt heavy in the ftomach, I made a trial of the COMMON MURIATIC ACID, and this proved, in the refult, to be one of the beft and moft pleafant acids. I have, fince that, conftantly made ufe of it. Befides thefe two mentioned acids, I have made ufe of others, and found their operation coincided with my opinion."

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YELLOW FEVER IN THE UNITED STATES.

We are difappointed in the expectation of inferting, in this number, an account of a malignant difeafe which raged with great mortality, laft autumn, in an interior fituation of this State. Affurances have been given us that the facts are very remarkable, and that a narrative of them fhall be tranfmitted as foon as it can be fully prepared.

In a letter from Dr. A. J. De Roffet, of Wilmington (North-Carolina), to Dr. Miller, dated 2d November, 1800, the following account is given of the epidemic of laft autumn.

"Our fummer had been remarkably healthy, very few cafes of remittents having occurred. About the beginning of September the wind changed to the eaft, and the weather became unufually chilly; after which thofe difeafes became more frequent, and many of them affumed a continued form. The fymptoms were fuch as ufually attend bilious fevers. The irritability of ftomach was lefs than in fome of the preceding feafons. A tendency to diarrhœa marked many cafes: the difcharges from the bowels were remarkably bilious. Thefe remittents were generally of the *double tertian* type. In feveral of such cases, which occurred to myself, as well as to some of my medical friends, the paroxysms that took place in the morning were accompanied, almost through the whole course of the disease, by a cutaneous eruption, resembling much the *urticaria* of Cullen, though in a very severe degree; while those fits which occurred on the evenings of the intermediate days were perfectly free from it. Among the seamen a few cases occurred where the disease assumed the form of yellow fever, most of which proved fatal: indeed, it was only among these people that any mortality took place; for none of the settled inhabitants died, if we except two or three infants. The crews of all the vessels in the harbour were very sickly, though no suspicion has been expressed, by persons of any description, of the importation or contagiousness of the disease, as its origin, in every case, could be reasonably ascribed to local circumstances. It may be mentioned, that relief was obtained, in some of the more violent cases, by a speedy ptyalism having been induced by copious mercurial frictions. As far as my information extends, the epidemic of other towns in this State differed in no respect from our own."

Dr. Kollock, of Savannah, in Georgia, in a letter to Dr. Miller, gives a favourable account of the health of that city, and of the State at large, through the last summer and autumn. In the month of August two or three cases of malignant fever occurred, which terminated fatally on the third, fourth or fifth days of the disease, marked by black vomiting and the other formidable symptoms of yellow fever. Two of these patients were gentlemen just arrived at Savannah from Charleston; neither of them was a native of that country, and one had only landed from Europe ten days before. No person received infection from them.

From Drs. Selden and Whitehead, of Norfolk, in Virginia, we have received a very interesting account of the fatal epidemic of the last summer and autumn in that city, which will be inserted in our next number.

Several physicians in Baltimore have engaged to send us further information concerning the epidemic as it appeared in that city.

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### YELLOW FEVER IN SPAIN.

No authentic notices of the pestilential epidemic which prevailed, during the last summer and autumn, in many parts of Spain, have yet come to hand. We give the following newspaper account as the best within our reach at present.

"The plague is committing dreadful ravages in Spain. In Andalufia 11,000 have died: in Seville 21,000: in Xeres from 160 to 200 die per day. The utmoft confternation prevails: It is approaching the borders of Portugal, and is fuppofed to fweep off one-fixth of the population of the places through which it paffes. But a fmall proportion of women die.—This diforder begins with violent pains in the limbs, and head-ache, a ftrong fever, and reaches its height by the fourth day. Many die with the black-vomit, and their bodies turn yellow."

We have written to feveral learned correfpondents in Europe, to requeft particular information concerning this epidemic, which we hope to be able, in due time, to lay before our readers.

## RETALIATION ON THE IMPORTERS OF YELLOW FEVER.

Importation of contagious and peftilential diftempers is very much dreaded by many perfons in America. Rejecting the exiftence and operation of a domeftic caufe, they are apprehenfive of introducing them from foreign places alone. In this opinion many perfift, although it has been fo often fhown to be unfounded in nature, and contradictory to experience. Now the doctrine they teach is vifited upon them. There is a party, in countries beyond the fea, who think as they do, that yellow fever is contagious, and eafy of conveyance from one port to another. They even quote American authorities in proof of it; and, for fear of fuffering from contagion imported from the United States, our fhips are fubjected to quarantines and their confequences in all the ports of Europe. If our trade extended to Smyrna, Aleppo and Damietta, doubtlefs the police of thefe cities would require nice examination of American veffels, for fear of importing contagion from New-York, Philadelphia and Baltimore! All that is wanted to remove this incumberance from commerce, and its concomitant reproach from legiflation, is to act according to the dictates of fcience, in preferving more cleanlinefs in fhips, and in ufing the fame means for that purpofe that are found fuccefsful in deftroying fimilar filthinefs in houfes: and thefe are known to almoft every female fervant.

## SMALL-POX.

We learn from Halifax (Nova-Scotia) that a general inoculation for the fmall-pox has been lately permitted there; and that the mortality has been very confiderable, particularly among children. One letter mentions 800 deaths, infants and adults, and that one family had loft feven perfons.

[*National Intelligencer.*

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VACCINE POX.

The inoculation of that difeafe in this city, mentioned in our laft number (fee p. 204), has not fucceeded according to expectations; and there is now much reafon to fuppofe that the matter employed is not genuine.

We hope this failure will fpeedily be remedied by procuring more efficient matter. For whatever difappointment may have arifen, on particular occafions, from the ufe of fpurious matter, there can be now no reafonable doubt, that the vaccine difeafe, truly produced, renders the fyftem unfufceptible of the fmall-pox. In addition to the numerous proofs of this fact, heretofore offered to our readers, we now fubjoin the following:

Dr. Andrew Duncan, Profeffor of the Inftitutes of Medicine in the Univerfity of Edinburgh, in a letter to Dr. Miller, dated 2d October, 1800, ftates, that "vaccine inoculation is making great progrefs at Edinburgh, and promifes fair to render the fmall-pox much milder than variolous inoculation. The medical practitioners here have given the lead; the children of Dr. Gregory, Dr. Spens, Mr. Bennett, &c. having been inoculated with vaccine matter. Though many hundreds have now been inoculated at Edinburgh with vaccine matter, yet, among all thefe, not one cafe has occurred where the patient was even in the fmalleft danger, or had a fymptom in any degree alarming. Not one inftance has occurred, where the child, after vaccine inoculation, has taken the fmall-pox; though repeatedly inoculated with variolous matter, and intentionally expofed to natural contagion."

The annexed declaration of phyficians and furgeons in London, taken from the Medical and Phyfical Journal, will tend further to eftablifh the preference of the vaccine difeafe.

"Many unfounded reports having been circulated, which have a tendency to prejudice the mind of the public againft the inoculation of the cow-pox, we, the underfigned phyficians and furgeons, think it our duty to declare our opinion, that thofe perfons who have had the cow-pox are perfectly fecure from the infection of the fmall-pox, provided fuch infection does not exift in the fyftem at the time of the inoculation for the cow-pox.

"We alſo declare, that the inoculated cow-pox is a much milder and ſafer diſeaſe than the inoculated ſmall-pox.

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| "William Saunders, M. D. | "Edward Ford. |
| "Matthew Baillie, M. D. | "Aſtley Cooper. |
| "Henry Vaughan, M. D. | "John Abernethy. |
| "Maxwell Garthſhore, M. D. | "Joſeph Hurlock. |
| "John Coakley Lettſom, M. D. | "William Blair. |
| "James Sims, M. D. | "Samuel Chilver. |
| "John Sims, M. D. | "J. M. Good. |
| "William Liſter, M. D. | "James Horsford. |
| "Robert Willan, M. D. | "Francis Knight. |
| "C. Stanger, M. D. | "James Leighton. |
| "Alexander Crichton, M. D. | "James Moore. |
| "Thomas Bradley, M. D. | "Thomas Paytherus. |
| "Thomas Denman, M. D. | "Thomas Pole, |
| "John Squire, M. D. | "J. W. Phipps. |
| "Richard Croft, M. D. | "John Ring. |
| "Robert Batty, M. D. | "James Simpſon. |
| "R. J. Thornton, M. D. | "H. L. Thomas. |
| "Richard Denniſon, M. D. | "Jonathan Wathen. |
| "Henry Cline. | "Thomas Whateley." |

Dr. Lettſom, of London, in a letter to Dr. Barton, of Philadelphia, writes thus:

"Vaccine inoculation is becoming more and more general in England; and on the European continent about 16,000 have had the diſeaſe, if diſeaſe it can be termed, without any caſe of fatality; and about 3000 have been inoculated again with the common ſmall-pox, without conveying any diſeaſe; ſo that, probably, ſoon, no other than the cow-pox will be adopted here.—I imagine a fatal caſe will never occur, as there is rarely more than one puſtule."

We hope our readers in the United States will endeavour to aſcertain whether the vaccine diſeaſe is to be found among the cows of this country; and, if ſo, that they will employ infection derived from a domeſtic, in preference to a foreign ſource.

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## MODE OF DESTROYING PRINTERS' INK BY COUNTERFEITERS.

The power of oxygenated muriatic acid to deſtroy *writing ink* is well known. The gallic acid of that black liquor being decompoſed by it, the hue which this ingredient of the galls imparted to the iron fades away and diſappears, leaving the paper without a ſtain. But *printing ink* reſiſts the action of that remarkable agent. Yet this pigment (for it is truly a paint) is not capable of refifting *all* folvents. It is chiefly a compound of fine carbone, or lamp-black, mingled with boiled lintfeed-oil and fpirit of turpentine. Hence it dries quickly after it is impreffed by the types. Human ingenuity, devoted to fraudulent practices, has difcovered a method of obliterating characters made upon paper by this coloured compofition.—The following note from the Cafhier of the Manhattan Company to Dr. Mitchill, and the reply to it, will elucidate, in fome degree, this pernicious practice, and teach how to guard againft it.

BILLET.

" H. Remfen prefents his refpectful compliments to Dr. Mitchill, and fends him herewith a phial containing fome of the *preparation* ufed by the transformers of bank notes to extract the printed part of the note, and which one of them (who is now convicted, and in the State-Prifon) informed the Attorney-General was the *falt of ley*. H. Remfen has been informed by Mr. Maverick, the engraver, that the ufual mode of cleaning old copper-plates, in the cavities (letters) of which the ink had been fuffered to harden by the inattention of the printer, was to cover the face of the plate with foft foap, and let it remain there till the ink in the cavities became foft, and could be removed by wafhing or wiping.

" *January* 28, 1801."

REPLY.

" *Eaft Rutger-ftreet, Jan.* 29, 1801.

" S. Mitchill to Mr. Remfen fends health and refpect.—He finds, on examination, that the fubftance contained in the phial is, indeed, the *falt of ley*; that is to fay, it is an impure pot-afh, evidently obtained by boiling down common ley until there remained too little water to keep the alkali in folution. From experiments made with it, there remains no doubt of its capability to decompofe and difcharge common printers' ink. There is a method of applying it, by which the colouring material may be deftroyed without fenfibly damaging the paper. This is probably effected by a combination with the *oily* part of the ink, whereby it is rendered incapable of adhering any longer to the *carbonic* part, and of fixing it, which is the colouring ingredient, indelibly in the paper.

" It may be thought fingular that this alkali, which deftroys the ink, fhould fpare the paper. Yet it ought to be remembered, that common paper is chiefly made of *linen* or *hempen* rags, and that cloth of these kinds, while in the manufacturer's hands, has repeatedly undergone the operation of such an alkaline salt as this, especially during the whitening process. Bleachers of linen goods and garments know that these will sustain, without damage, soaking, and even boiling, in alkaline ley, frequently and long, if skilfully managed. The efficacy of this liquid to remove spots and stains, at the same time, is well known. The destruction of the paper, then, if made of linen or hemp, is not a necessary consequence of even being boiled in a strong solution of pot-ash, or a ley sufficiently charged with that salt to bear an egg. Any damage done to the paper will be merely the effect of unskilful or clumsy adjustment and handling. In like manner, it seems, the material of which your notes are made possesses the quality of resisting, itself, the agent which has chemical power enough to destroy its ink.

"The desideratum in question, therefore, is to mix the colouring material for printing notes, and similar securities, with some one of the *essential oils* for which alkalies have a weaker attraction, and which, consequently, they cannot so readily decompound. Which of this numerous order of oils will be preferable, experiments, to be made for the purpose, alone can determine."

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### METEOR AND EARTHQUAKE.

*Pittsburgh, Jan.* 16, 1801.

About eight o'clock on Wednesday evening, the 7th instant, an extraordinary light appeared in the atmosphere, and continued for about ten seconds. It was equal to the brightest sunshine, and was succeeded by a slight rumbling noise. We are informed that on the Allegheny Mountain the earth was greatly agitated, and the noise similar to the discharge of cannon. [*Pittsburgh Gaz.*

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*Fayette, Jan.* 9, 1801.

On Wednesday evening last, about eight o'clock, the atmosphere being cloudy, and the night very dark, an extraordinary glare of light arose near the southern horizon, and illuminated the whole atmosphere for the space of about five seconds; and which, in about four minutes and a half after, was succeeded by an explosion similar to a discharge of a large cannon at a distance, which considerably shook the houses, and kept the windows and door-latches in continual trepidation, for the space of about twenty seconds. [*Fayette Gaz.*

*Wafhington (Penn.), Jan.* 12, 1801.

On Wednefday laft, between eight and nine o'clock, an extraordinary glare of light made its appearance, which illuminated the whole atmofphere for a few feconds: it was fucceeded by a rumbling noife, like diftant thunder. From fhaking of the houfes at the fame time, it is fuppofed to have been attended with a flight fhock of an earthquake.

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*Winchefter (Virginia), Jan.* 14, 1801.

On Wednefday, the 7th inft. at about twenty-two minutes after eight o'clock P. M. this town, and the country around, was illuminated by a meteor; and, in about thirteen minutes afterwards, a tremendous noife was heard, attended with a fenfible fhock, which not only agitated the windows of the houfes, but even the houfehold furniture. As the velocity of found is at the rate of 1142 feet in every fecond of time, it is prefumable that the diftance from this town to the place where the explofion happened could not be lefs than 168 miles.

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### PRIZE-QUESTIONS OF THE CONNECTICUT MEDICAL SOCIETY, FOR THE YEAR 1801.

1ft. Scirrhus, its caufes, fymptoms, and modes of iffue: what is the beft method of treating it in its recent ftate; and how beft treated if it becomes cancerous? Premium, Perkinfon's Voyage to the South-Sea.

2d. Chronic Rheumatifm, what; how diftinguifhed from the inflammatory; how diftinguifhed from the gout; its caufes, fymptoms, and beft method of cure? Premium, Dr. Fothergill's Works.

3d. Mercury, its nature: what preparations of it are beft; in what difeafes; and how to be adminiftered?

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### OFFICERS OF THE MEDICAL SOCIETY OF PHILADELPHIA.

At a meeting of the Philadelphia Medical Society, held on Wednefday, the 4th of February, for the purpofe of electing officers for the enfuing year, the following gentlemen were duly elected:

Prefident, Dr. Rufh. Vice-Prefidents, Drs. Barton and Phyfick. Correfponding Secretaries, Drs. Otto and Coxe. Curators, Meffrs. Gartley and Dorfey. Treafurer, Mr. G. Lee, jun. Secretary, Dr. George Logan.

### REGISTER OF THE WEATHER.

We have been favoured, by Mr. Seth Johnson, of this city, with a very accurate register of the weather for the year 1800. His observations generally distribute the weather into clear days, variable, cloudy, rainy, and snowy: he often notes the direction of the winds, and is very careful to remark all uncommon deviations from the course of the seasons, the excesses of high and low temperature, hurricanes, storms of lightning, &c.

It is gratifying to observe how large a portion of the year, in this climate, consists of clear and serene weather. In Mr. Johnson's recapitulation of his notes for the twelve months, he finds of clear days 235—of variable 55—of cloudy 38—of rain 33—of snow 4.—July presents the highest number of clear days, viz. 27—June 25—January 23—May, September and October, each 20—February and March 19—August 18—April and December 16—and November 12.

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## FOREIGN.

### EXPERIMENTS ON LIGHT AND HEAT.

AN ingenious gentleman of London has lately, by a repetition of the experiments of Sir Isaac Newton concerning light and colours, ascertained, "that *primogenial light* is *white*; and that the seven different *colours* which appear in the prism are produced by the inflections and changes which the white ray undergoes in passing between painted surfaces, and through transparent media."

Having, in a former number, announced the important discoveries of Dr. Herschel, on the different temperatures of the prismatic colours, we shall now give a short abstract of the two interesting papers on this subject, which have been laid before the Royal Society.—Being engaged in a course of experiments to ascertain the best method of viewing the sun with large telescopes, Dr. Herschel made use of various combinations of differently coloured glasses, for the purpose of darkening the image of the sun. While using these, he remarked that some which transmitted little light excited a strong sensation of heat, while others that allowed a freer passage to the light appeared to transmit but little heat. Now, as in these different combinations of glasses the sun's image appeared differently coloured, he was induced to fuppofe that the prifmatic rays might differ from each other in their power of heating bodies. To afcertain this, a ray of the fun was divided by a prifm, into a fpectrum, and the different colours applied fucceffively to the blackened bulbs of two thermometers: the experiment being made repeatedly, and always with a fimilar refult, it appeared that any of the prifmatic rays falling on a body will increafe its temperature, but that this effect is inverfely as their refrangibility, the leaft increafe being produced by violet, and the moft by red rays. Where the additional temperature occafioned by violet rays is equal to 1, that of green is equal to $1\frac{1}{2}$, and of red equal to $3\frac{1}{2}$. Thus far being afcertained, it became an object of importance to determine whether the *illuminating power* of the prifmatic rays coincided with the order of their *calorific powers*. With this view a number of experiments were made, agreeing unufually well with each other, and concurring in the conclufion, that the maximum of illumination lies between the brighteft yellow and the paleft green; that the red rays afford lefs light than the orange, and this laft lefs than the yellow; that the green itfelf is nearly as bright as the yellow; that the blue is upon a par with the red; the indigo is much lefs than the blue; and the violet is by far the fainteft of all. Having thus afcertained that the heat as well as light of the folar rays is refrangible, but that the place of greateft illumination is about the middle of the fpectrum, whereas the heat goes on increafing from the violet to the red—the queftion naturally arofe, whether the rays of heat might not be fo far feparated from thofe of light, by their different degrees of refrangibility, as that fome of them fhould actually fall fome diftance beyond the coloured fpectrum on the red fide. For this purpofe the fpectrum from a prifm, 52 inches diftant, was thrown on a ftand covered with white paper, and it was found that rays affording no illumination, at the diftance of half an inch beyond the extreme boundary of the red colour, raifed the thermometer $6\frac{1}{2}$ degrees in ten minutes; that thofe an inch beyond the red produced a heat of $5\frac{1}{2}$ degrees in thirteen minutes; and thofe an inch an a half beyond the red produced $3\frac{1}{8}$ degrees in ten minutes. At the other extremity of the fpectrum there was no increafe of heat beyond the boundary of the violet rays. As in thefe experiments the limits of heat extended beyond thofe of illumination on the red fide, it became of importance to determine the place of the greateft calorific power. This maximum of heat was found, by experiment, to be about half an inch distant from the boundary of the red colour, and the heat at one inch was equal to that of the middle of the red colour itself. The boundaries of the *calorific spectrum* lie between the extreme of violet and an undetermined point, at least 1½ inch beyond the red colour. From the above very important facts it follows, that there are rays coming from the sun which are less refrangible than any that affect the sight; that these *invisible* rays of the sun probably far exceed the visible ones in number; and if we call *light* those rays which illuminate objects, and *radiant heat* those which heat bodies, it may be questioned whether light is essentially different from heat. [*Lond. Month. Mag.*

## CURE OF SYPHILIS BY OXYGEN.

The late Mr. Girtanner writes, in a letter to Van Mons, that he has made a number of experiments in curing venereal diseases by oxygen, which discovery he claims to himself. The results of these are the following: When the disease is not inveterate, and only requires the first degree of oxydation, he uses the citric acid; for the second degree, the diluted oxalic acid; for the third degree, and, in general, against the most inveterate diseases, he applies the oxyd of arsenic. There is no remedy more efficacious against venereal diseases, diseases of the liver, obstructions of the belly, dropsies, &c. than this; but the lungs must not be affected, as the patient cannot then support it, but will expire in a short time. He mixes four or five drops of a saturated solution of the white oxyd of arsenic in nitric acid, with two pints of water, to be taken in two days. This remedy has done wonders with him. There is also nothing more powerful against agues than this. If the patient begins to cough, the remedy must be laid aside, a dry cough being a sign of the body becoming over oxygenated. Should the cough continue, it can be mostly removed by the liver of sulphur. [*Hufeland's Journal, vol. ix. No.* 102.

# MEDICAL REPOSITORY.

VOL. IV.—NO. IV.


## ARTICLE I.

*On the* YELLOW FEVER *at Norfolk (Virginia), in the Summer and Autumn of* 1800: *Communicated by Doctors* SELDEN *and* WHITEHEAD *to Dr.* MILLER.

TO determine the origin of the malignant fever, which has, of late, ſo frequently viſited the cities of the United States, whether it be foreign or domeſtic, is certainly a matter of the greateſt importance. A diligent and careful examination of circumſtances, a fair and candid ſtatement of facts, free from the heat of controverſy, and the acrimony of conteſted opinions, are undoubtedly the beſt means of ſhedding light upon this dark and difficult ſubject. Impreſſed with this belief, we will ſtate, as briefly and clearly as we can, the ſituation of Norfolk, the local circumſtances, both permanent and accidental, previous to the appearance of the diſeaſe, and during its progreſs, which have been known, in other places, to affect the health of the inhabitants; leaving it to thoſe who have accurately examined the operations of nature, in ſuch caſes, to form an eſtimate of the influence of each cauſe ſeparately, and jointly with the reſt, and determine whether we ſhall, with moſt juſtice, conſider this fatal malady the offſpring of our own climate, or regard it as a direful diſtemper, introduced by commerce from a foreign country.

The ground upon which the principal part of the town of Norfolk ſtands, forms a kind of peninſula of an oblong figure. The main ſtreet, ranging with the courſe of Elizabeth river, runs along the ridge of this peninſula, forming its longeſt diameter. It is not paved, nor are any of the other ſtreets or alleys, one ſmall lane only excepted; and the ſoil being chiefly a red clay, mixed with ſand, renders them, in rainy weather, extremely muddy. The market, where butchers' meat, poultry, and vegetables of all kinds, are ſold, ſtands on the main ſtreet, near the middle of the town; around which are ranged every morning carts from the country, loaded with proviſions of every kind, both vegetable and animal. It is generally after eleven o'clock (A. M.) in ſummer, before all proviſions are removed from the market place, ſo that, from what of animal and vegetable ſubſtances is left on the ground, by thoſe attending market, and from the ſweepings of the ſtores, houſes, kitchens, &c. which are caſually thrown into the ſtreets or gutters, eſpecially in the more populous parts of the town, we may juſtly conſider their ſurface as a compoſt of animal and vegetable matter, kneaded together by the feet of paſſengers, horſes, drays, &c. which, when acted on by moiſture, and the ſcorching rays of a burning ſun, muſt exhale abundance of gaſes extremely deleterious to the health of the inhabitants. This might be ſuppoſed to be true in a particular manner, this ſummer, from the long continuance of an extreme degree of heat and moiſture; which was, in ſome meaſure, confirmed by the obſervation of ſtrangers, who, on their firſt arrival in town, complained greatly of the diſagreeable ſmell of our ſtreets and gutters, though it was not ſo perceptible to the inhabitants of the place. But a more fertile ſource of noxious exhalations remains to be pointed out. The line which marks out the boundary of the borough of Norfolk, on the ſide next the river, comprehended originally more water than land, on that ſide of the main ſtreet. In ſome places the wharves are advanced upwards of an hundred yards into the river, as far as this boundary line, in others they are not yet carried ſo far, while, in ſome parts, no attempt has yet been made to diſturb the original poſſeſſion of the river; but that part of the town where the malignant fever chiefly prevailed, ſtands entirely on made land, reclaimed from the river, by ſinking pens of large logs, and filling them up chiefly with green pine-ſaplings, which are ſlightly covered over with earth or gravel. In ſome places large openings are left for the formation of docks; in others, wharves are formed next the channel of the river, while the more interior parts are ſtill covered with water, and, in many others, the lots remain in their original ſtate; ſo that from theſe circumſtances, and the looſe texture of the whole work, the water of the river penetrates, every tide, through the whole extent of this wooden fabric, which is thus alternately expoſed to the action of the water and air, aſſiſted by the powerful rays of an almoſt vertical ſun. The private intereſt of the moment, without regard to futurity, or interference of the police, ſeems alone to have directed the arrangement of the houſes on this property reclaimed from the river. The means of ventilation and cleanlineſs have been neglected; proper ſpaces for ſtreets have not been left; and what has been marked out for that purpoſe, is, in ſeveral places, not yet filled up, though the private property around is completely occupied with buildings. In the only tolerable public ſtreet in this part of the town, there are two places, in a very public ſituation, about twenty yards each in length, and eight or nine in breadth, which have never yet been filled up with other materials than what accident has carried thither, and the filth of the neighbourhood, for which it ſerves as the common and only receptacle. In theſe ponds, or rather ſinks, of putrefaction, though ſixty yards or more from the river, the tide ebbs and flows through the open texture of the adjacent reclaimed ground; yet, at low water, they are never entirely dry, but form an agreeable retreat to the neighbouring hogs to wallow in, as is cuſtomary with theſe animal in the ſultry months of the year. The effluvia which were exhaled from theſe and ſimilar places, during the warm months of ſummer and autumn, were indeed highly offenſive, and will appear to many medical men almoſt ſufficient of themſelves to account for the generation of peſtilential diſeaſes, wherever they may exiſt. And, in fact, the malignant fever did firſt make its appearance about twenty yards from theſe offenſive pools, in a wooden houſe, reſting upon logs, the ground under it not being raiſed to a level with the adjacent land, and which was always covered partly with water, and completely overflowed twice in twenty-four hours by the tide. Beſides theſe, and many other ſources of peſtilential vapours, which abounded in this quarter of the town, another, at this time, was accidentally added. Three veſſels arrived from the Weſt Indies ſucceſſively, on the 21ſt, 22d, and 23d of July, loaded partly with fruit. Theſe cargoes were landed on Commerce-ſtreet wharf, about ſixty yards from the above deſcribed ponds, and the greateſt part of the oranges and limes being ſpoiled, the caſks were opened, and picked on the quay, and the rotten fruit, together with the matter in which they were packed, were left on the ſpot a great many days. Theſe formed a large maſs of vegetable matter, in a ſtate of putrefaction, the offenſive ſmell ariſing from which was ſo great, that gentlemen have declared they were unable to paſs that way without ſtopping their noſtrils; and in one perſon, of undoubted veracity, deliquium animi, as he affirmed, was well nigh induced from the fame caufe: yet this nuifance was not removed till after a number of perfons feized with a malignant fever in the neighbourhood excited alarm, and attracted that way the attention of the public.

Two young gentlemen employed in a vendue-office at the fpot where the fruit was landed, and by whom it had been picked, and repacked for public fale, and near the window of whofe chamber the above mentioned putrid vegetable mafs had been for fome time lying, were the firft attacked on this ftreet, on the 26th of July, and both dying, after every effort had been made by their phyficians to fave them, with the ufual fymptoms of the Yellow Fever, in its moft malignant form, occafioned no fmall apprehenfions. Several, indeed, had died, after a fhort illnefs, fome days before, but thefe being moftly failors, in obfcure boarding-houfes, and not regularly attended, we believe, by any phyfician, had drawn but little attention.

With regard to the difeafes which prevailed anterior to the appearance of the malignant fever this year in Norfolk, it is worthy of notice that complaints of an high inflammatory character very generally obtained, during the fpring and firft of the fummer months, attended with fymptoms of greater feverity than were ufually met with in other years.

The fmall-pox, which had not difappeared altogether in the winter, became, in a manner, epidemic in the beginning of fpring. Many were attacked with this difeafe in the natural form, and died, who thought themfelves fecure from infection, believing to have had the diforder in their youth, as they had frequently acted as nurfes, with perfect fafety, to thofe labouring under the complaint. From inoculation alfo this diftemper was uncommonly fevere: large fores formed frequently at the place of inoculation on the arm, and tumors and abceffes in other parts of the body, which often proved extremely obftinate in the cure. In the month of May feveral cafes of cynanche maligna occurred, fome of which had a fatal termination. The whooping-cough made its appearance early in the fpring; in April and May it became very general, fevere, and often proved fatal; nor did its violence abate till towards the end of July. The cholera infantum began very early in June, and carried off vaft numbers of children. Slight cafes of dyfentery, and fevere cafes of cholera morbus were common in June and July.

The influence of climate in the generation of malignant difeafes is acknowledged by medical men of every age; and the prefent year, in this place, it appeared to be extremely unfriendly to health. The fpring was uncommonly late, but the hot weather fet in very early. On the 8th of April the quickfilver had rifen as high as 90 degrees of Fahrenheit; about the 20th of June it became fteadily hot, and continued till after the middle of Auguft with little variation. Southerly winds prevailed, which were always light, and often interrupted with calms; nor did we once experience, during that period, the north-weft wind, which ufually fucceeds rains, and tornadoes at this feafon; which proves fo refrefhing and invigorating, and which fufpends, for fome time, the too powerful influence of the fun in a fultry climate. Rains had been very frequent in June and July; but inftead of cooling the atmofphere, it was obferved that they were invariably followed by more intenfe heat. For more than two months after the 25th of June, the inhabitants of Norfolk lived in an atmofphere heated above the 85th degree of Fahrenheit, fometimes to the 94th and 95th, but very frequently upwards of 90 degrees. Such a long tract of intenfely hot weather is not, we believe, within the remembrance of any perfon now living in this place; and its effects on the health of the inhabitants, muft, of neceffity, have been very confiderable. It has been already obferved, that, previous to the 20th of July, feveral perfons had died, after a fhort illnefs, in a houfe adjoining the ponds of water above defcribed, without exciting any particular notice; but in a few days they were recollected with fenfations of dread, when a difeafe of malignant afpect began to fpread rapidly in the fame part of the town. On the 22d of the fame month, while yet no fufpicion exifted of an epidemic complaint, we were called to fee Thomas Bailey, a failor, then in the third day of his illnefs—His eyes were much inflamed and watery, his tongue was moift and furred, and his countenance expreffive of great anxiety and diftrefs; he was extremely reftlefs, and complained of intolerable pain over his eye-brows, great oppreffion about the præcordia, with a fenfation of burning in the region of the ftomach, which made him feel, he faid, "as if his bowels were all on fire." The heat of the body was much increafed above the natural ftandard, his face was flufhed, and his pulfe was more remarkable for frequency than ftrength. He had taken fome evacuant medicines before we faw him. He was bled with manifeft relief of his head-ache; a purge of calomel and jalap was exhibited, and a blifter was applied to the region of the ftomach. By thefe means the febrile fymptoms were confiderably moderated; but the blifter was not fuffered to remain till vefication was accomplifhed, and the ſenſation of burning in the region of the ſtomach increaſing, vomiting became inceſſant, and of a dark colour; the ſtrength ſunk rapidly, while the ſkin aſſumed a yellow hue, and the diſeaſe haſtened to a fatal termination, with ſymptoms unuſual in the febrile diſeaſes of ordinary ſeaſons. We have been induced to notice this caſe more particularly in conſequence of a belief with many that the malignant fever was introduced by the veſſels which arrived from the Weſt-Indies on the 21ſt, 22d and 23d of July. Although the extreme degree and long duration of the hot weather, with ſome other unfavourable circumſtances, which have been mentioned already, had not excited, for ſome time paſt, among the medical gentlemen, apprehenſions of a fatal epidemic; it was impoſſible to help obſerving, during the progreſs of Bailey's caſe, the ſtrict reſemblance it bore to the Bilious Yellow Fever, as deſcribed by phyſicians in different parts of the United States, where it has made its appearance. Our apprehenſions were but too ſoon realized. In two or three days after the termination of the above mentioned caſe, almoſt every phyſician in town had patients labouring under the ſame diſeaſe. Many of thoſe who were firſt attacked ſunk under the diſeaſe; and ſo great was the alarm in that quarter where it firſt appeared, that moſt of the mercantile houſes in Commerce-ſtreet, were, in leſs than a week, entirely ſhut up; and thoſe, who, from circumſtances, thought themſelves particularly liable to the complaint, left the place as ſoon as poſſible.

Europeans and natives of the northern States, who had not been accuſtomed to warm climates, were moſt expoſed to the attack of the diſeaſe in its ſevereſt form; thoſe from the ſame countries who had reſided here ſome time, and ſtrangers from this and the neighbouring States, were not exempt, but the diſeaſe put on a milder form; while thoſe who were born in Norfolk, and were old reſidents of the place, never enjoyed a greater portion of health in any former ſeaſon; none of them died, or were even affected with the prevailing epidemic. This entire exemption of the permanent inhabitants of Norfolk, different from what was experienced in more northern parts of America, as Philadelphia, New-York, and Baltimore, may probably be accounted for on the ſuppoſition that our ſituation and climate here approach nearer to the circumſtances of the Weſt-India iſlands, where ſtrangers in general are the only perſons attacked with the Yellow Fever.

Habitual intemperance in the uſe of ſpirituous liquors was the moſt powerful prediſpoſing cauſe; and in a vaſt number of inſtances, the diſeaſe was excited by a fit of intoxication, in which caſes the greateſt mortality occurred. But the fatal ravages of the fever were greatly extended by the very bad nurſing and attendance given to the ſick. In moſt of the ſmall boarding-houſes, where ſeafaring people are received, the rooms are confined, and the accommodations wretched. The care of the ſick was almoſt wholly entruſted to negroes, who, not being prompted by humanity, attachment, or a ſenſe of duty, executed their truſt in a very negligent manner; nay, in more inſtances than one, the people of the houſe deſerted their habitation entirely, and left the ſick to their fate. No wonder, in ſuch circumſtances as theſe, that the efforts of the phyſician were often unavailing, when deſtitute of that which is probably more neceſſary in this than any other diſeaſe, the cooperation of a careful and a judicious nurſe.

Tobacco ſhips were remarkably unhealthy, although communication with the ſhore was, as much as poſſible, guarded againſt. Of ſeveral that were loading here, during the months of Auguſt and September, a great part of their crews ſickened and died. Nor was the opinion entertained by many, that negroes are not ſuſceptible of the diſeaſe, found correct; many of them were attacked, and ſeveral fell victims to the diſeaſe. For ſeveral days in the laſt of July, and early part of Auguſt, the weather was cooler than it had been for ſome time before; there was then a temporary ſuſpenſion of the diſeaſe; but we are at a loſs to ſay whether this was owing to the change of weather, or to the inhabitants avoiding that part of the town which had been infected in the beginning; for the fever for ſeveral weeks after its commencement was quite local. The weather became ſteadily hot again about the 6th of Auguſt, and continued ſo throughout that month; the diſeaſe returned with the hot weather, and continued with unabated violence to the end of the month; by the middle of Auguſt the Yellow Fever was the only diſeaſe we met with in our practice; on the 30th there was a conſiderable fall of rain, which was followed by three or four days of cool weather, with a briſk northerly wind. On the 4th of September the thermometer ſtood at 60 degrees in the warmeſt part of the day. Attacks of the fever were leſs frequent at this period, but there was little alteration as to the form or ſeverity of the diſeaſe. The number of caſes was diminiſhed evidently from one cauſe, the leſſened number of ſubjects ſuſceptible of this form of fever. About the middle of the month it again became ſultry; rains were frequent, and the heat of the ſun oppreſſive; and although the number of new cafes was very fenfibly decreafed, yet no veffel arrived from Europe, or the northern States, without fome of the crew being immediately affected with the prevailing complaint. Towards the latter end of September the fever appeared under a new form in young fubjects of both fexes, but more particularly with delicate females; many young perfons, who had hitherto efcaped, were now overtaken with the difeafe, in the well marked form of typhus gravior: free from local complaints they exhibited marks of ftrong nervous affection, and generally became deeply comatofe three or four days before death.

On the 5th of October a deluge of rain fell, accompanied with a powerful fweeping wind from the north-eaft; the weather became fuddenly very cold; the mercury fell to 48 degrees on the morning of the 6th, and on the 7th it was as low as 42 degrees of Fahrenheit. In a few days after this, not a veftige of the Yellow Fever was to be feen in Norfolk; but children under 14 years of age were very commonly attacked with a fever of a continued type, with fevere nervous affections, and frequent difcharge of worms. The weather became hot again on the 12th and 13th (on the latter day the mercury ftood at 80 degrees in the fhade, and it was oppreffively hot in the fun) and continued till about the 20th. The ceffation of the fever in the early part of this month induced thofe who had removed to return, and ftrangers began to vifit us after the 15th; feveral of whom were attacked with this fatal difeafe, and not being aware of its exiftence, neglected themfelves in the commencement, and, in many inftances, fell victims to it; but fince the 30th all defcriptions of perfons have enjoyed uninterrupted good health. Of the mortality caufed by the fever no accurate regifter has been kept, but from the moft careful inveftigation of this fubject that now can be made, we believe the number that died this year of the Yellow Fever, not to have exceeded 250.

It is unneceffary to enter into any particular detail of the medical treatment that was followed in combating this formidable difeafe. It will be fufficient to obferve, that the depleting plan of cure was adopted in its fulleft extent, and the antiphlogiftic regimen, as far as circumftances would permit, was ftrictly adhered to. Mercury was exhibited liberally, and we found, as has been obferved by other practitioners, that where a free falivation was brought on, the patient uniformly recovered. But whether we ought to regard this effect of the mercury as a proof of the energies of the conftitution not fubdued by the diſeaſe, or as a legal victory obtained over the fever by means of the remedy, is what we have not yet, in our minds, been able to determine. Bark, wine, and cordials, in the early ſtage of the diſeaſe, were found always to do harm. The affuſion of cold water, after the bowels were duly emptied, was alſo had recourſe to with decided advantage. In ſeveral caſes where the cure of the diſeaſe was intruſted chiefly to cold bathing, it ſeemed to yield readily to that remedy; but it muſt be owned that theſe caſes were not of the moſt violent kind, and the remedy was applied on the very firſt attack. Although we have no reaſon to believe that the ſeveral remedies employed in the caſe of this diſeaſe have been leſs ſucceſsful in our hands than in thoſe of others, yet we are inclined to think that much remains to be learned both as to the nature and cure of the Yellow Fever. In this opinion we agree with an ingenious gentleman, lately much employed in the treatment of this complaint in the Iſland of St. Domingo: he ſays, "Quicunque medicinæ ſcientiâ confiſus, jactat, ſe hunc morbum poſſe certò curare, vel ſeipſum decipit, vel vult alios decipere."

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## ARTICLE II.

CASE *of* TETANUS *from a* PUNCTURED WOUND *in the* HEEL *cured by the* TINCTURE *of* CANTHARIDES: *Communicated in a Letter from Dr.* SAMUEL BROWN, *of Lexington (Kentucky), to Dr.* MITCHILL, *dated Dec.* 1, 1800.

ON Wedneſday, the 28th of October, 1800, I viſited Miſs P— D—, a young lady aged nineteen. On Monday night, previous to my viſit, ſhe, unfortunately, ſet her foot upon a nail, which, entering the middle of the heel, penetrated quite to the os calcis. At firſt ſhe complained of a numbneſs rather than pain; but in the courſe of half an hour the pain became tormenting in the wound, from which, however, it ſoon removed to the ſides of the ancle, leaving the puncture perfectly free from any uneaſineſs. During the night ſhe continued reſtleſs, though the pain, at intervals, conſiderably abated. On Tueſday evening all the ſymptoms became more violent. The wound diſcharged nothing except a drop or two of blood and ſerum; the pain became more acute in the ancle, and extended to the knee, hip and joints of the back. In the night ſhe had many twitches of the nerves, and ſpaſms of the muſcles of the arms, and thoſe which retract the head. Before the morning there was ſo great a degree of rigidity in the back of the neck, that the relations were at no loſs with regard to the nature of her complaint. A phyſician was ſent for, who unluckily, was at a horſe-race, and declined to viſit her. He, however, ſent a few anodyne pills, which ſhe took without any material advantage. It was twelve o'clock on Wedneſday night when I arrived. I found the patient in extreme agony, with ſpaſms in her back and neck, and acute pains in her ancle, knee, and hip joint. On examining the puncture, not the ſlighteſt appearance of inflammation could be diſcerned; the heel was preternaturally cold, the ſkin was pale, and nothing but blood and ſerum could be preſſed from the wound. I introduced my probe, and was greatly ſurpriſed to find that ſhe was ſcarcely ſenſible of pain from a very harſh examination of the direction and extent of the puncture. At length, however, the point of my probe touched a nerve or ligament, which appeared to poſſeſs extreme ſenſibility. Having fixed the probe firmly againſt the os calcis, I took a ſcalpel, and cut down the ſide of the probe through the ligaments quite to the bone, in a tranſverſe direction with regard to the foot. Immediately on making this inciſion, the whole of her complaints ſeemed to be removed, and I flattered myſelf, that I ſhould be able, by the uſual remedies, to prevent a recurrence of the ſpaſms. But, anxious more effectually to deſtroy the injured nerve, and to excite inflammation in the part, I waſhed the wound with ſpirits of turpentine; and, having made a doſſil of lint, I covered it with powdered ſulphate of copper and ſpirits of turpentine, and preſſed it down to the bottom of the inciſion. This application gave ſevere pain; but the patient aſſuring me, that it was much more tolerable than the ſpaſms, I ſuffered it to remain. I now gave her a very large doſe of laudanum, which I directed to be repeated every four hours—I likewiſe laid a large bliſter on the ancle, where the pain had been always very diſtreſſing ſome time before it extended to the body. Warm poultices were kept to the heel. I ordered two grains of calomel every hour when ſhe was awake, and had ℥i of mercurial ointment rubbed into the legs, arms, and back—I likewiſe endeavoured to haſten ſalivation, by rubbing calomel on the gums. She ſlept about two hours, and continued tolerably eaſy until twelve or one o'clock on Thurſday, when her ſpaſms returned—I was again ſent for, and arrived about dark. All the ſymptoms were then greatly aggravated; the ſpaſms more violent than I had ever ſeen them; they were more general—her jaws were ſtiff, her deglutition difficult, and the ſtridor dentium ſo great as to be heard in a very diſtinct manner all over the houſe. Recollecting the caſes which occurred to Mr. Dallas, and his friends, in the iſland of Carciacow, as publiſhed in the Edinburgh Medical Annals, from which, it appears, that not one perſon in fifty who is affected with tetanic ſymptoms, from the læſion of a nerve, recovered, notwithſtanding the moſt approved modern remedies were vigorouſly employed, I reſolved to give my patient a chance for life, by attempting to relieve her by a new mode of treatment.

The caſe appeared ſo hopeleſs, and death ſo near, that I thought the "*anceps remedium*" perfectly juſtifiable. Having, in vain, endeavoured to ſubdue the ſpaſms, by antiſpaſmodics, to produce ſalivation by the liberal exhibition of mercury, and to excite inflammation in the wound by the ſtrongeſt ſtimulants, I determined to make trial of wine and bark, which had proved ſo efficacious in the hands of Dr. Ruſh. Theſe were immediately rejected by the ſtomach. The bliſter, after remaining on the ancle, from Wedneſday until Friday night, produced very little effect on the ſkin.

By this time ℥ ij of mercurial ointment had been rubbed in, xxij grains of calomel taken in form of pills, and ℈i. rubbed on the gums. I now deſpaired of being able to excite ptyaliſm early enough to prevent the fatal termination of the diſeaſe. I therefore directed fifteen drops of the Tinctura Cantharid. in a cup of tea, to be taken every hour, until the ſymptoms of inflammation in the bowels forbid their further exhibition. I now removed the dreſſings from the wound, and filled it with the root of the phytolacca decandra (or poke-root), which produced very great uneaſineſs for two or three hours. The hot poultices were continued, together with the uſe of injections, which had been found neceſſary during the whole courſe of the diſorder.

After the patient had taken ℥ iſs of the tincture of cantharides, ſhe was ſeized with a ſenſation of heat and burning in the ſtomach, which, becoming more and more ſevere, extended through the whole courſe of the alimentary canal, and produced a number of ſtools, mixed with blood and mucus. The inflammation of the ſtomach occaſioned vomiting, and the acute pains in her bowels reſembled thoſe which are felt in the moſt violent attacks of dyſentery. *Immediately on the occurrence of theſe ſymptoms, all the tetanic affections diſappeared, and* *never returned.* In order to mitigate the difeafe which I had produced in the alimentary canal, I gave large quantities of mucilaginous drinks, and anodyne enemata, which afforded confiderable eafe. Fortunately, however, the day after this inflammatory ftate of the bowels came on, the mercury, which before feemed quite inert, began to fhow its effect on the falivary glands, and (as we have often feen in dyfentery) removed the difeafe of the inteftines. Some flight affection of the kidneys appeared, with bloody urine, but foon left the patient without any complaint, except a very moderate falivation, which continued for about two weeks. The wound began to form pus eight days after the accident, and was kept open feveral weeks, from an apprehenfion, that if it clofed, the fpafms might return.

This cafe, which terminated fo happily, is not communicated to the public as the foundation of any new favourite theory. The writer is fufficiently aware of the danger of deducing general inferences from folitary facts. Difappointed in his expectations of relieving his patient by the fafhionable remedies, his practice was the refult of that neceffity which occafionally gives birth to the moft ufeful difcoveries. He thought it his duty to communicate it with fimplicity and candour, and hopes that thofe who practife medicine in climates where tetanus is a common difeafe, will ftrive to leffen its mortality, by giving cantharides a fair trial. It is well known that phyficians are often under the neceffity of combating one difeafe by creating another, and although it muft be confeffed that the inflammation of the ftomach and bowels is attended with great danger, no practitioner will hefitate to affirm that tetanus is ftill more dangerous.

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## ARTICLE III.

*On the* CONNECTION *of* EARTHQUAKES *with* EPIDEMIC DISEASES, *and on the* SUCCESSION *of* EPIDEMICS: *Communicated in a Letter from* NOAH WEBSTER, jun. *Efq. to* Dr. MILLER, *dated New-Haven, Feb.* 21, 1801.

IN the courfe of reading, I frequently find accounts of epidemic or malignant difeafes, which corroborate, in a furprifing degree, the opinions I have advanced in my hiftory. Some of thefe accounts I will occafionally communicate to you, and you will judge whether the facts are worthy of a place in your Repofitory.

In the year 1770, Hispaniola experienced numerous successive shocks of earthquake. For many months, scarcely a day passed without a shock of greater or less violence; nor was the following year exempt from them. During these convulsions, a malignant disease broke out at Leogane, Port au Prince, and other places near the Bite, which must have been the real plague; for, soon after the patient was seized, a bile or tumour appeared under the arm, and he died in about eighteen hours. The Commander in Chief retired from that part of the island, all commerce with those ports was voluntarily abandoned for some months, and troops were posted to prevent all intercourse between them and the neighbouring country.—This disease was, at the time, ascribed to the noxious vapours ejected by the convulsions of the earth and eruptions. These facts are extracted from various gazette-accounts of the years mentioned.

" In 1770," says Moseley on tropical diseases, p. 44, London edition, 1795, " the nervous remittent fever, the endemic of Jamaica, entirely changed its type. It took on an immense miliary eruption, and other circumstances never before observed. It raged with violence, and killed almost all the young people who were seized. It returned the two next springs, and then disappeared." I shall only observe, that this change in the type of that disease was cotemporary with the events before related in Hispaniola, which is in the neighbourhood of Jamaica.

In the same year, a petechial fever broke out at Hartford, in Connecticut, in the family of one Burnham; most of the family, and several others died. This account I have from a friend of mine, who was then affected with the disease, and from an attending physician.

On the 7th of January, 1780, a severe earthquake was felt at Jamaica. In April following, a malignant ulcerated sore throat appeared, and killed almost every child seized. It abated in summer, but attacked adults in September. It was very insidious in its attacks; frequently the whole throat, fauces, and palate were rotten before the disease was perceived. In October following appeared the malignant yellow fever. Moseley, p. 182, 245.

I have related these last facts only for the sake of exhibiting their order—for it is the same as in this country—the malignant sore throat frequently, not to say usually, preceding the malignant yellow fever and dysentery. The most deadly dysentery that prevailed in Connecticut, the last half century, was in 1751 and 1773—in both years preceded by the angina maligna in fpring; as was the yellow fever and dyfentery of 1794.

To the facts illuftrative of the effects of earthquakes on the human body let me add, that the great earthquake, which deftroyed Lifbon, in 1755, was followed by a diftemper fo fatal as to raife an alarm in England, and an order was iffued by government, for all fhips from Portugal to ride quarantine, notwithftanding the calcareous bafis of Lifbon. My authority for this fact is not before me, but it is the Gentleman's Magazine for that or the following year, and may be feen in the New-York Library. In proof of the fame point I can heap Pelion upon Offa,* but it is not neceffary, as I believe the point to be conceded by medical gentlemen.

Another point fuggefted in my hiftory, and on which no fmall ftrefs is laid, is, that the moft generally prevalent, and moft fatal epidemics, are every where introduced by the influenza. I apprehend the fact to be proved, that the influenza in Egypt, and the tropical regions of America, is invariably and fpeedily followed by peftilential difeafes. In addition to the mafs of evidence accumulated in my hiftory, pleafe to accept the following facts:

In the winter of 1772—3, and immediately after the influenza of that period, a malignant difeafe appeared in Mexico, and the adjacent country. By the Spaniards it was called the plague. Twenty thoufand perfons died of it in a few days. How long it continued is not mentioned. This account is from a public gazette, inferted as a letter from Spain. It will be recollected, that in North-America the influenza of the fame period was followed by meafles, angina maligna, and dyfentery. In North-Carolina it was followed by an epidemic

* This allufion may be thought, by fome, not claffically correct; for Virgil defcribes the giants, in their war againft Jupiter, as attempting to place OSSA UPON PELION:

> Ter funt conati imponere Pelio Offam
> Scilicet, atque Offæ frondofum involvere Olympum. GEORG. I.

But Longinus, it ought to be remembered, (Περι Ὕψους §. 8.) has preferved a quoted paffage, by which it appears, the other mode of piling was undertaken: and yet thefe fons of Titan, who, on the Phlegrean plains of Theffaly, ftrove to heap the mountains on each other, did not fucceed in their enterprife.

The circumftances under which ficknefs from feptic effluvia *may* occur, notwithftanding the prevalence of *lime-ftone*, *chalk*, and *other kinds of calcareous earth*, were ftated and explained as long ago as 1797. See Medical Repofitory, vol. ii. No. 1, art. x. EDIT.

bilious fever in autumn 1773, unusually violent. In July of that year, Guatimala, in the Mexican country, was sunk by an earthquake, and 30,000 people perished. The same summer was very sickly at New-Providence; but New Spain, and the Bahamas are said to abound with lime-stone.

The scarlatina anginosa appeared in the eastern part of Connecticut, in Providence, and Newport, in the winter of 1783—4. It prevailed in Lyme, a town in Connecticut, lying on the river and the Sound, and which contains some salt marsh, but, in ordinary years, is as healthful as other towns in the State. In the summer of 1784, an epidemic bilious fever seized the inhabitants, to an extent not before recollected by elderly men. This is the more remarkable, as the scarlatina of that period fell lightly on the western parts of this State; but was more severe in the eastern towns, and in Massachusetts, New-Hampshire, and Rhode-Island. The connection in the epidemics at Lyme is not to be passed without notice. My authority is Dr. Mather, of that town.

I find an account of a very fatal bilious plague in Barbadoes, in the winter of 1647—8, introduced by the influenza of 1646, which I have transcribed and sent to the academy of medicine. It is the first instance, I believe, on record, as Barbadoes had then been settled but about twenty years. This was long prior to the period assigned to the importation of the Siam fever. Had the writers on that disease, whether French or English, examined the histories of America, the idea of its introduction from Siam or Africa, would never have entered their brains. Siam and Africa are as exempt from that malignant fever, in ordinary years, as Barbadoes or New-York.

Let it not be overlooked, that in Barbadoes, the same disease was universally severe *after* the influenza of 1733, 1737, 1761—2. I wish we had more light on this subject, and that medical gentlemen in the islands would examine the history of the diseases, as well as the memories of old people for facts. Barbadoes is said to have a basis of lime-stone, and this, as well as all the islands, are healthy in ordinary years.

In my history, vol. i. p. 251, I have mentioned the extreme drouth of 1761 and 1762, and have suggested, from the concurrent evidence of a great number of facts, the probability that an extraordinary evaporation, as well as failure of rain, precedes and accompanies eruptions of fire. I have since found an account of a remarkable eruption in Mexico, during that drouth. At Juruyo, in Michuacan, was only a small hill in 1760, on which was a sugar plantation. On the 29th of

September of that year the earth burſt open, with furious ſhocks, and continued to emit fire and burning rocks for ſome years, until the maſs ejected formed three high mountains of ſix miles in circumference. The aſhes were wafted 150 miles, and, at 60 miles diſtance, covered towns, ſo as to oblige the people to ſweep their yards two or three times in a day. See Clavigero, vol. i. 14. Note. This is an intereſting fact, as it throws light on the formation of volcanic mountains, and is one of the moſt recent inſtances. I do not, you will obſerve, undertake to allege, that the ſevere drouth of that period had a connection with the eruption, but the coincidences of this kind are remarkable and deſerve notice.

## ARTICLE IV.

FACTS *concerning the* NOXIOUSNESS *of* RAIN-WATER *and* DEW *in* 1797: *Communicated in a Letter from Dr.* FOOT *to Dr.* MILLER, *dated Greenſburg, Dec.* 29, 1800.

IT is with pleaſure that I comply with your requeſt, to furniſh you with the facts concerning the morbid effects of rain-water in this quarter of the country, in the ſummer of 1797. As I was not a reſident within this State at that time, and, of courſe, not a perſonal obſerver, I have delayed compliance until I could inform myſelf of more particulars, of the extent, duration, and other circumſtances of the occurrence.

After making particular inquiry, I find but few perſons of common curioſity, of thoſe who had been in a condition for this kind of obſervation, who had not noticed theſe uncommon appearances; and when I conſider the publicity and great ſingularity of the facts, conjoined with their importance, in ſupport of certain phyſical principles, and the intenſe thirſt for philoſophical reſearches, which characterizes the preſent age, I have been ſurpriſed that they have not heretofore found way to your Repoſitory; a work which I cannot but conſider as the proper receptacle for every thing novel or intereſting in the philoſophical world, and which, for the intereſts of medicine, it is to be regretted, had not been able to boaſt of an earlier origin in this country. Facts, of ſufficient importance, from which to infer new principles, or even to ſupport analogies, are not of daily occurrence, and may not be repeated in the ſame country in ſo intereſting a manner in an age: conſiderations which render a work like yours effentially important, and which ought to operate as a powerful ftimulus to country practitioners of medicine within the United States, whofe fphere of obfervation, it muft be acknowledged, is comparatively great.

Since the late improvements in Chemical fcience, and the writings of Dr. DARWIN (who, however, in fome of his principles, was anticipated by the ingenious BROWN), I believe, that the identity of thofe laws which govern animal and vegetable bodies is pretty generally acknowledged. This is a difcovery of incalculable importance to the interefts of medicine. It has prefented to the phyfician an extenfive field for improvement by analogical reafoning, and has called to the aid of medicine almoft every other fcience. For amufement, the phyfician ftands on a level with the Botanift and Chemift; and, in fhort, the healing art, inftead of a mere collection of fymptoms and prefcriptions, incoherent, and frequently contradictory, has become reducible to calculation, and merits the title of a fcience, affording the ingenious ftudent a field for amufement, as engaging as it is extenfive.

Craving your indulgence for the preceding, and I had almoft faid involuntary obfervations, the facts of which I promifed you a relation were as follows:—The latter part of the fummer of 1797, was rendered remarkable, by the fall of an uncommon quantity of rain. It commenced about the 15th or 16th of July, and continued, with fhort intermiffions, until paft the middle of the fucceeding month. The earth, by this means, became fo loaded with water, that it was almoft impoffible to walk with dry feet, even over the moft elevated fields. The confequence was, in this quarter of the country, a great lofs of property experienced in the damaging of much hay, and in the proftration of fome valuable mill-dams, with their mills.

But the greateft fingularity attending this feafon was manifefted in the inconvenience refulting from the effects of this water on the bodies of that clafs of people (farmers) who were neceffarily moft expofed to its influence. This appeared in an uncommon and troublefome forenefs of the hands and feet of thofe, particularly, who were occupied in faving their hay from the rain in low-land meadows. An erythematous inflammation of the whole part immerfed in water, frequently took place on the fame day; and, in addition to this, often a complete abrafion of the cuticle of the whole foot and leg, in many attended with fuch a degree of pain and tumefaction as to lay the fubject by. In others, befides the above effect, there frequently arofe on the part, more efpecially between and about the toes, where the water would be longeſt retained, a livid-coloured veſicle, which, on breaking, diſcharged a dark grumous-like matter; this left behind an ulcer of the phagedænick ſpecies, which became difficult to heal, and continued troubleſome even for weeks. But the moſt ſtriking proof of acrimony in this water was, that a ſwelling and ſoreneſs (as I am credibly informed) took place, in ſome inſtances, on the ſame day, after ſlightly wetting the feet, in walking through the dewy graſs of uplands in the morning. Theſe appearances were generally noticed as ſingular; yet few ſuſpected them the reſult of any morbid quality in the water; and as one of the moſt ſtriking (though not leſs miſchievous) propenſities of human nature is, that in caſe the real cauſes of effects do not readily preſent, to impute them, however ſingular, to the moſt obvious, ſo the conjectures on this occaſion were various, vague, and very unſatisfactory. Whether any ſingularity in this water was diſcernible by the organs of taſte, I have not been able certainly to learn. On aſking an old gentleman, a neighbour of mine, whether he taſted of this water, he replied, with a degree of engagedneſs, "that, when at labour from his houſe he had occaſion to take a draught from a ſmall rill iſſuing from the ground, it affected him ſo ſenſibly, that he did not forget it in a number of days." Inſtances of this kind may have been more frequent, but as the quality of water is materially changed by filtration through the earth, it is probable they were not numerous.

I have not likewiſe been able to ſatisfy myſelf, whether the health of other animals was materially affected; certain, however, it is, that ſwine, at this time, and often, were attacked with a diſeaſe, which proved, among them, unuſually mortal. The ſymptoms were, a loſs of appetite, and conſequent emaciation, attended with a diſcharge from the inner angle of the eye of a frothy limpid fluid, producing a depilation, and even excoriation of the whole cheek in its courſe. To what cauſe this ſingular complaint among that ſpecies of animals is imputable I ſhall not conjecture. The remedies which proved of moſt efficacy in ſaving them, I am informed, was a free exhibition of brimſtome combined with their food. If ſuch were the effects of theſe waters on animal bodies, we ſhould expect them to be at leaſt not leſs conſpicuous on vegetables: theſe appeared particularly in the deſtruction of tender garden plants, ſuch as cucumbers, &c. and in a diſcolouration of the graſs where the water remained any time, and in its complete deſtruction in patches about meadows, as effectually as if ſcorched by fire.

I have been more particular in a relation of theſe appearances, as they took place ſome time paſt. With reſpect to their extent, I believe, from the beſt information I have been able to obtain, that they were limited by the ſouth of this, but extended northwardly quite into Dutcheſs county, eaſterly to the diſtance of a few miles only. The circumſtance of limitation ſeems to involve ſome obſcurity. Neither have I been able to learn at what period of this rainy ſeaſon theſe effects were moſt conſpicuous.

I am not qualified to hazard any conjecture on this ſubject. You will recollect that the ſummer of 1797 was rendered remarkable by numerous occurrences, which go ſtrongly to eſtabliſh the doctrine of ocult cauſes in the atmoſphere—a doctrine which contains many valuable arcana, and from a developement of which important acquiſitions will reſult to the ſcience of medicine.

Did theſe waters poſſeſs an acrimonious quality previouſly to their precipitation? If ſo, was it of volcanic origin? Was the atmoſphere of that ſeaſon compounded of more than its uſual quantity of azote? Or did the morbid properties of this water ariſe from its meeting with ſome agent on the ſurface of the earth? If ſo, was this ſeptic acid ſimply from vegetable decompoſition, aided by the water as a menſtruum? And did this water poſſeſs any unuſual quality which favoured this decompoſition?

## ARTICLE V.

*Caſe of* ALKOHOL *adminiſtered to a Man after having taken an immoderate Doſe of* OPIUM: *Communicated to Dr.* MITCHILL *by Mr.* SHEPHARD, *in a Letter dated New-York, Dec.* 17, 1800.

I SUBMIT to your conſideration a caſe of debility, ariſing from the effects of Opium, that fell under my care, which, perhaps, more accurately illuſtrates the operation and effects of *this* medicine, and ſhows to what extent *it* may be exhibited, and the patients ſtill have a chance for recovery, than almoſt any experiment by which it has been preceded.

Daniel Grayham, aged about 35 years, of a firm, robuſt habit, and apparently in perfect health, reſiding at the time tranſiently in Schenectady, in this State, took the fatal reſolution of deſtroying himſelf, and made the deſperate attempt by the means of opium. Early on the morning of February 4, 1800, he procured, of a phyſician in that town, two drachms of opium; and then, repairing to an adjacent inn, called for a bed (complaining of illneſs), and immediately took the intended fatal portion. This, as nearly as could be aſcertained, was about eight o'clock in the morning; and about eleven he was diſcovered by one of the family. I ſaw him immediately, and found him in a ſtate of inſenſibility, accompanied with a complete apoplectic reſpiration, and ſome ſlight convulſive contractions of the muſcles, eſpecially of the hands and face. The pulſe was full, regular, and not perceptibly removed from the ſtandard of health. From theſe appearances I ſuppoſed him to be in the interval of an epileptic paroxyſm; it not being known, at this time, that he had taken any thing to injure himſelf, or even had the deſign in contemplation. The ſymptoms, however, continuing the ſame for a conſiderable length of time, without any ſucceſſion of ſpaſm, or appearance of returning animation, I was totally at a loſs how to proceed, or, in fact, what opinion to form of the diſeaſe. Some other phyſicians were now called in by the general alarm; but, previous to their arrival, I had accidentally diſcovered a paper upon the floor, in which, I found, had been opium; and which, at once, developed the wretched ſcene before me.

One of the phyſicians who now attended propoſed, on this diſcovery, to immediately give an emetic, which was accordingly exhibited: but as the opium had had its full effect long before, no benefit could be expected from *ſuch* practice. I exerted myſelf to have an oppoſite mode of practice purſued, and could not effect my purpoſe; but calmly contented myſelf with looking on, while a variety of other exertions were made, without the leaſt advantage.

As a dernier reſort, he was, about two o'clock P. M. placed into the hot bath, in which he was immerſed a conſiderable, and, probably, a ſufficient length of time; but the reſult of this experiment was ſimilar to every former trial; and he was now abandoned by all to the certainty of his fate.

For ſome time previous to this period I had been abſent; but about four o'clock, and near two hours after all exertions in the patient's favour had been diſcontinued, I again ſaw him.

To ſupport the ſyſtem by the exhibition of an *adequate* degree of ſtimuli was the object I had before wiſhed to purſue. In *this* laſt ſtage of the diſeaſe it was the *only* object. And although I ſcarcely retained a hope of ſucceſs, yet the dictates of humanity, the proſpect of future utility to the world, and the confidence I had in the principles on which I proceeded, urged me not to relinquiſh every hope while exiſtence remained. *This* was the moment to which the ſtimulant mode of cure was peculiarly *adapted*; for now the effects of the opium were ſubſiding, and the ſyſtem rapidly ſinking into the impending diſſolution with which it was momentarily threatened. The apoplectic reſpiration now nearly ſuſpended, and a weak, ſinking, tremulous and irregular pulſe, were the only indications of remaining vitality. His ſkin was univerſally cold, and partially ſuffuſed with a glutinous moiſture; and his cadaverous countenance was literally the aſpect of death. The tongue and mouth (which were widely extended) were perfectly dry, and produced, to the touch, a ſenſation ſimilar to that ariſing from the action of a raſp; and, in fact, every appearance pointed to an immediate termination of the tragical ſcene. Theſe were the formidable ſymptoms I had to encounter; and, as the patient was expoſed to public view, I ſuſtained a degree of cenſure for the temerity of retaining a hope of ſucceſs in a ſituation ſo deſperate. The ſafety of the patient, and my own reputation, were ſources of great anxiety; but ſtill I adhered to my firſt reſolution of trying the experiment.

I took ſome brandy, which having ſweetened, and diluted with a trifle of water, I exhibited a little immediately after each reſpiration, the intervals of which were now near a minute. I ſoon found the mouth and tongue were aſſuming a degree of natural ſoftneſs, and was confident the liquid was gradually, though quite mechanically, paſſing into the ſtomach; and in this cautious manner I very ſoon gave more than a gill of the brandy; and I flattered myſelf I diſcovered ſome ſlight ſymptoms of returning animation. At this period I was obliged to leave the patient with an attendant, directing him, with the moſt forcible injunctions, to ſteadily purſue the plan I had adopted. I was abſent near an hour; and, on my return, had the pleaſing ſatisfaction of finding my patient perfectly ſenſible, able to turn and raiſe himſelf in bed, and to converſe freely; but incapable of ſupporting an erect poſition, in conſequence of the vertigo incident to that ſituation, in caſes of extreme debility.

He had now taken about one pint of brandy. His irritability was ſo great, that the ſmalleſt cauſe of emotion would excite great, and ſometimes an alarming degree of agitation. I continued this practice through the night, without any variation, excepting gradually diminiſhing the quantity of ſtimulus exhibited. The next morning I changed the ſtimulus by alternating the brandy with wine; which I continued through the day and night enſuing, ſtill diminiſhing the quantity of ſpirits; and, as ſoon as the ſtomach would admit, gave him biſcuit, and wine and water, and from thence proceeded to the uſe of freſh-meat broths. On Thurſday he took a portion of calomel; which, I preſume, from the irritable ſtate of the ſtomach, proved violently emetic, and very ſlightly cathartic.

This medicine was materially ſerviceable, as his lungs had been all along ſomewhat oppreſſed; which, by this, was relieved, and the ſtomach and bowels ſufficiently cleanſed for the reception of the bark. From this period the bark was exhibited, and the laudanum and wine uſed as ſtimuli; and the caſe, in every reſpect, treated as a convaleſcent of indirect debility. In about ten days he was able to leave the town, which he performed on foot.

After his recovery he informed me, that his deſign being to make his exit ſure, he had taken all the opium procured of the phyſician above-mentioned, which he ſaid was *two drachms* (the truth of which the phyſician afterwards confirmed to me), together with a piece he had before obtained, as he ſuppoſed about half a drachm; and that he retained his recollection for about ten minutes after taking the doſe.

One obſervation occurred to me, which, I preſume, will be found of conſequence in the treatment of ſimilar caſes; which is, that *no* ſtimuli ſhould be exhibited till the effects of the one conſtituting the diſeaſe are ſubſiding, and the ſyſtem diſcovers evident marks of ſinking. This is the period to employ the aſſiſtance of other ſtimuli, to give due ſupport to the habit, and to excite and maintain *its* action till the morbid diſturbance has *ceaſed to be.* Had the brandy been given on the firſt diſcovery of the patient, undoubtedly the already too highly excited action would have been increaſed, the hopes founded on this practice fruſtrated, and the patient loſt. There is room ſufficient for obſervations, and for a good deal of theoretical ſpeculation, on a caſe ſo ſingular as the above: but, as I was under the neceſſity of protracting it to the length in which it now appears, I preſume that further remarks may be diſpenſed with.

## ARTICLE VI.

OPINION *of the* MEDICAL FACULTY, *addreſſed to* JAMES CALHOUN, *Eſq. Mayor of the City of Baltimore, relative to the* DOMESTIC ORIGIN *of the* PESTILENTIAL SICKNESS *in that City, during the hot Seaſon of* 1800: *Communicated by Dr.* DANIEL MOORES *to Dr.* MITCHILL.

SIR,

IN compliance with your requeſt, the Medical Faculty of the city of Baltimore have taken into conſideration the ſubject of the late epidemic, and herewith tranſmit to you the reſult of their inveſtigation of its origin, together with their opinions reſpecting the moſt probable means of obviating the recurrence of a ſimilar calamity.

After the moſt ſcrutinizing inveſtigation, the faculty have found no proof, or even cauſe of ſuſpicion, that the fever which lately ſo unhappily afflicted our city was derived from foreign cauſes. The following conſiderations, they are perſuaded, will tend to elucidate this opinion.

I. The prevalence of an *epidemic conſtitution of the air*, which, although not yet demonſtrated by chemical analyſis, is ſufficiently apparent from the following effects:

1. It appears, from the united teſtimony of the faculty of medicine, throughout the United States, that the diſeaſes of our country have for late years, manifeſted a more malignant character. Thoſe places formerly ſubject to mild intermitting and remitting fevers, have lately been viſited by diſeaſes of a more inflammatory diatheſis. In the weſtern part of this State, a fever of a very malignant type has prevailed for two or three years, very different from any diſeaſe hitherto known in that tract of country.

2. The morbid diſpoſition of our atmoſphere has been further evinced by its deleterious influence on certain brute animals in various parts of the United States; it has affected horſes, horned cattle, dogs, cats and poultry. Now the general hiſtory of epidemics proves that this affection of certain brute animals, either precedes or accompanies their prevalence.

3. The exiſtence of ſuch a ſtate of atmoſphere diſcovers itſelf to our ſenſes, by the various ſenſations which are perceived during the prevalence of that fever, even by thoſe not

confined with it, more eſpecially in perſons not accuſtomed to inhale the impure air of our city. The hiſtory of all countries proves, that great epidemics have viſited them at ſome period, and it would be extraordinary indeed, that the United States ſhould be the only country on the globe exempt from their invaſion.

II. That the late epidemic fever was derived from domeſtic ſources we think the following facts and circumſtances will ſufficiently demonſtrate. The firſt perſons who ſickened had no communication with veſſels engaged in foreign commerce, but were expoſed to powerful local cauſes, and were attacked at ſuch diſtances from each other, as to preclude the probability of any one of them having derived it from the other.

The caſe of John Harris, viſited by Dr. Rounald, near Jalland's garden, Fell's Point, on the 2d of May; Thomas Sherwood, viſited by Dr. Potter on the 2d of May—theſe two caſes occurred immediately ſucceeding the remarkable warm weather during the laſt week in April; Captain Conner on the 8th of June, Mrs. Davis on the 9th, John Mills on the 13th, Captain Derochbroom's apprentice boy on the 22d, Captain Stewart's niece on the 24th, Baſit Gale's ſiſter on the 24th, and ſeveral others, all viſited by Doctor Coulter previous to the 1ſt of July; James White, viſited by Doctor Allander on the 10th of June; Mrs. Wilſon, viſited by Doctor Dunhel on the 21ſt of June; Jonah Thomas (John-ſtreet, Old Town), viſited by Doctor Archer on the 28th of June; Thomas Ing, near the corner of Gay and Frederick ſtreets, viſited by Doctor Archer on the 3d of July; Thomas Sorin, about fifty yards from Jonah Thomas's, viſited by Doctor Archer on the 25th of July. The above caſes attended by Doctor Coulter were at Fell's Point, where they had been expoſed to powerful local cauſes, emanating from the cove hereafter to be deſcribed, and to other ſources of peſtilential exhalation. Thomas Sherwood had worked near a putrid ſink of water, containing vegetable matters, in a ſtate of putrefaction, and the offenſive condition of Jonah Thomas's market yard, and the gutters and ſtreets near his houſe, are well known to have annoyed all who paſſed them. We have in vain endeavoured to trace any of thoſe caſes to veſſels employed in foreign commerce; none of them had any communication with any known vehicle of human contagion. Theſe caſes and ſome others occurred before the fever became general, and did not communicate to any perſon; if it had been derived from human contagion, why did they not communicate it in the ſame manner as it muſt have been communicated to them? It is no inconſiderable argument in favour of our opinion to remark, that a ſimilar diſeaſe has viſited many of the interior parts of the United States, remote from all communication with the Atlantic, but where the local cauſes were too evident to eſcape the notice of the moſt ſuperficial obſerver. Not to enumerate many of the places where a diſeaſe has been marked with all the characteriſtic ſymptoms of the yellow fever, and with the ſame mortality as in the city of Baltimore, we would aſk, if the diſeaſe was imported, how it could have reached Galliopolis on the Ohio, Mifflin County in Pennſylvania, or the Geneſee Lakes in the State of New-York? To ſuppoſe that the fever which has ravaged theſe new ſettlements at ſuch a diſtance from the Atlantic, could be derived from the Weſt-Indies, would be too unphiloſophical to merit attention.

III. The general extinction of this diſeaſe by froſt, proves that the cauſe exiſts in the atmoſphere, for fevers ariſing from human contagion are admitted to be moſt contagious in cold weather.

IV. Is it not very extraordinary that we ſhould be ſuppoſed to receive a diſeaſe by imported contagion, which is only occaſional in the country whence it is allowed to be derived, and is there ſcarcely thought contagious?

V. We are, moreover, confirmed in our opinion of the indigenous origin of the late epidemic fever, by having learned that a ſimilar diſeaſe prevailed, at the ſame time, in many other parts of this State; viz. in Harford County, on the banks of the Suſquehanna—on the canal in Cecil County—in Charles County—in Dorcheſter County—and in ſome other places.

VI. The reaſons, in our opinion, why this diſeaſe has been ſo long and ſo erroneouſly aſcribed to imported human contagion, is the circumſtance of its having ſo often originated on ſhipboard, from foul air, generated by improper ballaſt, or other ſubſtances in a ſtate of putrefaction. Indeed, the confined ſituation of the holds of veſſels is, of all circumſtances, the moſt likely to be productive of noxious effluvia. The hiſtory of the yellow fever which originated on board of the United States frigate General Greene, affords a melancholy illuſtration of this opinion. The narrative given by Dr. Kollock ſtates, that this ſhip ſailed, on her firſt cruiſe, from Rhode-Iſland, and that the yellow fever appeared on the 15th day from the time ſhe left Newport, and is aſcribed, by him, to her having ſprung a leak, and thereby affected her ballaſt, which was compofed of iron, flate-ftone, and fhells, intermixed with marine vegetables. The Doctor further ftates, that after her return to port the fever was in no inftance communicated, although the intercourfe between the fick and well was conftant and inevitable. The faculty would here be underftood to draw a diftinction between an imported difeafe and the imported caufe of difeafe. While they are convinced that this fever cannot, with truth, be attributed to imported human contagion, they are equally well affured that the caufe may be imported, and that the foul air in the holds of veffels is a frequent fource of mifchief, and may co-operate with the like caufes on fhore, in the production of difeafe. We are neverthelefs confident, that if the air of our city was rendered as pure as it might be, by the removal of nuifances on fhore, that the caufe on fhipboard would fcarcely be worth eftimating as an object of terror, as it muft foon be fo widely diffufed, in a pure furrounding atmofphere, as not to produce any permanent effects.

The gradual manner in which this difeafe becomes epidemic is an additional proof that it is not derived from foreign fources. The firft effects produced by the caufes, while they are feeble—fuch as flight pains in the head, ftomach and liver, and other mild grades of the difeafe—are the certain harbingers of a more malignant ftate of fever, when the fame caufes acquire more force. If this difeafe were imported, the prominent features would develope themfelves at firft, and thefe precurfors and more mild grades of the difeafe could not affect thoufands on fhore who never had any communication with veffels from the Weft-Indies, or any difeafed body.

It has been fuggefted that the late fever might have been imported in the United States frigate Infurgent. This fuggeftion, we are fatisfied, is deftitute of foundation. The Infurgent arrived at this port on the 24th of March, with an healthy crew, who continued equally free from difeafe after her arrival, which precludes the poffibility of perfonal contagion from this fource. That the ballaft of this fhip was not the caufe of the fever is evident from the following facts: The neighbourhood of the wharf at which fhe was moored was the moft healthy at Fell's Point, and the firft cafe of fever occurred at the other extremity of that place. Of nearly two hundred perfons who were conftantly employed on board, in repairing this fhip, not one was among the firft perfons attacked by the fever. The rumour that Mrs. Wilfon contracted her death-ficknefs from expofure to the ballaft of the

Infurgent, is equally invalid. Her illnefs is more rationally explained by her having paid a vifit, on the margin of the peftilential cove, immediately preceding her attack: and hence moft of the firft cafes at Fell's Point may be traced; and hence they date their firft indifpofition.

But what, in our minds, places this queftion beyond the reach of controverfy, is the fact, that this fever is never contagious early in fummer, and rarely fo at any feafon in a pure atmofphere, remote from the exhalation of ftagnant water, or putrefying animal or vegetable fubftances. If this fatal difeafe were derived from imported contagion, each fucceeding cafe fhould be as capable of multiplying itfelf as that whence it firft originated on fhipboard. Since, then, it is evident that this difeafe is not communicable beyond the fphere of noxious exhalation, the advocates of imported contagion will agree with the favourers of domeftic origin in recommending energetic meafures of prevention on fhore, however materially they may differ on the controverted queftion of origin.

The faculty believe the following to have been the principal fources of this late malignant fever.

1. The *cove*, which extends from the mouth of Jones's Falls to the interior parts of Fell's Point, the bottom of which was left bare, by the recefs of the tide, for fome weeks immediately preceding the epidemic appearance of the fever. This was occafioned by the prevalence of north and eaft winds, which continued a great part of the fummer, as may be perceived from a regifter of the weather during that feafon. Such is the fituation of this peftilential cove, that all the filth conveyed into it by the weft, north-weft, and fouth winds, muft remain to ftagnate and putrefy under a fummer's fun. There can be no egrefs by any but a north-eaft wind, and this cannot act, for the point is a barrier which effectually obftructs the wind from that quarter.—From the united teftimony of the phyficians at Fell's Point, the difeafe began on the borders of this cove, and its progrefs could be traced through the ftreets in whatever direction the winds wafted its poifonous effluvia. Such was the peftilential condition of this fink of putrefaction, that the labourers employed in filling up its northern fhore were compelled to relinquifh their undertaking early in the fummer. So offenfive were the effluvia emanating from this fource of death, that it affected thofe who had occafion to pafs it even at a confiderable diftance.

2. The *docks* in general, but more efpecially the *interftices between the wharves*, where the water ftagnated, and af-

forded a proper matrix for the generation of peftilential effluvia.

3. The ftagnant water retained in *cellars.*

4. The *gutters.* The noxious exhalations from this fource, fo near the doors of our houfes, are too obvious to require a comment.

5. Certain filthy *alleys* and *unpaved ftreets.*

6. Unclean *back yards.*

7. Certain *privies.*

8. The *ponds* and *low grounds* in the city and its vicinity.

9. The *made ground,* of which the wharves and the lower parts of fome of the ftreets are formed; and from all fubftances, animal and vegetable, fubject to putrefaction.

From thefe fources we derive the firft cafes of the late fever; and from thefe, fomented by the fummer's fun, we believe it to have become afterwards epidemic. We are more ftrongly impelled to afcribe our late malignant fever to thefe caufes, from having afcertained that it did not exift in the higher parts of the city, remote from exhalation, unlefs it had been carried there from the Point, or from the lower parts of the city. The following fact is of itfelf fufficient to point out the fources of our late awful calamity. The fuperintendant of the ftreets, who enumerated the nuifances previous to the epidemic appearance of the fever, declares, that in whatever part of the city he then marked a *nuifance,* he can now mark the ravages of death.

## ARTICLE VII.

EXPERIMENTS *and* OBSERVATIONS *on* MERCURY: *In a Letter addreffed to Profeffor* HOSACK, *by* GEORGE LEE, *A. M.*

*Pennfylvania Hofpital, Sept.* 12, 1800.

DEAR SIR,

HAVING lately finifhed fome experiments on mercury, which tend, in a fmall degree, to correct a prevailing error of fome magnitude, I cannot avail myfelf of a more favourable opportunity of tranfmitting them to public notice than through your hands. With this liberty I therefore hope you will indulge me; at the fame time affuring you, that a high and grateful fenfe of the kind treatment which I received from you at New-York, a few weeks ſince, is not among the ſmalleſt of the conſiderations which have induced me to make this communication.

The ſubject to which theſe experiments were more particularly directed, preſents an intereſting example of the evil which may accrue from an imprudent and unphiloſophical application of a principle which, in its preſent unguarded extenſion, I hope to prove fallacious. I allude to a late doctrine taught by Drs. Girtanner and Beddoes—men as juſtly celebrated, perhaps, for the inventive genius of imagination, as for the uſeful and durable labours of a cool and deliberate underſtanding. Theſe gentlemen believe that mercury, when introduced into the body, owes its activity to oxygen, with which they ſuppoſe it is always combined. To accord with this doctrine, it was neceſſary to conceive and aſſert, that after the adminiſtration of this metal in a previous ſtate of oxydation, it was thrown out revived, in conſequence of having imparted its oxygen to the ſyſtem.*

Having ſtated the doctrine which I mean to controvert, it would be injuſtice, on my part, not to mention, in this place, that the authors of it have made no experiments to maintain their favourite poſition. At the ſame time it would be derogating from their fame not to add, that the opinion ſeems to have ſprung partly from analogical induction, but more from preconceived theory. To act otherwiſe, I ſay, would be unfriendly: for but few artiſts poſſeſs the power of raiſing a ſuperſtructure, the pillars of which have no foundation. This is what is commonly called reaſoning *a priori*; which is, for the moſt part, either accidentally right, or accidentally wrong. To ſay in which of theſe two points the reaſoning of our authors has terminated, is unneceſſary: ſuffice it to obſerve, that, in general, it is neither an arduous nor unpleaſant taſk, to reaſon *down*, by experiment, opinions which men attempt to reaſon up by *conjecture*. Hypotheſis may, by chance, caſt an ephemeral ray of reaſon on a ſubject, but it is *experiment* alone which can reflect the durable and animating lights of truth.

Candour induces me, before proceeding any farther, to acknowledge, that, upon my firſt acquaintance with this doctrine, I was much pleaſed with the ſimplicity of its ſtructure, as well as the ingenuity with which it had been erected. I was, during ſome time, an advocate for its prevalence; ſo in-

* Vide Beddoes on Conſumption, and Girtanner on Irritability.

ſenſibly was my mind carried into a conviction of its ſuppoſed truth. But who would not be captivated by, and admire the theory of the *modus operandi* of a claſs of medicines (called ſialagogues), which reduced it to ſo plain and ſo intelligible a point, as that oxygen was the univerſal principle of ſalivation? I forſook this belief, however, nearly as ſoon as I had attached myſelf to it: for, after ſome ſtudy, and not without ſatisfaction, its abſurdity ſtruck me in the moſt forcible manner. Why, it was natural to inquire, attribute the effects derived from the adminiſtration of mercury to oxygen, and not to the metal itſelf? or, why uſe the latter, if the former is alone the agent by which every thing is effected?

Some of the reaſons which cauſed me to ſuſpect the validity of the fore-mentioned doctrine, I will here adduce, nearly in the order in which they occurred.

1. Many ſubſtances ſalivate which do not contain a particle of oxygen; of courſe, a ſalivation may be induced without the preſence of oxygen. Dr. Barton, in his lectures on the Materia Medica, mentions the caſe of a child, who, in conſequence of ſwallowing a cent, was ſalivated. The coin, when diſcharged, was diminiſhed in ſize a fifth part. The copper, in this caſe, when ſwallowed, contained no oxygen; and to ſay that it became oxyded in the ſtomach, is an evaſion which, on account of its abſurdity, merits but little attention. It has been obſerved,* that the phoſphoric acid exiſts, in a naked ſtate, in the gaſtric juice, which may be capable of oxyding a metal. From the reſpect due to the gentlemen† who are ſuppoſed to have detected this acid, I am averſe to diſpute its exiſtence in the gaſtric juice. It is my duty, however, to obſerve, that if it does really exiſt in this fluid, its quantity muſt be very ſmall indeed, when the colour of a blue vegetable is not altered by it. This was proved by ſeveral experiments which I aſſiſted Dr. Glover to make upon the gaſtric juice of animals‡ which had previouſly faſted many hours. As a further proof of the non-exiſtence of this acid in the gaſtric juice, we have the high authority of Spallanzani, and his profeſſional colleague Scopoli, who, by accurate and well-conducted experiments, were unable to detect any other acid than the muriatic, which was combined with the volatile alkali.§ Spallanzani ſays, that when an acid is

* Elements of Chemiſtry and Nat. Hiſt. by Fourcroy, vol. iv. p. 21.

† Meſſrs. Macquart and Vauquelin.

‡ Cats and dogs.

§ Spallanzani's Diſſertations, vol. ii. p. 328—331.

found in a free ſtate in the ſtomach, it is not derived from the gaſtric juice, but is evolved by the aliment in digeſtion. This fact accords with the experiments made in conjunction with my friend Dr. Glover.* But if theſe be not ſufficient reaſons for diſbelieving the calcination of a metal in the ſtomach, how will the authors of the opinion to which this paper is oppoſed explain the operation of camphor and ſeneka, which, upon the authority of Dr. Barton, ſalivate?

2. It has been ſaid that ſulphur relieves a ſore mouth by combining with the oxygen which was the cauſe of the diſeaſe. But, in anſwer to this, were I to inquire, is the ſulphuric acid formed in this caſe? I ſhould receive but an unſatisfactory anſwer. Again—Dr. Barton ſays, in his Lectures, that he has ſeen, in a number of caſes, the effects of mercury upon the mouth abated in a very ſurpriſing manner by the uſe of opium. The illuſtrious Boerhaave has taken notice of the ſame fact, in the following extravagant words: "Opium is a heavenly and moſt certain remedy in quieting a too violent ſalivation."† I do not know that opium has an affinity to oxygen!

3. It is well aſcertained, that the heat of the human body is not ſufficient to deoxygenate mercury in the forms in which it is generally uſed. It is true that trituration alone will revive precipitate *per ſe*. This preparation contains but a ſmall quantity of oxygen, and all higher degrees of oxydation require a temperature many degrees above 98, to diſengage the oxyding principle from mercury.

4. Mercury may be rendered inviſible, by triturating it with rhubarb and honey, in the ſpace of two minutes. Is it to be preſumed that this metal can be oxyded in ſo ſhort a time? Yet, if adminiſtered to a patient immediately, it will ſalivate.

5. A few grains of corroſive ſublimate will ſalivate, which do not contain, perhaps, a thimble-full of oxygen. Can gentlemen tell you that this ſmall quantity of oxygen will produce a *febris mercurialis*, who believe themſelves in the oxygenation of the blood by reſpiration? If this paradox can be reconciled to common ſenſe, it is to be effected only by the ingenuity of a Girtanner or of a Beddoes.

I could multiply objections of this nature—I had almoſt ſaid—*ad libitum*. But this would be making an unpardonable intruſion on your patience. If the ſubject, however, is

* Vide his Inaugural Diſſertation on Digeſtion. 1800.
† Vide Acad. Lect. vol. vi. p. 398.

not ſufficiently examined already, the following experiments, I hope, will place it in a fairer point of view. They are calculated to prove that mercury, in two of its forms, is not oxyded; and, conſequently, that is action in *them*, at leaſt, does not depend on oxygen. It therefore muſt be preſumed, *cæteris paribus*, that oxygen is not the eſſential, nor only active principle, in the other preparations of this metallic ſubſtance.

One hundred and twenty grains of crude mercury, and an hundred and ten grains of powdered rhubarb and conſerva roſarum, mixed, were triturated together in a marble mortar until the mercury was inviſible. The thermometer of Fahrenheit was at 90 deg. At the end of this operation, which was continued at leaſt half an hour, the maſs was carefully weighed, and found to have loſt ſeven and a half grains in weight. Next day, the thermometer being at 82 deg. this experiment was repeated upon 240 grains of mercury, and 300 grains of the rhubarb and conſerve. The trituration was continued the ſame length of time, and the loſs of weight in the maſs amounted to $15\frac{1}{2}$ grains.—*N. B.* A very conſiderable degree of heat was generated in the maſs by the trituration, and the diminiſhed weight doubtleſsly aroſe from the conſequent evaporation.

These two experiments tended not a little to convince me, that the belief in the oxydation of mercury was rather premature. Yet the poſſibility of evaporation and fixation of oxygen going on at the ſame time in the trituration of theſe ſubſtances, rendered the experiment ſomewhat equivocal. This difficulty was removed by another experiment.

Two hundred and forty grains of mercury, an hundred and ſixty grains of flour, and an hundred and twenty grains of conſerva roſarum, were triturated together, in a marble mortar, two hours, the thermometer ſtanding at 80 deg. The loſs experienced in weight was fifteeen grains.—By way of compariſon, 160 grains of flour, and 120 grains of conſerva roſarum (the ſame quantity of each uſed in the laſt experiment), were triturated without mercury, the thermometer being about 78 deg. The trituration was continued as long, and in a manner ſimilar to the laſt. The loſs which reſulted was thirteen grains.—The evident impracticability of repeating theſe triturations exactly in the ſame way, will eaſily account for the difference in the reſults of the two laſt experiments. This difference, however, proves, in an eſpecial manner, that the metal was not oxyded; for if it had been, the additional weight it would have neceſſarily received would have rendered the total loſs in the firſt much leſs than that in the laſt experiment.

Theſe two laſt experiments being repeated upon a larger ſcale, with a correſpondent reſult, in addition to the preceding, ſatisfied me that the metal, in the hydrargyrous maſs, was not oxyded. Hence the efficacy of the *blue pill* does not depend upon oxygen. And that its virtue conſiſts in an extreme or minute diviſion of the mercury (ſo as to fit it for abſorption), is an inference which, in my opinion, can be drawn with ſtrict propriety from the foregoing experiments. Whether the ſame principles can be applied to mercurial ointment, will be determined by the ſucceeding experiments.

One hundred grains of crude mercury, and 150 grains of ſimple cerate (a compoſition of hog's-lard and bee's-wax), were unremittingly triturated together for the time of one hour and an half, and the loſs of weight was twenty grains. This experiment was repeated upon double the quantity of theſe ſubſtances, and the loſs was forty-three grains.* For the purpoſe of a comparative eſtimate, 300 grains of ſimple cerate were triturated an hour and an half, and the loſs of weight was forty-one grains.—*N. B.* The thermometer was about the ſame ſtandard in all theſe experiments—being generally at the 80th degree of Fahrenheit.

The reſults of theſe laſt-mentioned experiments coincided ſo happily with the reſults of the foregoing, that little heſitation exiſted in my mind, in its determination on the queſtion. But wiſhing to place the truth as much in the light as I could, I inſtituted another experiment, which, perhaps, is of as much importance as any yet related.

For the purpoſe of triturating mercurial ointment in a certain quantity of atmoſpheric air, I procured a common apothecary's bottle, with a large mouth, and cut the bottom off. Over the mouth of this bottle I tied a ſound piece of bladder, leaving it ſo looſe as to admit of a conſiderable concavity, when it was ſuffered to fall within the mouth of the bottle. In the centre of this bladder a crucial inciſion was made, and a long wooden peſtle was paſſed through, and the bladder tied firmly round it, about midway. I then faſtened a ſmall glaſs mortar to the ſhelf of a pneumatic tub, over which the water roſe two inches. The bottle thus conſtructed was proved to be air-tight, by immerſing it full of air, when no

* The trituration was continued one hour and an half.

bubbles arofe from it.—Having put two ounces of frefh lard and ten drachms of crude mercury into the mortar, the bottle was placed over it on the fhelf. A quantity of air was then withdrawn from it by means of a fyphon; and the height to which the water arofe, within the bottle, was marked on its outfide, making, at this time, the bladder preferve a plane. The trituration was then commenced, and continued two hours, at the end of which time the water within the bottle rofe exactly to the fame height at which it ftood before the experiment was begun. The ointment had by this time affumed its ufual blue appearance. This experiment was repeated upon two ounces of mercury and two ounces of lard; and, after a trituration during two hours, the air had not diminifhed, apparently, in the fmalleft degree. The inference, therefore, from thefe experiments, is, that if mercury is oxyded by this kind of trituration, it is not in confequence of the decompofition of atmofpheric air. That this metal could have been oxyded by the lard, as has been fuppofed by fome perfons, was improbable from two circumftances: 1. The lard was not rancid, which was a proof of its not being faturated with oxygen. 2. Lard has a ftronger affinity to oxygen than mercury; confequently the latter cannot take oxygen from the former. This is proved by boiling lard upon an oxyd, when the metal will be revived.

I will not lofe fight of the above experiments, before I add an important obfervation of Mr. Cruickfhanck, who fays, that the "globules of quick-filver, in the beft prepared mercurial ointment, may be diftinctly feen in the microfcope."* This is a ftrong argument againft the oxydation of mercury.

It is not uninterefting to obferve, that fome of the ointment, as well as of the mercurial mafs, made in the above experiments, was adminiftered to patients in the hofpital, with the common effects of thefe remedies.

Before I bring this letter to a conclufion, permit me to make one or two additional remarks. The dark blue colour of the ointment has been affigned as a proof of the oxydation of the mercury it contains. This colour, however, is only natural. When the ointment is new, it is of a light afh, or grey colour, and becomes blue gradually in time. This gradual change is not owing to the union of oxygen to the mercury: for 500 grains of frefh mercurial ointment were expofed in

* Vide Anat. of Abforb. Veffels, p. 103.

a box covered with fine gauze, and, at the end of three months, it was found to have loſt 18 grains of its weight. It is true, that if a certain quantity of air be expoſed to mercurial ointment, it will be diminiſhed. In this caſe the oxygen is abſorbed by the lard, which thereby becomes rancid. A quantity of fixed air is emitted from the lard. This ariſes from a combination of part of the oxygen to the carbon of the lard. Hence a putrefactive proceſs goes on in the lard, and the metal remains unchanged. Another proof of this was afforded me, by expoſing equal quantities of mercurial ointment and lard, ſeparately, in equal quantities of atmoſpheric air, and the abſorption in both was exactly the ſame.

Gentlemen who have adopted the theory I have endeavoured to prove erroneous, have been ſo much infatuated by the perverting poiſon of enthuſiaſm, that nothing has been able to cool their ardour, or to put a ſtop to their wild career. Oxygen has been the burden of their ſong; and, in the purſuit of this queſtion, common ſenſe has been offended, whilſt prudence has been unable to mark out a ſingle limit to their range. Candour has long ſince retired from the ſcene of action: for while the heart beat ſenſibly for the truth on one ſide of the queſtion, ſelf-love and miſguided fancy proclaimed victory on the other.

It has been the cuſtom, of late, to eſtimate the powers of medicines according to the quantity of oxygen they contain. Hence the ſuperior powers of the oxygenated muriate of mercury, over thoſe of the mild muriate, have been explained in this way. May not this doctrine be applied, with equal advantage, to ſaccharum ſaturni and white lead? But to be ſerious—is not corroſive ſublimate of mercury a more complete ſalt than calomel, and on this ſtate alone do not its ſuperior powers depend? The nitric acid is more powerful than the nitrous; and it is ſaid, becauſe it contains more oxygen. Admit the fact: but, then, is it not combined with the azote? Is not the azote completely ſaturated in the nitric, and not in the nitrous acid; and does not this circumſtance conſtitute in the one a more complete acid than in the other? Azote is as neceſſary to the formation of the acid of ſepton as oxygen; and if certain effects are derived from the uſe of this acid, they are to be attributed to both its conſtituent principles, and not to one alone. When azote and oxygen are combined, they produce certain effects upon the body. Theſe are properly ſaid to be the effects of the nitrous acid. When theſe two principles are not combined, they are either inactive, or their effects are no way analogous to thoſe of nitrous acid. The ſame remarks may be applicable to the oxygenated and common marine acids.

But after all that has been ſaid on this curious ſubject, have our authors ever proved the decompoſition of theſe different ſubſtances in the body? This is a point of ſome conſequence to them. Their future reputation reſts upon it in a great meaſure. In my opinion, an inveſtigation of the ſubject, on this ground, will either extricate them from their preſent difficulties, or advance them a few ſteps further into the mire. It behoves them, at leaſt, to make the experiment.

## ARTICLE VIII.

*An* ACCOUNT *of* REMARKABLE EFFECTS *from the* APPLICATION *of the* ACTUAL CAUTERY *to the* NAPE *of the* NECK *and the* TOP *of the* HEAD, *in ſeveral Diſeaſes, both Idiopathic and Symptomatic, of the Eyes, Ears and Brain. By* LOUIS VALENTIN, *M. D. formerly Profeſſor of Anatomy at Cape-François, &c. &c. now of Nancy, in Lorraine. Communicated to Dr.* MITCHILL.

### SECTION I.

IT is well known how much the actual cautery was uſed by the ancients; and, at this day, great is the extent of the practice among the Egyptians, the Japaneſe and Chineſe, either by the *moxa* or the hot iron, for pains of almoſt all parts of the body. It was ſo familiar with the Grecians and Scythians, that they looked upon diſeaſes as incurable when fire had not conquered them. Thereupon Hippocrates ſaid: "*Quod remedium non ſanat ferrum ſanat, quod ferum non ſanat ignis ſanat, quod ignis non ſanat inſanabile dici oportet.*" This excellent method has been renewed and celebrated in our age, by Pouteau, of Lyons.* I do not mean to relate all caſes where I have ſucceſsfully employed this help

* See the poſthumous works of that ingenious and ſkilful ſurgeon, by Dr. Colombier, of Paris. Proſper Alpin. Med. des Egyptiens. Du Jardin, Hiſtoire de la Chirurgie, tom. i. à Paris.

in the healing art, but ſhall confine my remarks merely to what concerns the principal diſeaſes of the head and face, as it has been extenſively uſed in them.

## Section II.

In many kinds of obſtinate opthalmias, in the blindneſs that follows them, and in ſerious old ſores of the eyes, whatever the cauſe might be, in which all means, both internal and external, bliſters and ſetons on the hinder part of the neck, had been employed, I have always obſerved the efficacy of fire upon the top of the head to deſerve a preference. It muſt be applied about the middle of the hinder edge of the coronal bone (the place being ſhaved), and the extent of the burning at leaſt as large as a dollar. The application produces, indeed, an acute pain, but the patients are greatly relieved by the uſeful effects they derive from it. The part muſt be immediately anointed with oil, and covered with a ſoft and ſuppurative plaſter. The next day two or three crucial inciſions muſt be made into the burned ſpot, in order to accelerate the ſuppuration, which becoming more copious, and being nearer the ſeat of the diſorders than when theſe emunctories are put on the nape or occipital region, they produce a ſpeedier relief; beſides the primitive effects of the exuſtion, in changing the nervous irradiations, and attracting, as about a centre, the humours of the head. I prefer it to the other external irritants, as it maintains for a longer time a copious diſcharge of matter.

At Cape-François, where ſore eyes are common and very obſtinate, and their cure very difficult, I have cured many people by this ſalutary method, though they had already taken advice from all parts, and tried, unſucceſsfully, various kinds of remedies, for a long time; and this even when the blindneſs was acknowledged and certified by profeſſional men.*

I oftentimes ſcarified and took off portions of the tunica conjunctiva, when the veſſels were conſiderably choaked up, particularly in the *opthalmia chemoſis*, *opthalmia ulceroſa*,

* A fact the moſt known and deſperate concerns a young lieutenant of volunteers, whoſe cure the general aſſembly of the colony had truſted to me, about the beginning of the year 1792, after the exhibition of a certificate delivered to him by the two firſt health-officers of the charity-hoſpital, where he had before been treated, atteſting the loſs of his ſight, and his being paſſed as incurable. The proof of the radical cure is mentioned in the verbal procés of that aſſembly, June 24, 1792. The patient recovered his ſight in leſs than five weeks.

and many others. In all cafes one or two pukes muft be adminiftered previous to the cauterization, and they fhould be ufed rather than purges.* The foftening and lenient topicks and collyria ought to be preferred to thofe which are acrid and irritating, in the increafe as well as in the decreafe of the difeafe.

## Section III.

In fore ears, as the *otalgia inflammatoria*, accompanied with delirium, convulfions or drowfinefs, when liniments, topicks, cupping-glaffes, leeches, or blifters, have been unfuccefsfully employed, the hot iron behind the ear, upon the *proceffus maftoideus*, fucceeds perfectly well. I have alfo cauterized, advantageoufly, the inward portion of the ear with a fmaller red iron, flipping through a fheath, with a defign of appeafing tooth-ache, and pains of the jaws and the contiguous parts, produced by a defluxion to that region, as fome of our predeceffors have done.

## Section IV.

I have feen it likewife produce good effects in acute and obftinate pains of the head—that is to fay, in *cephalalgia* and *cephalæa*, as well as in madnefs, after an unfuccefsful ufe of other means. Then it is better to cauterize the vertex ftrongly, and, if it be poffible, on the painful place, particularly when the fits return periodically, and have not been fufficiently overcome by the red-powder-bark.

Some have alfo employed a large blifter-plafter, covering all the head; and in malignant fevers and commotions of the brain its effects appear very falutary.† Others have cauterized the head to the very fkull, or even to the bone itfelf, after having cut away the hairy fcalp, in madnefs and in epilepfy.‡ But thefe experiments were not always profperous.

## Section V.

It is in phrenitis, in the frightful fymptoms of putrid and malignant fevers, and others of an eruptive kind, or coma,

* In general, I have obferved, in all cafes of fore eyes, that pukes fucceed better than purges. This preference given to pukes, in difeafes feated above the diaphragm, agrees with the aphorifm of Hippocrates: *Quæ, fupra feptum tranfverfum vomitus, et infra purgationes requirunt.*

† The blifter-plafter, in the form of a cap, is known to be ufeful in commotions of the brain; and M. Default, chief furgeon of the Hotel Dieu, at Paris, has ufed it frequently, and with fuccefs.

‡ Vide Dehaën, ratio medendi.

delirium, convulſive motions, *proſtratio virium*, &c. that the application of the actual cautery on the occiput is very uſeful. I could give an account of many remarks made in France, in the Weſt-Indies, and particularly in Virginia, with regard to the hot iron in the treatment of the above diſeaſes. I ſhall confine myſelf, however, to a few facts.

Mademoiſelle Pellier, a ſuperannuated maid, at Nancy, in Lorraine, living near the Botanical Garden, was attacked by an exceſſive phrenitis, in the year 1787, after the operation of a violent purge ſhe had taken for the head and belly-ache. She was furious, and they were obliged to tie her in bed. Her pulſe was low and frequent, and her eyes animated. She conſtantly refuſed ſwallowing. Repeated employment of the ſemicupium, and bliſters put on the legs, dry frictions, cooling topicks upon the head, were inefficacious, and nothing could appeaſe or relieve her. Having been conſulted on her dangerous caſe, I cauterized the nape of the neck without delay. Her great agitation, flow of words, and cries, ceaſed immediately. She remained with her eyes open, and ſpeechleſs, during two hours; after which ſhe ſlept till the next morning. Her fever was moderate, her pulſe ſtronger and more free, and that diſeaſe which had a putrid character was radically cured in a fortnight.

## Section VI.

At St. Domingo, where malignant fevers of a bad character, agues and intermitting fevers, are exceedingly common amongſt the white people, the cauterization of the nape of the neck, preciſely between the occipital bone and the firſt cervical vertebra, near the ſuperior inſertions of the trapezius muſcle, has very often ſucceeded with me, when the ſick had fallen into a coma, with convulſive motions, and a cloſing of the jaws. Sometimes the power of ſwallowing was loſt, beſides ſhortneſs of breath, &c. If the patient is depreſſed, low, and ſinking under the diſeaſe, notwithſtanding bliſters and the uſe of quinquina, ſo advantageous in this ſtate; if the nervous ſyſtem was a little affected, the brain confuſed, and the mind roving, and thoſe means were inadequate to put a ſtop to theſe diſorders—I apply the burning iron without delay. I made uſe of it early, according to the emergency, but never before having obtained the neceſſary evacuations; it would otherwiſe be uſeleſs. It may be employed at any other times, towards the ſixteenth, ſeventeenth, or twenty-firſt day; ſeldom later in thoſe climates.

Two young men in Cape François underwent this operation at an advanced period of their ſickneſs, after which the criſis* and cure appeared to take place. The one named Vetcon (chevalier) fell ſuddenly ſenſeleſs on the ſeventeenth day: the teeth cloſed, the belly ſwelled, and he was rapidly declining under his ſymptoms, though he had all along received regular treatment and attendance. He at laſt threw up all his medicines.—The other, named Arnould, a watch-maker,† was ſtruck with the ſame deſperate ſymptoms on the ſixteenth day; having had, till that time, a ſimple remittent fever, regularly treated. Convulſions and dreadful howlings, affrighting the neighbourhood and the people paſſing by, not being abated by cold water poured on the head, bliſters on the legs, aſſiſted by ſinapiſms, &c. I fully cauterized the occiput. He ſoon began to ſwallow ſome ſpoonfuls of an anti-ſpaſmodic mixture and powder-bark; and the diſeaſe was happily terminated, by degrees, in the former about the thirty-firſt day, and in the latter the twenty-ſecond.

## Section VII.

The ſame operation was very advantageous to us in the fatal epidemic diſeaſe which afflicted the ſeamen of the French ſquadron which was at anchor in Cheſapeake-Bay, in the months of February, March and April, of the year 1794. Theſe men, miſerably diſtempered, were placed in our three hoſpitals, eſtabliſhed on both ſides of Elizabeth-River, near Norfolk.

The character of the diſorder was a putrid and malignant fever. Some were troubled with worms and peripneumony. The greater part were brought to me in a ſtate of extreme debility and deſpondency—being often in a delirium—having a blackiſh looſeneſs, little fever, and ſcarcely ſixty-eight or ſeventy-two pulſations in a minute. There were ſome in whom the vital ſtrength languiſhed ſo much, that I found only thirty-ſix, forty-four, forty-eight, and now and then from fifty to ſeventy, pulſations in a minute.

Others, very much animated, and ſtronger, having a full and frequent pulſe, became ſoon frantic, and, getting out of their beds, wandered up and down, and obliged us to tie them. For ſome of theſe I preſcribed bleeding, with anodyne and

* Thoſe diſeaſes are commonly ſhorter in the Antilles than elſewhere: in general, the criſes are never obſerved, becauſe of the early and ſo amazingly profitable uſe of the quinquina.

† From Nancy.

antifpafmodic remedies. Sometimes they refufed them. But nothing abated thofe fymptoms better than cauterizing. They recovered fooner and more eafily than the former, to whom this operation was made in the ftate of delirium and of tremours in the extremities. Blifter-plafters and quinquina kept almoft always an equal pace together: fometimes Huxham's tincture, with camphor and vitriolic acid..

Many of thofe patients underwent the hot iron. One day, in my morning vifit, I cauterized eleven of them in a fingle hofpital, and we were fatisfied that many owe their falvation to it. Fire has two effects: 1. In awakening and reanimating the benumbed fenfitive principle in the former, or the weakeft patients; in changing the nervous irradiations more fuddenly, and having a tendency to deftroy the other irradiation fo hurtful to the fyftem, &c. in the latter. 2. By determining, in both, a more copious flow of humours from the tela cellulofa (fince the fkin is diforganized), and during a longer time than can be effected by blifters.

We faw fome parotids, but almoft all were mortal, notwithftanding the ftimulating topicks. The cautery applied to the tumours was more beneficial. At length, attendance failing, many died, becaufe the health-officers, as well as myfelf, inhaled the poifonous vapours, and fickened in confequence thereof.

## ARTICLE IX.

*To the Editors of the Medical Repofitory.*

Gentlemen,

*If the following obfervations appear to deferve a place in your Repofitory, the infertion of them will oblige your moft obedient,* *F. BLANCHET.*

*New-York, 24th Auguft,* 1800.

READING, in the "Philofophical Magazine" of London, an account of the circumftances which led to Dr. Mitchill's theory of peftilential fluids, I find that the reafon affigned for the prevention of chemical combination between the azote and oxygen in the ordinary ftate of the atmofphere, is, that thefe elements, united to a fufficient quantity of caloric to render them gaseous, are repelled beyond the sphere of chemical attraction, and, of consequence, remain in the state of mechanical diffusion.

This explanation, though extremely ingenious, is not entirely free from objections. For if, according to the supposition of Dr. Mitchill and Citizen Guyton, atmospheric air can form an acid by the condensation of the integral molecules of the two gases (viz. of azote and oxygen) which compose it, how happens it that cold, which always produces condensation of the constituent particles of bodies, does not form nitric acid? Agreeably to the hypothesis of these two distinguished persons, it ought to follow, that the spontaneous formation of nitric acid in the atmosphere should be more frequent in the frozen zones than in the torrid zone. But this seems to be contradicted by experience.

Besides, whether our attention be extended over the globe, or confined to the narrow limits of a laboratory, it appears that the formation of nitric acid is produced by caloric, the effect of which must be expansion rather than condensation. In consequence of this fact, which appears to be invariable, it necessarily results, that caloric, in certain circumstances, exerts a chemical action upon these two bodies, and changes, by this combination, their individual nature into one new and peculiar. Further, it is reasonable to suppose, if caloric be a substance, that it should, like other substances, exert a chemical attraction for matter. It is, doubtless, on account of our ignorance of the laws of this attraction, that nature presents compositions which still astonish us, and baffle all the powers of our minds.

From the considerations thus briefly stated, I still venture to differ in opinion with these celebrated chemists. But, whatever may be my predilection for my own notions, I hold myself always ready to submit to evidence. Like those gentlemen, I am in search of truth. I am entirely convinced, as they are, that truth is essential to the happiness of man. I should be far from wishing to obscure it by any mistakes of mine. I am apprehensive that but too often it is only to be found at the *bottom of the well.* Whatever may be the danger of descending, I am willing, in quest of such an object, to run the risque of plunging into the water.

## ARTICLE X.

### Observations *on certain* Objections *of Dr.* Joseph Priestley *to the* Antiphlogistic System *of* Chemistry. *By* James Woodhouse, *M. D. Profeſſor of Chemiſtry in the Univerſity of Pennſylvania, &c.*

### No. III.

*To the Editors of the Medical Repoſitory.*

Gentlemen,

THIS letter will finiſh my reply to the objections of Dr. Prieſtley to the new theory of chemiſtry, and I ſhall not make any more obſervations on the ſubject until I hear from the Doctor.

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*Of the Production of the Carbonic Acid, or Fixed Air, from heating Copper, Silver and Lead, in pure Air.*

An objection of Dr. Prieſtley, to the opinion that fixed air is compoſed of oxygen and carbon, is, that this gas is obtained by heating certain metals in pure air, which, according to the French chemiſts, do not contain charcoal.

To decide this queſtion, a quantity of copper was precipitated from a clear ſolution of blue vitriol in diſtilled water, by iron tacks, which were previouſly expoſed to vitriolic acid, diluted with water, in order to ſcale them. When the copper was collected, vitriolic acid and water was added to it, to diſſolve any particles of iron it might contain, and it was well waſhed in pure water.

The focus of a lens was thrown upon a portion of this metal, confined in fifty-ſix ounce meaſures of oxygenous gas, which had been waſhed in lime-water, and was of the purity of 155, until nineteen ounce meaſures were abſorbed: the remaining air was of the purity of 140, and contained $\frac{1}{100}$ parts fixed air.

The copper calcined in this operation was then revived, by heating it in forty-eight ounce meaſures of hydrogenous gas, from malleable iron, when eighteen ounce meaſures of the air diſappeared. The remainder of the inflammable air contained no fixed air.

The revived metal was then melted in fifteen ounce meaſures of pure air, of the ſtrength of 140, until eight ounce meaſures were abſorbed. The remaining air was of the purity of 125, and contained $\frac{1}{10}$ parts fixed air. The calcined metal was again heated in forty-four ounce meaſures of hydrogenous gas, until ſixteen ounce meaſures diſappeared.—The remaining air contained no fixed air.

The revived metal was then heated in twelve ounce meaſures of pure air, until four ounce meaſures were imbibed by it. The remaining air contained $\frac{5}{100}$ fixed air. It was then repeatedly heated, alternately in inflammable and pure air, and always with the ſame reſult. The remainder of the pure air uniformly contained ſome fixed air.

Similar experiments were made with the lead of the ſhops, and lead precipitated from its ſolution in the acetous acid by plates of zinc; with the copper of the ſhops, the copper money of Great-Britain and the United States, and copper revived by inflammable air from the calx of copper, precipitated from blue vitriol by ammoniac; and with ſilver precipitated from its ſolution in the nitric acid by ſtrips of copper. In ſeveral of the experiments no fixed air was procured by heating theſe metals in pure air: no abſorption of this gas took place when ſilver was heated in it, for the innumerable bright ſurfaces of the metal reflected the rays of light, and no impreſſion could be made upon it by the lens.

Having acknowledged the fact, that fixed air is generally obtained by heating the pureſt ſilver, copper and lead, that can be procured in pure air, the next thing is to find the charcoal, which is one of the component parts of this gas.

As the metals are obtained from their ores by means of coal, it is not unphiloſophical to ſuppoſe, that a ſmall portion of this ſubſtance is mixed with them in the operation of reduction.

When lead is precipitated from its ſolution in the acetous acid by zinc, or copper from blue vitriol by iron, a portion of theſe precipitants is diſſolved, and the coal ſeparated from the diſſolved part will be depoſited with the precipitated lead and copper.

When fixed air is generated by heating copper in pure air, which has been revived by inflammable air from the calx of copper, precipitated by ammoniac from blue vitriol, the only ſource of the coal can be from particles of duſt which accidentally become mixed with the copper, and which it is difficult to exclude.

The diſintereſted muſt decide whether this explanation is completely ſatisfactory.

Secondly. *Of Manganeſe heated in Inflammable Air.*

In my anſwer to Dr. Prieſtley's conſiderations on the doctrine of phlogiſton and the decompoſition of water, publiſhed in the fourth volume of the American Philoſophical Tranſactions, it is particularly mentioned, and a number of experiments are related to confirm the poſition, that when metallic oxyds are heated by a burning lens, in hydrogenous gas, that the air vaniſhes, and that its diſappearance is always in ſtrict proportion to the pure air which the calces contain. An argument which was conſidered as concluſive was brought forward to prove this fact. One drachm of manganeſe, expoſed to the action of the lens in hydrogenous gas, made exactly twenty-two ounce meaſures of the air diſappear in ten minutes; but when the pure air was previouſly driven off from it, by means of a red heat, it would make none of the air vaniſh, although it was heated in it one hour.

In reply to this, Dr. Prieſtley tells us (Med. Rep. vol. iv. p. 137), that manganeſe, out of which the pure air had been expelled by a ſtrong heat, when heated in inflammable air, produced the ſame reſult as if freſh manganeſe had been uſed, except *that much more heat was neceſſary* to make it imbibe the air.

The two experiments made by the Doctor, relating to this part of the controverſy, do not warrant the concluſion which he has drawn from them. No comparative trial was made with freſh manganeſe, and an equal quantity of the ſame kind of calx from which the air had been driven off by heat. He acknowledges that manganeſe, containing dephlogiſticated air, imbibes inflammable air *very rapidly*, and with a very *moderate degree of heat*; but he does not ſay in what manner the oxygen acts to produce this effect.

The Doctor ſuppoſes, that when the calx of manganeſe is heated in inflammable air, the oxygen it contains enters into the phlogiſticated air which is found in the reſiduum; but there is no occaſion to make this ſuppoſition, for phlogiſticated air is contained in all manganeſe, and is expelled from it by heat. When I expoſed three drachms of this calx in fifty-ſix ounce meaſures of hydrogenous gas, fifty-four ounce meaſures of the air diſappeared, and two ounce meaſures of phlogiſticated air remained behind, which was previouſly contained in the manganeſe, and was expelled from it by the heat of the lens.

Since, then, when manganeſe, and other pure metallic calces, are heated in inflammable air, fixed air is not produced; if the pure air which they contain parts from them by the heat of the lens, and cannot be found, in an uncombined ſtate, in the air which remains behind; if the ſource of the phlogiſticated air which is ſometimes produced can be pointed out in a moſt ſatisfactory manner, what becomes of the pure air of the calces, if it does not unite to the hydrogen, and form water?

When manganeſe has been expoſed to the low red heat of a common furnace, a part only of its pure air is diſſipated from it; and the eighteen-inch lens of Dr. Prieſtley being ſuperior to the heat of the furnace, will expel more of the air, which, when the operation is performed in inflammable air, will unite with it, and make ſome of it vaniſh; but the eleven-and-a-half-inch lens which I uſe being not ſuperior to the heat of a furnace, will not expel the remainder of the pure air from the manganeſe, which has previouſly been expoſed to heat; conſequently, when it is heated in inflammable air, none of the air will diſappear.

Let Dr. Prieſtley make a fair comparative experiment, as I have repeatedly done, with freſh manganeſe, and ſome from which the pure air has been expelled by heat, and he will find that the former will make much more inflammable air diſappear than the latter.

### THIRDLY. *Of Finery Cinder heated in carbonated Hydrogenous Gas.*

A probable evidence of a calx containing oxygen or dephlogiſticated air, ſays Dr. Prieſtley, is, that when it is revived in inflammable air, fixed air is produced. But this is not the caſe when finery cinder is revived in theſe circumſtances, although I purpoſely prepared ſome by melting iron in the open air.* In another place he tells us, that a very ſmall quantity of oxygen is attached to the ſcales of iron, becauſe a barely perceivable quantity of fixed air is ſometimes found, when they are revived in inflammable air.†

The obſervation that oxygen, in a calx, is, perhaps, moſt eaſily detected by its forming fixed air when it is heated in inflammable‡ air, is not true.

No fixed air is generated by heating the pure calces of red precipitate and manganeſe, which are acknowledged to con-

* Doctrine of Phlogiſton eſtabliſhed, p. 14.
† Ibid. p. 12.
‡ Ibid. p. 28.

tain oxygen, in inflammable air from malleable iron; but if carbonated inflammable air be ufed, fixed air is always formed from the oxygen of the calces uniting with the coal held in folution in this gas.

The fame refult takes place from heating finery cinder in thefe airs. Water is formed when pure inflammable air is ufed, and fixed air when carbonated inflammable air is tried.

The focus of a lens was thrown upon one drachm of finery cinder, obtained from paffing fteam over red-hot iron-wire, confined in eight ounce meafures of carbonated hydrogenous gas, from the flowers of zinc and coal, and which had been well wafhed in lime-water. No abforption took place. One meafure of the remaining air, thrown in an eudiometer tube, over lime-water, gave $\frac{10}{100}$ parts of a meafure of fixed air.

The reafon that Dr. Prieftley obtains more water from heating finery cinder in pure inflammable air than from red precipitate, is, that the water, which is one of the conftituent principles of this fubftance, is feparated from it, and another portion generated, by the oxygen uniting with the inflammable air.

## ARTICLE XI.

### Luminous Appearance *of* Ocean-Water *caufed by* Animals: *In a Letter from Profeffor* Mitchill, *of New-York, to Profeffor* Barton, *of Philadelphia.*

SO obvious an appearance as the phofphorefcence of ocean-water was afcribed to animals as long ago as the time of Pliny. Some of thefe adhering to the rigging of veffels in windy and ftormy weather, and fhining in the dark, feem to have caufed the appearances known formerly by the names of Caftor and Pollux. Much has been offered on this fubject, both phyfically and hiftorically, you know, by Charles Frederic Adler, in his Differtation *de Noctiluca Marina*, which is well worthy of perufal. He has given a magnified figure of a microfcopic worm, which, in the fea of China, makes the falt-water luminous. It is called, by fome French writers, *fcolopendre marine luifante*, and by Linnè, *nereis noctiluca*.—Some of the *fea-jellies* and *fea-blubbers* have alſo been long known to be occaſionally luminous. The principal part of theſe are "meduſas," which, at a very early day, obtruded themſelves on the attention of naturaliſts.—But, notwithſtanding all this, the philoſophical world ſeems ſtill to be a good deal undecided as to the real cauſe of the phoſphoreſcence of the ocean. I have therefore recorded the following facts, which fell under my own eye, hoping they may not be without their uſe in explaining the phenomenon. PENNANT, in his Britiſh Zoology, vol. iv. expreſſes very juſt ideas on the ſubject.

On the evening of Saturday, the 13th of September, 1800, about high-water, as we were preparing, between ſeven and eight o'clock, to bathe in the bay, my attention was called to a remarkable luminous appearance at the water's edge on the beach. The wind was from the ſouthward, and the day had been ſo warm, that about 2 P. M. the quickſilver in a thermometer hanging in a ſhaded piazza, on the ſouth ſide of the houſe, had riſen to 89 deg. At this moment it ſtood as high as 76. The diſtance from the chamber windows to high-water-mark is 210 feet. It ſeemed as if the beach was covered with coals of fire, and that bright ſparkles were conſtantly emitted among them. The ſmall undulation which moved to land looked like a wave of flame rolling along the ſhore. And the water beyond, to the diſtance of a few rods, exhibited frequent corruſcations of extraordinary brightneſs. On going down to the water, I found the ſand covered with molluſca-animals, the greater part of which were the *meduſa ſimplex*. Thouſands of them had juſt been left by the receding tide, and were yet alive. Being incapable of living long out of the water, and unable to ſurvive until the next flood, they ſeemed to be under the influence of their laſt vital movements. They lay ſo thick under foot, that at every tread many of them were cruſhed to pieces. Beſides their ſpontaneous power to become luminous, whenever they were moved they emitted light; and this happened indifferently whether their gelatinous bodies were agitated through the medium of air, water, or the direct contact of the feet or fingers. On walking among them, and thereby exciting their luminous action, the beach reſembled melted metal in a red-hot ſtate; or the phenomenon might be compared to a radiant glory ſurrounding the feet, to the diſtance of a foot and a half, or more, at every tread. In ſeveral inſtances, the light emitted by a ſingle one, when taken, in its freſh and vivid ſtate, into my hand, was ſufficient to enable me to determine the time of night by my watch, the minute and hour hands being plainly to be seen: but this brightness was but transient. Frequently the creature emitted not a particle of light, and then, on a sudden, the luminous appearance would be conspicuous, and as quickly disappear. The succession of these lucid emanations from the creatures lying in such numbers upon the wet sand, resembled, if small things may be compared with great, the unsteady light of the fixed stars; and, indeed, the twinkling of these phosphorescent animals below, and of the celestial bodies above, afforded a spectacle so singular and so splendid, that I spent good part of the evening in admiring it. I remarked, also, that the sand on which these animals were left by the tide was luminous; and found, on crushing them to pieces in my hand, that a faint phosphorescence was imparted both to the sand and to my skin; but in neither case did it last long.

But what was as singular as any part of the phenomenon, was the effect produced by them upon our bodies and clothes while we were bathing. Whenever the water near one of them was agitated, a large fire-ball seemed to burst upon the view beneath the water; and whenever this happened in contact with one of the limbs, caused some of us instantaneously almost to start, for fear of being burned. Where any of the slimy matter was left, somewhat of a luminous appearance was perceptible on our clothes, giving them and our skins sometimes the appearance of phosphoric spots, and sometimes the more extraordinary semblance of being painted over with liquid fire. There were more than one species of animal; for, besides those which, by their magnitude, were very plain subjects for examination, there were some luminous spots as small as points, and as minute as the eye could discern. These adhered to our clothes and skins, and, when taken up with the water in vessels of glass, were too small or too pellucid to be distinguished by the naked eye, though they contributed eminently towards the effect of this submarine illumination. This, I presume, was the *nereis noctiluca*, an INTESTINAL animal. I succeeded in discovering another species, which was a slender worm of about a quarter of an inch long, and emitted, at times, a bright light of a greenish hue. This was probably a larger species of nereis.

Not being well acquainted with the nature of those mollusca beings, I apprehended some inconvenience from such a mass of animal matter left on the shore to putrefy so near the house. But my cause of alarm vanished before the next rising ſun: for, during the receſs of the tide, they all periſhed; though, inſtead of remaining a great maſs of dead gelatinous creatures on the beach, this whole collection of living animals, whoſe vivid exhibitions of light evinced their being alive near midnight, had ſo totally diſappeared before four o'clock, that no other trace of their having been there could be diſcerned, than ſome phoſphoreſcence in the ſand, on being ſtirred up by the foot or taken up in the hand. They had loſt their organization, and, in ſo ſhort a time, diſſolved into a kind of ſlime, which penetrated the ſand, and was mingled with the water of the next flood. On examining the ſpots at ſix o'clock next morning, before the beach was covered by the tide, not a veſtige of one of this numerous ſhoal of animals was diſcoverable by day-light. A ſpectator of the morning-ſcene could not have known, by any thing diſcernible, that ſuch a brilliant exhibition had been made there the preceding evening, or that a ſingle animal had been caſt aſhore on the ſpot.

I put ſeveral of the larger ſpecies of theſe creatures into glaſſes of their native ſalt-water, and carried them into my chamber. During the night I made repeated obſervations upon them, and found that the light they afforded was neither perpetual nor extended to their whole bodies. It was intermitting, and confined to certain lines paſſing from one extremity of the creature to another. The light was of a bluiſh colour, and the ſtreams of it were highly beautiful. Theſe animals lived all night in the water, and were as lively as ever in the morning. They were almoſt tranſparent, and nearly of the colour of the fluid in which they were ſuſpended; yet, on placing them in a good light, they were found ſufficiently opaque to be diſtinctly examined. Their figure was globoſe, or rather elliptical, ſhaped like a walnut. The largeſt were about an inch and a half in length, and the leaſt as ſmall as the eye could diſcern. Their ſtructure was too delicate to allow them to be examined in any other manner than in their floating ſtate. They were about of the ſame weight with ſea-water. At their option they could readily aſcend and deſcend in it. And as they have no air-veſſels like fiſhes, they accompliſhed their riſe and fall by a mere change of their ſpecific gravity, contracting themſelves into a ſmaller volume if they wiſhed to ſink, and expanding themſelves to a wider bulk if they intended to ſwim. Before ten o'clock next morning ſeveral of them were evidently dying, and before forty-eight hours had elapſed all of them were dead, and ſo entirely diſorganized that not a film or membrane was left; but the water, which was a little turbid, had a ſmall mud-like ſediment, and ſmelled ſtrong of phoſphorated hydrogenous gas.

The nearneſs of their approach to pellucidity diſplayed their internal ſtructure to the eye without the trouble of anatomizing. They might be looked through without the aid of a diſſecting inſtrument; and their blood, though not *red*, but nearly of the pale colour of their bodies, reflected light enough in the day-time to enable it to be ſeen in motion, briſkly circulating through the arterious and venous tubes. This view of the circulation of the blood through the whole economy of a healthy animal was one of the moſt intereſting appearances in animated phyſiology that I ever had beheld. This creature, like the echinus, and many more, had no heart, but the veſſels were endowed with muſcular power enough to propel their fluids without the aid of ſuch an organ. The pulſations of the arteries could be eaſily counted, and the little waves of the circulating fluid diſtinguiſhed as they paſſed from the larger extremity, where the motion was moſt evident, to the ſmaller, where it was more evaneſcent, and terminated in correſponding veins. In theſe animals the circulation not only proceeds, as in other creatures, one while ſwiftly, and at another ſlowly, but, at times, is totally intermitted or ſuſpended, and this, ſeemingly, *ad arbitrium*. Eight large arteries received the pale blood from a common trunk, and conveyed it from one extremity toward the other. They were about equidiſtant, and gave the animal a ſomewhat ſtriped appearance, ſuch as a ſlight intermixture of arſenic imparts to glaſs. The termination of theſe arteries in continuous veins was very plain to be ſeen, until their ramifications upon the parts which appeared to be nutritive viſcera became too minute for ſight, after which the inviſible tubes ſeemed to connect their branches into a common canal, or vena cava, whence the eight arteries before-mentioned derived their ſupply.

Such being the manner in which their juices circulated, it could now be underſtood in what part the luminous exhibition was made. I was ſoon ſatisfied it was in the *arteries*, and not in the veins; and the diaphanous conſiſtence of the animal permitted this light to be ſeen through its ſubſtance as plain as through cryſtal. The blood, after entering the arteries, and during its ſubjection to their action, became luminous, and paſſed through like ſtreams of ignited metal or electric emanations. And this vaſcular illumination, variouſly refracted in paſſing through the pellucid ſubſtance of the creature, through the water in which it floated, and through the atmosphere to the eye, made the whole body, when seen at a distance, appear luminous. These streams of light, however, were not constant. They not only intermitted when the circulation of the blood was intermitted, and the action of the vessels stopped, but very commonly, while the fluids were passing through their tubes with the utmost rapidity, there would be no phosphorescence at all. Then, again, one or more, and sometimes all the arteries, would suddenly exhibit the lucid phenomenon, and the creature and the surrounding water flash with light. This luminous evolution was not confined to the nocturnal existence of the animal; for, on attentively examining their functions by day, when the light was too faint to be seen, it could be easily distinguished, by the *colour* of the fluid in the vessels, that the same action was going on. It appeared of a bluish, or somewhat iridescent hue, along the course of the arteries, though its feebler light, like that of a taper, was lost amid the splendour of the solar rays. The same process, however, is going on during the day-time, in these creatures, though unobserved, that we behold in the dark.

One of these medusas may be compared to a glass lanthorn, freely permitting the light produced within it to diffuse itself to the surrounding spaces, while an external observer can thereby discern what is going on in the inside. I am so entirely satisfied of the connection between this *evolution of light* and the *circulation of arterious blood*, that I want no clearer evidence to that point. It is probable that in an animal which is entirely destitute of lungs as well as of heart, the pulmonary function may be performed by the vital vessels themselves. In these creatures I believe this to be the fact.

The light, then, which these marine animals exhibit, may be concluded to be produced by a function in them analogous to the respiration of animals which are of larger size and more complicated structure. The only reason why it is visible from their bodies is, that the gelatinous matter of which they consist is transparent. It is not improbable the same phenomena would be as obvious in the bodies of other creatures, and of even human beings, if the opacity of the materials of which we consist did not hinder the light within us from shining so as to be seen.

The remarks hitherto made chiefly refer to the larger species of light-emitting creatures. The same apply, as far as I can judge, to all the smaller species. A vessel of the water, containing no *viſible* animalcula, was carried, the ſame evening, to my chamber. When agitated from without it ſparkled; and, if ſtirred by the finger within, the number of ſhining ſpots increaſed. When left to reſt, lucid points were frequently to be ſeen arranging themſelves at the ſurface of the water, where it touched the inſide of the glaſs. Some of this water, that was poured upon the table, appeared full of ſhining points, like ſparks of fire. There was not a doubt in my mind, that theſe phenomena, like the others, were animalcular; yet, on viewing the water in the morning, it was as tranſparent as ſea-water uſually is, and not a ſingle creature was to be diſcerned in it. The preſumption, therefore, is, that this form of marine light is alſo owing to animalcules, though too ſmall to be diſcerned by the eye unaſſiſted by optical glaſſes. I am ſomewhat doubtful whether the tranſparency of theſe minute light-emitting creatures would allow them to be diſtinguiſhed if I had had a microſcope with me.

Reaſoning in this manner, I became perſuaded that the luminous appearance of ocean-water in other caſes, wherein no flaſh or ſparkle was diſtinctly to be ſeen, or traced to an individual point, but an indiſtinct glow alone appeared, as around the blades of oars, or near the bows and rudders of veſſels in motion, that the phenomenon was, in like manner, referable to animalcular action. And I terminated my ſpeculation by concluding, that the light emitted from millions of theſe viewleſs aquatic animals concurred to produce the general luminous appearance of the ocean in which they float, by the ſame rule that innumerable cluſters of fixed ſtars, as modern aſtronomers teach us, produce the luminous ſpots or milky hue of thoſe portions of the heavens where Omnipotence has placed them.

I have ſaid nothing about the manner in which the light is evolved in theſe animals. If it is by the decompoſition of oxygenous air that light is ſo freely emitted, what becomes of the caloric? for their bodies are not ſenſibly heated, nor warmer than the fluid in which they ſwim. Still it is not to be denied, that in the decompoſition of that *triple* fluid there may be an evolution of *caloric* ſufficient for the economy of creatures ſo ſmall, and of a ſtructure ſo nice and exquiſite as theſe, and yet not be meaſurable by our thermometers; and that *oxygen* may mingle with their fluids in due quantity. And it may be eaſily conceived, that during the proceſs *light* may be evolved, ſufficient, in rapidity and quantity within them, to occafion, by tranfmiffion through their pellucid forms, the phenomena of thefe and all other luminous oceanic meteors.

The animalcular origin of this phenomenon is corroborated by this additional confideration. At the time when the falt-water is remarkably luminous in fome places, there is very little of it to be feen in others, though but a few rods diftant. At fuch times, I found that by taking up parcels of the water, and viewing it, there were abundance of lucid points in thofe which were moft luminous, and but few in thofe which were feebly fo. The light proceeding from thefe invifible INTESTINAS, when nearly and narrowly examined, radiates from numberlefs fhining particles or centres; and, when viewed from a diftance too remote to permit thefe lucid centres to be feen, the effect produced on the organ of vifion is a general and weaker impreffion, as if every drop of water was luminous, by reafon of fomething chemically diffolved in it.

The fame creatures are not capable of emitting light for a long continuance of time. If fhaken, touched or agitated, their luminous faculty foon becomes exhaufted, and the water in which they float immediately returns to its ordinary colour. This is fo much the cafe, that if a very luminous portion of water (I do not mean a current) be much moved by the limbs of feveral perfons fwimming or wading in it, its luminous quality will, in a few minutes, be fenfibly diminifhed. Therefore, when a boat is rowed along, or a fhip is moved by the wind, or when a ftream rufhes over rocks, or againft any kind of obftacle, the light emitted in fuch inftances is produced by a fucceffion of animals, each of which, on being ftimulated, evolves, in its turn, a certain proportion and duration of light, and in this manner gives continuance or permanency to the phenomenon.

In October, 1772, Mr. Forfter obferved the Southern Ocean, beyond the Cape of Good-Hope, illuminated in a fimilar manner (Voyage round the World by Cook and Forfter, vol. iii. p. 45). The curious inquirer will be ftruck with the correfpondence of the phenomena off Table-Bay, and thofe in Long-Ifland Sound. The circumnavigator afcribed the luminous appearance of the fea-water, in 34 deg. fouth latitude, to animals of the fame genus which caufed it in 40 deg. 40 min. north. He faw the ocean luminous in 58 deg. fouth, during March, 1773, while the weather was tempeftuous, and fo cold that the quickfilver in the thermometer was as low as $33\frac{1}{4}$ deg. at noon. Thus it appears these creatures can live in water of any temperature above the freezing point. (Ibid. p. 97).

An opinion has been entertained, that, during the *shining of the sun, its rays are absorbed by the ocean*, and that the extrication of them again makes its water luminous. It has been conjectured, too, that the water of the ocean becomes occasionally so *highly electrical*, that the brightness it manifests is but the evidence of a high charge of electricity. There has been published, too, an idea that the *phosphoric matter* extricated from putrefying fish in the ocean, was the cause of this marine resplendence. And others have even been inclined to think the light proceeded from some attrition of *saline particles against each other*, or some unknown combinations formed among them. The true cause of the phenomenon, I am inclined to conclude, is neither of these, but universally, as far as my knowledge of the subject extends, is a function of animals. These are often conspicuous in tempests, when

> High o'er the poop th' audacious seas aspire,
> Uproll'd in hills of fluctuating fire. FALCONER.

And though the timid may be impressed with additional alarm at this appearance,

> Not so the man of philosophic eye
> And inspect sage; the waving brightness he
> Curious surveys, inquisitive to know
> The causes and materials, yet unfix'd,
> Of this appearance beautiful—— THOMSON.

It is remarkable how far these creatures, on some occasions, are carried up our rivers. During the drought of the year 1796, when sea-crabs were plentifully caught in the Hudson as high as Poughkeepsie (eighty miles from New-York), the water of the river was luminous in the neighbourhood of Pollepell's Island, as I sailed through the Highlands one dark night.

I forbear to trace the analogies between these *aquatic* animals and the numerous *aërial* species which emit light. Leaving these to your sagacity and penetration, I have only to conclude by renewing the assurances of my respect.

SAMUEL L. MITCHILL.

*Cedar-Grove, Oct.* 1, 1800.

# REVIEW.

Art. I. *Six Chemical Essays, by* Joseph Prieſtley, *LL. D. &c. Read at ſeveral Meetings of the American Philoſophical Society.* 4to. pp. 50.

THE ſheets on which theſe Eſſays are printed form the beginning of the fifth volume of the Tranſactions of the Philoſophical Society of Philadelphia. But as we poſſeſs them detached from the reſt of the volume, which is not yet publiſhed, we loſe no time in giving our readers an account of them.

That the value of the experiments related may be duly appreciated, it is proper to mention that the moſt important of them were made with a burning lens of ſixteen inches diameter, "generouſly furniſhed," ſays the author, "by Mr. Parker, who has ſo much diſtinguiſhed himſelf by his improvements in the art of grinding glaſs." To the liberality of this gentleman, in ſupplying him with various veſſels made of glaſs, Dr. Prieſtley declares the public is indebted for a great proportion of his other experiments on air.

We ſhall proceed to examine theſe pieces in the order in which they ſtand.

1. *Experiments on the Tranſmiſſion of Acids and other Liquors, in the Form of Vapour, over ſeveral Subſtances in a hot Earthen Tube.*

The reſults of ſending the vapour of ſpirit of nitre over *iron-turnings*, *copper*, *perfect charcoal*, *charcoal of bones*, *melted lead*, *tin* and *biſmuth*, are conciſely ſtated. The effects of the *vapour of marine acid* and *copper* upon each other, and what happened to it when paſſed through an earthen tube *glazed on the outſide only*, and when acting upon perfect charcoal—are alſo told. Theſe recitals will be inſtructive to thoſe who are engaged in ſimilar purſuits, or who, in the courſe of experiments, employ the ſubſtances which Dr. P. made uſe of. He relates a remarkable fact concerning *cauſtic fixed alkali*. When he ſent this *in vapour*, through an earthen tube containing iron, the firſt portion that came over was ſlightly *acid*, but not afterwards. The ſame reſult was obtained in three proceſſes. What ſort of acid this was we are not informed.

The remainder of this paper is of a miſcellaneous caſt, and has no ſtrict connection with its title: for he next recites certain experiments with *perfect charcoal* and *charcoal of copper* in nitrous acid by ſolution; with ſome account of the diſſolution of *phoſphorus* and *dry-boiled beef* in the ſame. He is of opinion that nitrous air contains oxygen, from the burning of pyrophorus and charcoal of wood in it. Though he ſeems again inclined to think, if oxygen was really one of its ingredients, it ought not to retain its aërial form. We believe the generally-received idea is correct, that it is an oxygenated baſis, whether it exiſts in a liquid or a gaſeous form. If "the juice of turnſole does not change its colour by ſaturation with nitrous air," all that we infer is, that *ſuch* nitrous air is an oxyd, and not an acid; but give it oxygen enough, and it will redden litmus inſtantly. The experimenter, who works much in his laboratory, will find it uſeful to examine theſe particulars.

After theſe follow eleven articles of detached chemical intelligence. Every one of them has its value in its preſent inſulated ſtate, and will acquire additional worth when its connection with other facts is better underſtood. We are glad to ſee morſels of ſcience thus preſerved. It was directed by a great authority, "to gather up the fragments that remained, that nothing be loſt."—The experiment with Papin's digeſter ſhows, "that a ſolution of cauſtic alkali, aided by heat, in that inſtrument, made a *liquor ſilicum* with pounded flint glaſs." The ſolution of ſilex in the boiling fountain of Geyſar is *now* no myſtery.—We relate the following facts at large, as they are not only curious in themſelves, but may explain another cauſe of *ſpontaneous* combuſtion beſides thoſe commonly known. "Pyrophorus is generally made with the charcoal of vegetable or animal ſubſtances mixed with alum, or any thing that contains the acid of vitriol, and the heat by which it takes fire is occaſioned by the eager attraction of this acid for water. I accidentally found that a pyrophorus may be made of *ſulphur and iron.* Having kept a cupfull of this mixture, made up with water, in a quantity of common air, about two months, I then took it out, and left it in the cup. The next day, perceiving the cup to be warm, I emptied it upon a board, when it grew hot, ſmoked very much, gave out a ſtrong ſmell of vitriolic acid air, and, at length, became red-hot. Putting a part of it into another cup, confined by common air, the air was rapidly diminiſhed."

2. *Experiments relating to the Change of Place in different Kinds of Air, through ſeveral interpoſing Subſtances.*

In this paper Dr. P. relates ſome extraordinary facts relative to the *ſeeming* permeability of the materials of chemical apparatus by aërial fluids. That opaque veſſels of metal and earth were penetrable by heat, and that tranſparent ones of glaſs would admit both light and heat, every operator has long known. It has not ſo generally been underſtood that an earthen veſſel of inflammable air, inverted in a large jar of oxygenous air, will, on being heated by a lens, part with its contents, and, in lieu thereof, be filled with oxygenous air. Nor has the converſe of this been commonly known, that a ſimilar veſſel of oxygenous gas, inverted in a larger jar of inflammable air, will, after being expoſed to the heat of a lens for half an hour, exchange its original charge for an equal quantity of the ſurrounding inflammable air, with which it will be found wholly filled. Yet Dr. P. affirms that ſuch are the reſults of his experiments. He found the mixture of airs in the external or *glaſs* jar was a chemical one; while that in the internal or *earthen* one had undergone no change, but was of the very ſame quality with that in the glaſs jar. Of the reaſon of this difference he can form no probable conjecture.—He formed ſomewhat of a like tranſmiſſion of the two airs both ways, when heat was applied through a *common* and a *tanned* bladder, though without chemical union. The like change of place he has found to happen in various other circumſtances, and unexpected products to be obtained when nitrous air and marine acid air were employed. The diverſified trials which he made have led this *man of long practice in experiments* to conſider them among the moſt extraordinary that have occurred to him in Phyſics, and ſuch as experimenters ought to be acquainted with, in order to prevent miſtakes of conſiderable conſequence. Through ignorance of theſe facts, it is probable that hundreds of miſtakes have been made already, and that the philoſophical world is at this moment miſled by their deceptions.

3. *Experiments relating to the Abſorption of Air by Water.*

The matter contained in this paper is likely to ſhake our faith in the correctneſs of eudiometrical experiments with *nitrous air over water.* The unfitneſs of the eudiometer to indicate the purity of atmoſpherical air has been mentioned in our vol. iii. p. 212. The reaſons there given were two

1. The variableneſs of the ſtrength of the nitrous gas; and, 2. Its attraction for water. Dr. P. has found that the whole materials of an eudiometrical mixture will combine with water; and, indeed, "if ſufficient time be allowed, all kinds of air, without diſtinction, will be wholly abſorbed by the water with which they are confined." A mixture of *nitrous* and *common air* was completely abſorbed by water in about eleven months. Another mixture of equal quantities of the like ingredients was made on October 5th, and was quite abſorbed on the 24th of next July. And a third, made on December 11th, had diſappeared on July 1ſt. A mixture of equal quantities of *common* and *inflammable airs*, fired together, was totally abſorbed between December 13th and July 19th. And that the *water* imbibed the gaſes appeared indubitable from contraſting the experiment with quickſilver; for when nitrous and common air, in mixture, were confined over that metal from October to April, there was no change diſcernible.

Independent of nitrous air, the whole of every kind of air confined with water, will, ſooner or later, be incorporated with it. But when atmoſpheric air is the ſubject of this experiment, the oxygenous part is always attracted firſt, and after that is imbibed, the remaining air, to the amount of about three-fourths, was quite phlogiſticated. But this was afterwards gradually blended with the water too. He found dilatation by an air-pump to prevent abſorption, and compreſſion by a condenſing machine rather to promote it. This piece alſo contains ſome curious facts on the change of the qualities of different kinds of air by *agitation in water*. Of theſe, the deſtruction of the inflammability of hydrogenous air is one of the moſt memorable.

## 4. *Miſcellaneous Experiments relating to the Doctrine of Phlogiſton.*

This piece is a recital of experiments tending to the ſame point with thoſe which have appeared in the former numbers of our work. It contains experiments on plumbago, on the revival of quickſilver in inflammable air from the precipitate *per ſe*, on pyrophorus, on the calcination of metals in common air over lime-water, on finery-cinder, on aërated *terra ponderoſa*, and ſome other ſubſtances. As this is a part of the great phlogiſtic controverſy, the whole eſſay ought to be carefully peruſed in connection with the other documents on the fubject. The concluding paragraph, howewer, is fo remarkable that we fhall infert it entire.

"I have obferved, that when a mixture of dephlogifticated and inflammable air is exploded, *acid* is produced if there be any excefs of the dephlogifticated air, but *only water with phlogifticated air*, if there be any excefs of the inflammable air. Thefe proportions I endeavoured to afcertain, and I found that acid is formed when 100 meafures of inflammable air are united to 54 meafures of dephlogifticated air; but that only water was produced when 100 meafures of inflammable air were united to 47 meafures of dephlogifticated air."

5. *Experiments on the Production of Air by the freezing of Water.*

This is the article which was publifhed in our prefent volume, page 17. It is republifhed here, with the following words of adddition at the end of the concluding paragraph: "Alfo, if any fpecies of air be entitled to the appellation of *hydrogen*, it is phlogifton, and not inflammable air." That is, we fuppofe, the *bafis* of inflammable air, and not the gas itfelf, is *hydrogen*, *i. e.* the *phlogiftic radical* of water.

6. *Experiments on Air expofed to Heat in Metallic Tubes.*

Dr. P. finds that in *metallic* as well as *earthen* tubes a mixture of dephlogifticated and inflammable air will not explode even in a red heat, though this always takes place in tubes of *glafs*, where there is no metallic ingredient. This he verified in tubes of *iron*, *copper*, *filver* and *gold*, and of *flint-glafs*, which contains a portion of *lead*.

He thinks, in fome cafes, *airs* are tranfmitted through the *fubftance of metallic* tubes, in a manner analogous to their paffage through *bladders* and *earthen* tubes. Thefe are, indeed, exceedingly curious matters, and eminently deferving the attention of all who purfue chemical inquiries. They difclofe the fources of fo much fallacy in artificial philofophy, that of a large proportion of fuch experiments, though made by able hands, and with the beft apparatus, we fcarcely know what to believe or what to difbelieve. Nor is this fcepticifm unfriendly to truth and reafon: for latterly we have obferved that the exceffive defire—the rage we may call it—of making experiments in rooms and work-fhops, has confiderably diminifhed the number of the true obfervers of nature. While engaged in minute operations with the imperfect inftruments of human contrivance, within narrow and fecluded apartments, the genius of our time too often ſuffers the great works carried on by the perfect machinery of the Deity, through the wide range of creation, to paſs unnoticed or neglected. His laboratory is his world, and not unfrequently he knows little or nothing of what is going on out of doors! NATURE IS THE GREAT EXPERIMENTER; and what we moſt want are OBSERVERS AND INTERPRETERS OF HER PROCESSES. But man is vain and impatient, and will be buſy, though in vain. Dr. P.'s communications will have a ſtrong tendency to make his readers modeſt and diffident, and to turn their minds to becoming objects.

Towards the cloſe of this paper are ſome experiments relating to phlogiſticated air. The baſe of this, like all other kinds of air, he believes to be water; and, beſide it, to conſiſt of nothing but ſome modification of phlogiſton. He thinks, however, there is a peculiar difficulty in aſcertaining its conſtitution, as ſome of his experiments ſeem to ſhow that it contains the principle of acidity, and others that it is entirely free from it: nor do we find the difficulty removed by the experiments related.

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ART. II. *A Review of the Improvements, Progreſs, and State of Medicine in the* 18*th Century. Read on the firſt Day of the* 19*th Century, before the Medical Society of South-Carolina, in purſuance of their Vote, and publiſhed at their Requeſt. By* David Ramſay, *M. D.* 8vo. pp. 47. *Charleſton.* Young.

AMERICA already ranks the author of the " Review" before us among her beſt hiſtorians. The opportunities afforded him, while he was a member of Congreſs, to acquire a correct knowledge of public affairs, and to inſpect original documents in their proper offices, were induſtriouſly improved. And the publication of the " Hiſtory of the American Revolution," and of the " Hiſtory of the Revolution of South-Carolina," was not only reputable to the literary character of the author's native State and country, but was replete with information concerning the cauſes, the progreſs and termination, of that ſtruggle which ſevered the Atlantic Colonies from the Britiſh Empire.

The compoſitions from Dr. Ramſay's pen, which have been inſerted in our work, ſhow him to no leſs advantage in his profeſſional capacity. Such of our readers as have peruſed the addreſs to the Medical Society, inſerted in page 98 of the preſent volume; and the account of the yellow fever at Charleſton, in page 217, will already have formed a favourable opinion of the good ſenſe and diſcernment of the author. In the piece now before us he riſes in our eſtimation, while he takes a wider range of obſervation, and ſurveys the progreſs of medicine, from one improvement to another, during the laſt hundred years.

We do not mean to ſay that it contains a complete and circumſtantial account of every thing done, during the century which has juſt elapſed, to advance the intereſts of phyſic in all parts of the world; but there is ſo much information contained in it, on the different branches of the profeſſion, and ſtated in ſo orderly and conciſe a manner, that the peruſal has afforded more than a common ſhare of pleaſure. There is a polite and gentlemanly air which pervades the whole performance; and whether Dr. R. makes mention of the dead, or offers any ſentiments concerning his cotemporaries now alive, liberality and candour diſtinguiſh his expreſſions. Not a word of invidious diſcontent, nor of jealous rivalſhip, nor of angry diſputation, is to be found in this chaſte and manly pamphlet.

After ſome preliminary remarks on the ſtate of logic, of literature and ſcience, at the cloſe of the ſeventeenth century, the author turns his attention more particularly to medicine. The improvements in *anatomy* firſt engage his notice. The anatomizing of human bodies, the injection of their veſſels with various coloured fluids, and with wax; the corroſion of them by acids; the improvements in delineation and engraving; and the making of models in imitation of natural forms, are ſucceſſively mentioned. Then follow the diſcoveries in *ſurgery*; of which the modern mode of operating for the ſtone, hydrocele, aneuriſm, fiſtula lacrymalis, bubonocele and cataract, and a number of other advantages of ſurgery as practiſed at this time, are enumerated. He next treats of the *obſtetric art*, and delivers a ſketch of its hiſtory from the printing of Thomas Reynold's book, entitled "The Byrthe of Mankind," in 1540, down to the recent publications of Hamilton and Denman. The *theory and practice of phyſic* are then conſidered. After which follow Braidwood's and Sicard's *plans of inſtructing the deaf, and teaching them to ſpeak and write*; *the diſcoveries made by means of morbid anatomy*; *experiments with poiſons, and other ſubſtances, on living animals*; *and the eſtabliſhment of humane ſocieties* *for the recovery of perſons drowned, and otherwiſe apparently dead.*

Dr. R. afterwards calls the attention of his hearers to the *cool regimen in fevers and ſmall-pox*; to the eſtabliſhment of learned ſocieties; to the erection and endowment of hoſpitals and infirmaries; and to the improvement and ſimplification of the materia medica. The cultivation of botany, and the late and great diſcoveries in chemiſtry, are the next ſubjects of the intelligent author's obſervations. The triumphs of phyſic over the ſmall-pox by inoculation, and over ſcurvy by vegetable diet and oxygen, are ſpoken of in terms at once exulting and philanthropic.

After ſome obſervations on the abatement of plague, peſtilential fevers, putrid ſcurvies and dyſenteries, from the improvements made in diet, cleanlineſs and living, during the eighteenth century, Dr. Ramſay enters a little into the *medical* hiſtory of America. From this (p. 35) we make an extract in the author's own words, that our readers may form ſome judgment of the ſubject, and his manner of treating it.

"The Rev. Dr. Cotton Mather recommended, and Dr. Boylſton (one of the anceſtors of Preſident Adams) practiſed inoculation in Boſton, as early as the year 1720. Dr. Mather received his firſt impreſſion in favour of this practice from a volume of the Tranſactions of the Royal Society of London, which gave an account of inoculation at Conſtantinople. This he ſhowed to Dr. Douglaſs, who treated the propoſal with ridicule. He was more ſucceſsful in his application to Dr. Boylſton, who began to inoculate at the riſk not only of his practice, but even of his life. The friends and enemies of the practice filled the newſpapers of the day with arguments for and againſt it. The whole of the influence which the learning and piety of the New-England clergy have always given them, was exerted; and the whole of it was neceſſary to induce their hearers to conſent to inoculation. The pactice, by degrees, extended through New-England, to New-York and Philadelphia, and, finally, to Charleſton, where it was partially adopted in 1738, and afterwards became general in 1760.

"The earlieſt publication in America, on a medical ſubject, which has come in my way, was a treatiſe on the iliac paſſion, by the late Dr. Cadwallader, of Philadelphia, printed about ſixty years ago. In this the enlightened author very ably explodes the then common practice of giving quickſilver and draſtic purges, and recommends in their place mild cathartics, with the occaſional uſe of opiates. About the ſame time, Dr. Tennant, of Virginia, wrote a treatiſe on the pleuriſy, in which he brought into public view the virtues of ſeneka ſnake-root, which were before unknown. Dr. Colden, of New-York, and Dr. Ogden, of Long-Iſland, at this early period, favoured the public with their obſervations on a ſpecies of ſore-throat which was then prevalent and mortal. I have not been ſo happy as to meet with either of theſe performances, but have heard a favourable account of each of them. There are, doubtleſs, ſeveral other early writers in America, but they have not come to my knowledge.

"At the commencement of our revolutionary war, Dr. John Jones, of New-York, one of the moſt eminent phyſicians and ſurgeons that ever graced this country, publiſhed a work, entitled 'Plain Remarks on Wounds and Fractures,' addreſſed to the ſtudents and young practitioners in America. This was particularly deſigned for the benefit of the ſurgeons in the army and navy of the United States, and will long remain a monument both of the profeſſional ſkill and patriotiſm of its worthy author.

"The yellow fever, which, for eight years paſt, has infeſted our ſea-port towns, has given birth to much medical diſcuſſion; but as the writers on this ſubject are ſtill living, any obſervations on them, at preſent, would be premature.

"Fain would I point out to your recollection the many valuable and important writings of Dr. Ruſh, who has reſcued America from the reproach of producing no original writers in medicine; but he lives, and long may he live the pride and boaſt of his country; and delay, to a far diſtant day, that celebration of his fame which is only decent after the death of its ſubject. For the ſame reaſon, I muſt, in ſilence, paſs over the literary productions of Dr. Mitchill, of New-York. If we may judge of the full harveſt by the firſt fruits that have already appeared in his early youth, we may confidently indulge the hope, that, in the progreſs of his valuable life, he will largely contribute to the growing fame of his country.

"The firſt medical lectures in America were given, in or about the year 1763, by Dr. Shippen, the preſent Profeſſor of Anatomy and Surgery in the Univerſity of Pennſylvania; who had been prepared for the able diſcharge of this duty by the celebrated Dr. William Hunter, of London. The truſtees of the college of Philadelphia, with the venerable Franklin at their head, ſoon after enriched their inſtitution with the lectures of the enlightened Morgan, and of the judicious Kuhn, who had been a pupil of Linnæus. One was ftill wanting to complete a fyftem of medical education. The truftees turned their eyes to young Rufh, who had then fcarcely completed his apprenticefhip; and they encouraged him to profecute his ftudies in Europe, with the promife of a Profeffor's chair on his return. With how much judgment and advantage this was done, the noble ardour for medical improvements which he poffeffes, and with which he has the happy art of infpiring his numerous pupils, affords the moft ample teftimony. Whilft thefe young Profeffors were engaged in teaching anatomy, furgery, materia medica and chemiftry, the venerable Bond, then an old practitioner, was appointed to illuftrate the practice of phyfic, by chemical lectures on the cafes of patients in the Pennfylvania Hofpital. Some of thefe original Profeffors have been fucceeded by younger men, who are not inferior to their predeceffors; and promife to continue, in the nineteenth century, that generous ambition for medical diftinction which had began among Americans in the eighteenth. In fuch high eftimation are they held, that their lectures are attended, every feafon, by more than an hundred medical ftudents.

"Much praife is due to the truftees of the college of Philadelphia, who, at this early day, eftablifhed the firft medical inftitution in America, and began to confer degrees, while their country was a colony of Great-Britain. With pleafure I add, that fince we have been free and independent States, other medical eftablifhments have been made in New-York, Cambridge Univerfity in Maffachufetts, and Dartmouth College in New-Hampfhire: in each of which are Profeffors of merit and talents.

"It reflects no fmall honour on our young country, which only began to be fettled by civilized people in the feventeenth century, that, at the clofe of the eighteenth, there are in it fo many medical fchools; and, in particular, that in the three adjoining States of New-York, New-Jerfey and Pennfylvania, within the diftance of 120 miles, there are three Profeffors of Chemiftry—Mitchill, Maclean and Woodhoufe; who, for an accurate knowledge of their department, can bear a comparifon with the Profeffors of the fame in the oldeft feminaries of Europe. The greateft chemift of the world has alfo fixed his refidence among us, and, in the woods of Northumberland, continues thofe philofophical experiments which have done fo much honour to the eighteenth century.

"Our country is now favoured with a periodical publication, under the title of the 'Medical Repoſitory,' which, in addition to many valuable original eſſays, chiefly from the ingenious editors, Drs. Mitchill and Miller, brings to the view of the American ſtudent all that is new, ingenious or uſeful in foreign publications, on the ſubject of medicine, or the arts connected therewith.

"In the medical hiſtory of South-Carolina, the yellow fever and ſmall-pox have been the moſt injurious epidemics. My information relative to theſe two diſeaſes, prior to the year 1763, has been chiefly furniſhed by Dr. Prioleau, as collected from the manuſcripts of his accurate and obſerving grand-father, the venerable Samuel Prioleau, Eſq. who died in the year 1792, at the age of ſeventy-four. From theſe it appears, that in the year 1699 a diſeaſe prevailed in Charleſton, which ſwept off a great part of the inhabitants, and ſome whole families. This was then called the plague, though afterwards ſuppoſed to have been the yellow fever.

"In the year 1732, the yellow fever began to rage in May, and continued till September or October. In the height of the diſorder there were from eight to twelve whites buried in a day, beſides people of colour. The ringing of the bells was forbidden, and little or no buſineſs was done. In the year 1739 the yellow fever raged nearly as violently as in the year 1732: it was obſerved to fall moſt ſeverely on Europeans. In 1745 and 1749 it returned, but with leſs violence: however, many young people, moſtly Europeans, died of it. It appeared again, in a few caſes, in 1753 and 1755, but did not ſpread. In all theſe viſitations it was generally ſuppoſed that the yellow fever was imported; and it was remarked that it never ſpread in the country, though often carried there by infected perſons, who died out of Charleſton, after having caught the diſeaſe in it.

"For forty-two years, after 1749, there was no epidemic attack of this diſeaſe, though there were occaſionally, in different ſummers, a few ſporadic caſes of it. In the year 1792 a new æra of the yellow fever commenced. It raged in this city in that year, and alſo in 1794, 1795, 1796, 1797, 1799, and 1800. In thoſe laſt ſeven viſitations of this diſeaſe, it extended from July to November, but was moſt rife in Auguſt and September. With a very few exceptions (chiefly children), it excluſively fell on ſtrangers to the air of Charleſton, and was in no inſtance contagious. In the years 1796 and 1797 it raged with its greateſt violence. In the two laſt years it has conſiderably abated. In the year 1799, the whole number of deaths from it was 239; and in 1800, no more than 134: but this decreaſed mortality was partly owing to the decreaſed number of ſtrangers; for ſuch were cautious of viſiting Charleſton in the warm months. In Philadelphia it began with great violence in the year 1793; and from that time to the preſent it has been more or leſs epidemic almoſt every year, in nearly all the ſea-ports of the United States.

"The years 1699 and 1717 are the dates of the two firſt attacks of the ſmall-pox in Charleſton. In both it proved fatal to a conſiderable proportion of the inhabitants. It returned in 1732, but effectual care was taken to prevent its ſpreading. In the year 1738 it was imported in a Guinea ſhip, and ſpread ſo extenſively that there was not a ſufficiency of well perſons to attend the ſick, and many periſhed from neglect and want. There was ſcarcely a houſe in which there had not been one or more deaths. Dr. Mowbray, ſurgeon of a Britiſh man of war then in the harbour, propoſed inoculation; but the phyſicians oppoſed it. Col. Beale, who was informed of the ſucceſs of inoculation in Boſton, had his family inoculated. Mr. Philip Prioleau was the firſt perſon in Charleſton who ſubmitted to the operation. The ſucceſs which attended this firſt experiment encouraged ſeveral others to follow the example. The diſeaſe ſoon after abated.

"About the beginning of the year 1760, the ſmall-pox was diſcovered in the houſe of a pilot on White Point. Guards were placed round the houſe, and every precaution taken to prevent the ſpreading of the diſeaſe, but in vain. When the perſons firſt infected at White Point were either dead or well, the houſe in which they had lain was ordered to be cleanſed. In doing this a great ſmoke was made, which being carried by an eaſterly wind, propagated the diſeaſe extenſively to the weſtward, in the line of the ſmoke. Inoculation was reſolved upon, and became general. Fifteen hundred perſons are ſaid to have been inoculated in one day; but it is alſo ſaid that five hundred of theſe died. This mortality, though great, was comparatively leſs than what had taken place in the year 1738.

"In the year 1763 the ſmall-pox again became epidemic; but as there were few to have it, and inoculation was generally adopted, its ravages were not extenſive. For ſeventeen years after the year 1763, the ſmall-pox was ſeldom or never heard of. During the ſiege of Charleſton it was introduced, and immediately after the ſurrender of the town, on the 12th of May, 1780, a general inoculation took place. As the cool regimen was then univerſally adopted, the diſeaſe paſſed over without any conſiderable loſs or inconvenience. Since that time no pains have been taken to exclude the ſmall-pox. To inoculate for it is a thing of courſe, and the diſeaſe has ceaſed to be formidable.

"For eighty or ninety years after the firſt ſettlement of South-Carolina, the practice of phyſic was almoſt entirely in the hands of Europeans: among theſe were ſeveral able phyſicians, who poſſeſſed an accurate knowledge of the diſeaſes of our country. In this claſs Dr. Moultrie, the elder, was eminently diſtinguiſhed. He died twenty-eight years ago, after having been at the head of his profeſſion for more than forty years. He was the idol of his patients. They who had him once, could not be ſatisfied, in caſe of need, without having him again. So great was the confidence repoſed in his judgment, that they who were uſually attended by him, preferred his advice and aſſiſtance, even on the feſtive evening of St. Andrew's day, to that of any other profeſſional man in his moſt collected moments. He poſſeſſed excellent talents for obſervation, and was wonderfully ſagacious in finding out the hidden cauſes of diſeaſes, and adapting remedies for their removal. His death was regretted as a great public calamity. Several of the ladies of Charleſton bedewed his grave with their tears, and went into mourning on the occaſion. The year after his deceaſe was diſtinguiſhed by the deaths of ſeveral women in child-birth. While he lived, they thought themſelves ſecure of the beſt aſſiſtance in the power of man, or of art, in caſe of extremity. In loſing him, they loſt their hopes. Depreſſing fears ſunk their ſpirits, and, in an unuſual number of caſes, produced fatal conſequences.

"In that early period of American medical hiſtory, which was before Dr. Ruſh began his brilliant career as an author, there were more experiments made, more obſervations recorded, and more medical writings uſhered into public view, by the phyſicians of Charleſton, than of any other part of the American continent. Dr. John Lining, of this city, favoured the public with a ſeries of judicious ſtatical experiments, perſeveringly conducted through the whole of the year 1740. He was one of the firſt experimenters in the novel ſubject of electricity, with which he became acquainted, in correſponding with Dr. Franklin, ſoon after the diſcoveries of that celebrated man had aſtoniſhed the philoſophers of both the old and new hemiſphere. Dr. Lining, alſo, in the year 1753, publiſhed an accurate hiſtory of the American yellow fever, which was the firſt that had been given to the public from our continent.

"Dr. Lionel Chalmers made and recorded obſervations on the weather for ten ſucceſſive years, that is, from 1750 to 1760. The ſame able phyſician furniſhed a particular account of the opiſthotonus and tetanus, which was communicated to the Medical Society in London, in the year 1754, and afterwards publiſhed in the firſt volume of their Tranſactions. He alſo prepared for the preſs an account of the weather and diſeaſes of South-Carolina, which was publiſhed in London, in the year 1776; but his moſt valuable work was an eſſay on fevers, printed in Charleſton, in the year 1767. In this he unfolded the outlines of the modern ſpaſmodic theory of fevers. Hoffman had before glanced at the ſame principles; but their complete illuſtration was reſerved for Cullen, and laid the foundation of his fame.

"Dr. Garden, about the year 1764, gave to the public an account of the virtues of pink-root, and, at the ſame time, gave a botanical deſcription of the plant. This truly ſcientific phyſician was much devoted to the ſtudy of natural hiſtory, and particularly of botany, and made ſundry communications on thoſe ſubjects to his philoſophical friends in Europe.

"In compliment to him, the greateſt botaniſt of the age gave the name of Gardenia to one of the moſt beautiful flowering ſhrubs in the world.

"William Bull was the firſt native of South-Carolina who obtained a degree in medicine. He had been a pupil of Boerhaave; and, in the year 1734, defended a theſis 'De Colica Pictonum,' before the Univerſity of Leyden. He is quoted by Van Swieten, as his fellow ſtudent, with the title of the learned Dr. Bull.

"John Moultrie was the firſt Carolinian who obtained a medical degree from the Univerſity of Edinburgh, where, in the year 1749, he defended a theſis 'De Febre Flava.' Between the years 1768 and 1778, ten more natives obtained the ſame honour. Three of theſe, viz. Drs. Fayſſoux, Harris and Chanler, have been preſidents of our ſociety.

"Since the revolutionary war, the number of native ſtudents has very much increaſed. Among them are ſeveral young men of great hopes. If we may judge of their profeſſional ſkill by the ſpecimens they have already given, we may augur well to our country. It is no inconſiderable evidence of the increaſing proſperity of South-Carolina, and of the progreſs of medical knowledge therein, that at the cloſe of the eighteenth century, in the ſpace of four years, fifteen of its native ſons, viz. Johnſon, Alſton, Huger, North, Prioleau, Brailsford, Bellinger, Akin, Baron, Gough, Glover, Hunſcombe, Screven, Smith and Tidyman, have been admitted to the degree of Doctors of Medicine, which is treble the number of all the Carolinians who had attained that honour, thirty-two years ago, at the expiration of one hundred years from the firſt ſettlement of the province, in 1669. In that long period of our infancy, the whole number of native graduates was only five, viz. Bull, Moultrie, Chanler, Caw, and Fayſſoux."

Dr. Ramſay mentions, with great reſpect, LINING, CHALMERS, MOULTRIE, GARDEN and WALTER, South-Carolinians, who have eminently contributed to the enlargement of our knowledge of medicine and natural hiſtory. We barely obſerve, but without complaining, that we have looked in vain for the name of CATESBY. The author exhorts the members to loſe no opportunity of improving their profeſſion; adviſes an accurate analyſis of rice, the ſtaple commodity of the State; the inveſtigation of the qualities of indigenous vegetables; and the erection of a diſpenſary for the relief of the poor.

He concludes by exhorting the phyſicians of Charleſton to accept ſeats in the City Council, that they may aſſiſt in amending the Police, particularly as reſpects the prevention of peſtilential diſtempers. It is a remarkable fact, that very few inſtances exiſt, in any of the American ſea-ports, where phyſicians are members of municipal bodies. By generally withdrawing themſelves from juries, from moſt town and ward offices, and from the militia, medical gentlemen are looked upon as exempts from the active ſervices of ſociety, and excluſively devoted to the purſuit of their profeſſion. This appears, in many inſtances, to be carried too far; for thereby the public, in a conſiderable degree, loſes the benefit of their extra-profeſſional counſel, and their profeſſion itſelf is deprived of much of the influence it ought to poſſeſs in the community. Believing, as we do, civic duties and relations are as binding upon phyſicians as upon other claſſes of citizens, we think they ſhould exert themſelves to perform, at leaſt, their proportional part of the public labour; and, in doing ſo, be enabled to participate an equal ſhare of public uſefulneſs and honour.

ART. III. *An Addreſs to the Philadelphia Medical Society, on the Analogies between Yellow Fever and True Plague. Delivered, by Appointment, on the 20th February,* 1801. *By* Charles Caldwell, *M. D.* 8vo. pp. 44. *Philadelphia.* T. *and* W. Bradford. 1801.

WHEN coloniſts from Europe firſt eſtabliſhed themſelves on the eaſtern ſhores of North-America, it was natural, and, in many inſtances, indeed, during ſome time, neceſſary for them to derive their ſupplies, both of food and of knowledge, from the country whence they emigrated. The proviſions which they brought with them might ſoon be conſumed, and additional quantities imported from their former homes. But, in due ſeaſon, the plants and animals brought with them, by thriftineſs and increaſe in their new ſituations, furniſhed an adequate ſtore of nouriſhment; and, in addition to theſe, the indigenous productions of the ſoil itſelf on which the adventurers had fixed their abode, likewiſe contributed ſomething toward their ſubſiſtence. Soon, therefore, would they become independent of their parent land for the neceſſaries of *bodily* ſupport.

Far otherwiſe was it with regard to the *mind.* Having little leiſure, from the preſſure of immediate wants and exertions, to cultivate their underſtandings, they languiſhed through neglect of culture, or ſickened for lack of knowledge, *the true phyſic of the ſoul.* Or if, at length, information was ſought after and obtained, it was generally through the medium of the publications, diſcourſes and converſations faſhionable in the mother country, and tinctured, of courſe, with the prejudices and errors of every ſort which were prevalent there. To this ſource can we trace language and its dialects, religion and its rites, government and its forms, manners and their tendencies, cuſtoms and their peculiarities, with much of the habits, taſte and genius of the different tribes of our people. From the ſame origin came the literature and ſcience which reigned in their infant ſchools and ſeminaries, where frequently the books that were read, and the inſtructors who preſided, were imported from foreign dominions.

Great as this influence was, it had in no department of knowledge more ſway than in the profeſſion of phyſic. Many of the practiſers of this art were natives of Europe. Of the deſcendants of the coloniſts, many were ſent to Holland, or England, or Scotland, for education: of thoſe who remained at home, the greater part, either directly or indirectly, gleaned fomething from the books in vogue; and as they perufed the writings of Pitcairn, Allen or Salmon, made up their minds accordingly.

But this ftate of dependence was not to continue for ever. The fevering of the political connection between this country and Europe was a glorious event. Not only an efcape from the tyranny of political and theological, but of literary and fcientific domination, was effected. Taught to think and act for themfelves on governmental, military and commercial fubjects, the American people alfo began to affert independence in matters of a philofophical nature.

A peftilential ficknefs, one of the moft ferious calamities that ever fell upon civilized fociety, has ftimulated phyfical inquiries, and exercifed medical talents, to an extraordinary degree. Under the defolating influence of this diftemper, the Americans grew vigilant, and fuffered none of its accompaniments to efcape their notice. They beheld its rife, progrefs and decline, year after year, under circumftances the moft favourable to its inveftigation. Their feelings, their hopes and their interefts, all prompted them to be correct in their obfervations, clear in their narratives, and fair in their reafonings. A candid fpirit of inquiry, like Ariadne's thread, led them through the labyrinth, and enabled them, on their return, to make a true report of what they had witneffed, inftead of having been, like their predeceffors, bewildered and loft in its mazes.

They declared, as the refult of their experience, that the yellow fever, which they had fo often feen, was a plague, whofe peftilential quality, however remotely dependent upon the general conftitution of the atmofphere, as modified by climate and feafon, was particularly occafioned by poifonous exhalations from certain forts of organized fubftances in a corrupting condition; that beef, and fifh, and hides, and human fæces, putrefying in hot weather, had often afforded fuch a deleterious air, by which many perfons had been difeafed, and many killed; that this feptic effluvium was moft noxious near the place of its production, and could not be formed, even from materials which contained its elements, but by the joint operation of moderate degrees of heat and moifture. They alfo declared their conviction, that febrile diftempers of all denominations, from quartan agues to Syrian plagues, were excited by the fame general caufe, varioufly modified in its ſtrength and virulence, and in reſpect to the food, way of life, habits, temperaments, dreſs, prediſpoſition, and part of the conſtitution to which it was applied; that this cauſe being not the offspring of living vaſcular ſecretion, but of common putrefactive diſſolution, and therefore not a contagion, would not produce a contagious diſeaſe; and that, of courſe, not one of the diſorders ariſing from this general or common ſource of miſchief was (in the proper ſenſe of the word) contagious, or liable to ſpread from man to man in any other manner than as a putrid and ſickening vapour might be engendered in the diſcharges of the body before, and in the body itſelf after death. And they further became ſatisfied, that if this plague of America was not contagious, the plague of Aſia ought not to be contagious; that the yellow fever often aroſe from local cauſes on board merchant-ſhips and veſſels of war, and was thence erroneouſly ſaid to be brought from places beyond the ſeas; and, by parity of reaſoning, the plague of the weſtern Mediterranean ports was not introduced from the Archipelago and Levant, but engendered on ſhip-board, through improper regulations there, either during their voyages, or rather during a quarantine, or forty days detention at the place of their arrival; and, conſequently, that this miſconception had given riſe to many unneceſſary and burthenſome reſtraints upon commerce, to the great reproach of legiſlation, and the diſgrace of ſcience.

Dr. Caldwell is one of thoſe whoſe underſtanding has been long exerciſed in contemplating the appearance and diſappearance of the peſtilential diſtempers of Philadelphia. They have repeatedly ariſen, taken their courſe, and died away before his eyes, under circumſtances the moſt favourable for obſervation and remark. And the piece now under conſideration is a reſpectable teſtimonial of the care he has taken to gather facts, and of the ability he poſſeſſes to reaſon upon them. He expreſſes his opinion, that under the term "peſtilence" ſhould be included all diſeaſes which ariſe from a vitiated and malignant atmoſphere. Plague and yellow fever ariſe from this cauſe, and conſtitute two of the leading modifications of peſtilence. Being certainly promoted by putrid exhalations, officers of police ought to be much leſs ſolicitous to prevent their introduction from abroad, than to guard againſt their local and inteſtine engendering among ourſelves. Diſbelieving the contagiouſneſs both of the one and the other of theſe diſtempers, he conſiders the importation of their ſpecific poifon from countries beyond the feas, and their propagation by means of it in our own, as a grofs and vulgar miftake.

The publication having been made at the requeft of the Medical Society, Dr. C. has dedicated it to the members.—After a modeft and handfome exordium, he ftates his fubject, and paffes fome pointed ftrictures upon the author of the Treatife on Plague and Yellow Fever, which was reviewed in our vol. iii. p. 373 & feq. He afterward, in page 7, proceeds to enumerate the analogies thus:

"The plague of Afia, like the yellow fever or peftilence of our own country, is a difeafe which delights in the devaftation of populous cities. Perhaps neither of thefe calamities has ever been known to originate, as an epidemic, in villages or country fituations; nor do they oftentimes extend to fuch places, even in times of their moft general prevalence. It is only in the artificial and vitiated atmofpheres of large cities that they are able to find a fufficiency of their proper nourifhment.

"True plague, when it has prevailed in the cities of Europe, has always made its appearance about the clofe of fpring, or in the courfe of the fummer—has reached its fummit in the autumnal months, and declined, or wholly difappeared, on the commencement of cold weather. But fuch is known to be, in like manner, the courfe of the yellow fever or peftilence of America. To the generation and propagation of both thefe difeafes, therefore, a warm atmofphere is no lefs neceffary than the filth and crowded population of large cities. Even when committing their heavieft devaftations, a few nights of cold weather, particularly if it be accompanied by froft, will check them as certainly, and almoft as fpeedily, as it will the vegetation of tropical plants. I know of no inftance on record of either of thefe difeafes having prevailed, to any extent, throughout the winter of high latitudes.

"It is a circumftance alike common to plague and yellow fever, that they occur epidemically, in places fubject to them, only at certain irregular periods, or after indefinite intervals of time. Fortunately, thefe deftroyers of the human race do not appear as the regular endemics of any fituation. Though fummer and autumn are their native feafons, yet thefe feafons are not alone fufficient to produce them, unlefs they be aided by a peftilential conftitution of atmofphere.

"Epidemic plague banifhes from around it every other form of febrile difeafe, and reigns itfelf the folitary tyrant of the place where it prevails. It would be fuperfluous to offer teftimony in confirmation of this fact. Moft authors on peftilence, who have written from obfervation, bear witnefs to its truth. But the fame thing is true with regard to the epidemic ftate of yellow fever. Taking poffeffion of the atmofphere, it expels or fuffocates all other defcriptions of fever, and creates for itfelf a difmal folitude. During the late autumns in which it prevailed in this place, it is known by our practitioners to have fuffered no rival difeafe to approach it.

"Plague and yellow fever are alike remarkable for being preceded, followed, or accompanied in adjacent places, either by new difeafes, or by an increafe in the frequency, but more particularly in the malignity of common difeafes. Since the year eighty-nine [1789?], this country has been feveral times vifited by epidemic catarrh, and in fome places by an epidemic cynanche, difeafes which had not before occurred to fuch extent, within the memory of our oldeft citizens. Since the fame period, the common difeafes, in different parts of the United States, have undergone fuch a ftriking change, as to call for a different and much more energetic mode of treatment. That fimilar phenomena are connected with the prevalence of plague in Europe, and in the Eaft, we learn from many works on the fubject, particularly from that of Dr. Patrick Ruffel, and from Mr. Webfter's excellent 'Hiftory of Epidemic and Peftilential Difeafes.'

"It belongs in common to plague and yellow fever to be attended with moft fatality on their firft occurrence. It is a melancholy truth, that thefe difeafes feldom fail to hurry to the grave a great proportion of their earlier fubjects. As they become more general, but efpecially when they are on the decline, individual cafes, laying afide their malignity, prove much more manageable, and may be generally conducted to a favourable iffue. Thefe circumftances are probably attributable to a threefold caufe.

"1. Thofe firft attacked by, would appear to be moft ftrongly predifpofed to, the above difeafes, and therefore to be moft likely to have them in a violent degree.

"2. In this early ftate of things, an ignorance of the dangerous nature of their complaints, prevents patients from being fufficiently prompt in applying for medical aid.

"3. On the firft occurrence of an epidemic, phyficians themfelves, neither acquainted with its character nor aware of its malignity, generally fail to treat the early cafes of it with fufficient boldnefs.

" Neither plague nor yellow fever can prevail at any time, nor in any place, which is not calculated to give rife to an abundance of putrid exhalation. Whatever is inimical to the origin of fuch exhalation, proves equally inimical to thefe complaints. But the production of this poifonous gas is particularly prevented by three caufes, namely, cold, great humidity, and exceffive heat, accompanied by an exceffive aridity of the atmofphere.

" The hoftility of the firft of thefe caufes to the difeafes in queftion, has been already mentioned; that of the two latter fhall be treated of in a fubfequent part of my addrefs.

" Thus far on the analogies derived more immediately from the origin of plague and yellow fever. In the phenomena connected with their propagation, they exhibit no lefs of a kindred nature.

" Though they have both fomewhat the appearance of fpreading by contagion, their progrefs is certainly too rapid to depend on a caufe of fuch limited powers. Allow me to call your attention to a palpable inconfiftency (not to fay an abfolute contradiction) which exifts in the ftate of common opinion on this fubject.

" Plague and yellow fever are acknowledged by every one to be much lefs contagious than fmall-pox, becaufe they attack, with much lefs certainty, perfons expofed for a fhort time to their influence. Nor are they fuppofed to be communicated to fo great a diftance as fmall-pox. Notwithftanding this, they fpread with nearly tenfold its rapidity. In the courfe of a few weeks they will overrun an extent of city, which it would fcarcely pervade in twice as many months. Here, then, admitting plague and yellow fever to fpread by contagion at all, they would appear to be both more and lefs contagious than the fmall-pox. But this is a pofition which even the advocates of contagion will reject. Perhaps the only method of removing the contradiction is to admit, that the two former difeafes are not propagated by contagion at all, but by the more powerful medium of a vitiated atmofphere. But more of this hereafter.

" It is a fact notorious in the United States, that if a patient in the moft malignant ftate of yellow fever be removed from the city to the country, he may there be vifited and nurfed, without endangering the health of his phyficians or attendants. But we learn from Profper Alpinus, Ruffell, Mariti, Sonnini, and various other writers, that the ſame thing is true with regard to the peſtilence of the Eaſt. When perſons ill of that diſeaſe are conveyed from a place where it is epidemic, to one where it is not, they may be approached and attended without hazard.

"True plague, therefore, exhibits no unequivocal marks of contagion, when removed without the limits of a malignant atmoſphere. That calamity is believed to be, for the moſt part, introduced into Syria and Egypt from Conſtantinople. Yet, in common years, when no peſtilential ſtate of the elements prevails, perſons in all ſtages of it arrive from the latter in different parts of the former places, without communicating infection to any one.

"The phyſicians of America have not now to learn, that certain claſſes of perſons are much more liable than others to be attacked by yellow fever. But this is in like manner true with reſpect to the oriental peſtilence: and it is not a little remarkable. that theſe two diſeaſes manifeſt a predilection for perſons and habits of the ſame deſcription.

"Does yellow fever attack and deſtroy men rather than women? So does peſtilence.

"Does the former ſelect, as its victims, the robuſt, the healthy, and the young, rather than the weak, the infirm, and the aged? Such is alſo the caſe with the deſtroyer of the Eaſt. Perſons turned to their ſeventieth year have, comparatively ſpeaking, but little to apprehend from that dreadful calamity.

"Does yellow fever ſpare infants and children rather than adults? And does not a ſimilar diſcrimination characterize the deſolating courſe of peſtilence?

"Finally, do not both theſe diſeaſes either entirely paſs over, or but ſlightly affect, the frugal and the ſober, while they attack more certainly, and more certainly deſtroy, the luxurious and the intemperate?"

Dr. C. then goes on to note the concomitant ſickneſs, from the ſame cauſe, of dogs, cats, horſes and kine, and even of birds and fiſhes. He enumerates ſome peculiarities in natural phenomena during peſtilential ravages, ſuch as irregularities in the weather, the diſappearance of birds, the multiplication of inſects, and the luxuriance and ſicklineſs of plants. He next recites the *pathological* characters of the two diſeaſes, and ſhows that they have a ſtrong and marked reſemblance. In their *decline* and *termination* there is as ſtriking a ſimilitude. Local conſiderations concerning Egypt and Syria are brought forward to illuſtrate and enforce the argument; wherein he boldly affigns the reafons which have inclined him to confider the plague of the eaftern world "as propagated not by contagion, but through the medium of a vitiated atmofphere."— In doing this he varies widely from the common doctrine of the fchools. But in this cafe we confider a departure from ancient prejudice and authority highly neceffary. And we applaud the intrepidity of fpirit no lefs than the juftnefs of conclufion manifefted in this well-timed and well-managed addrefs. We wifh it may be extenfively read; for, to the young and unlearned, it will exhibit an inftructive parallel between two diftempers heretofore thought very diffimilar; and to thofe of more mature years, whether they coincide in fentiment with the author or not, it will prefent an ample theme for reflection.

According to the plan propofed in the title-page, the orator fhould have concluded here, and we really wifh he had made this his peroration. We fhould then have had no ground of difference with him on any point of moment. But, animated with his fubject, he undertakes the difcuffion of another queftion, in which, we believe, he is lefs fortunate and fuccefsful. Not content to eftablifh the general identity of caufe and chracter between plague and yellow fever, he goes a ftep further, and attempts to prove the radical diffimilarity of *plague* and *jail* or *typhus fever*. It had been afferted by fome, that peftis was nothing more than the higheft grade, or moft exalted form of typhus. Dr. C. differs entirely from them, and declares typhus to be "perfectly independent of the putrefactive procefs," and that a "vitiated fecretion" (fpecific contagion we fuppofe) "is all that it requires for its origin and propagation." We have no evidence of fuch a morbid fecretion. On the other hand, it appears more probable that the poifonous matter exciting typhus is formed from human excretions, fweat, urine, &c. by means of the chemical changes they undergo, like other inanimate fubftances. This is formed commonly within doors, in clofe chambers, and inheres particularly in bedding and clothing, not wafhed and alkalized as often as they ought to be. This explains its more common prevalence in the abodes of poverty and filth, and its connection with petechiæ produced by the local action of the virus upon an unclean fkin. We are further inclined to believe, that the difference of the typhoid fymptoms is no evidence of a difference of exciting caufe; becaufe it would be very extraordinary indeed if the morbid virus, acting upon emaciated and impoverifhed conftitutions, fhould produce the fame effects which it might be capable of working in thofe which are full fed, and in a highly vigorous ftate.

We conceive that much of the difficulty of this fubject may be explained, by calling to mind that the heat of the human body, operating upon its own excretions too long retained and accumulated in bed and body clothes, by habits of uncleanlinefs, in clofe and filthy apartments, during the cooler feafons of the year, may probably produce effects analogous to thofe of high atmofpherical temperature upon dead animal and vegetable matters during the fummer and autumn. Particular conftitutions of the air favour each of thefe proceffes; but they feem likely to exert a more decifive influence in the latter than in the former. Hence typhus may occur, often during a cool feafon, in any family where cleanlinefs and ventilation are neglected. But the peftilential epidemics of the fummer and autumn appear always to require the aid of a general unfalutary condition of the atmofphere.

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## Art. IV. *Tranfactions of the American Philofophical Society, &c. Part* iv.

[Continued from page 182.]

### *Hints relative to the ftimulant Effects of Camphor upon Vegetables. By* Benjamin Smith Barton, *M. D.*

THE experiments made on this fubject induce Profeffor Barton to think that camphor exerts a greater ftimulant effect upon plants than any other fubftance with which he is acquainted. If the expenfivenefs of it fhould forbid us to employ it as a manure upon a large fcale, ftill the author fuggefts, that "a few grains of camphor, acting as a cordial, will revive a drooping plant, will increafe its beauty, and prolong its exiftence"—objects of no mean importance in the eye of the florift. After fome experiments on the comparative ftimulating effects of camphor and nitre, Profeffor B. concludes that the refult favours the idea, that camphor is a more wholefome ftimulant than nitre.

### *Experiments and Obfervations on Land and Sea Air. By* Adam Seybert, *M. D.*

In this paper we are prefented with a variety of eudiometrical experiments on land and fea air, in many different fituations.

Dr. Seybert believes that the air over a large body of water is always purer, *cæteris paribus*, than that of the adjoining land, owing, as he conjectures, to a decomposition which the water may suffer from the action of the sun's rays; and likewise, in part, to its absorbing many foreign matters, which, on land, are more or less intimately mixed with the air in a mechanical way.

As to the state of the air in different situations on land, Dr. S. adopts the conclusion of all the more respectable eudiometrical experimenters, that the results vary but little. And he is disposed to admit the opinion of Fontana, that "the difference in the purity of the air, at different times, is much greater than the difference between the air of the different places."

*Observations intended to favour a supposition that the black Colour (as it is called) of the Negroes is derived from the Leprosy. By Dr.* Benjamin Rush.

The opinion supported in this paper is supposed to be rendered probable by the following facts and analogies. 1st. That the leprosy is accompanied, in some instances, with a black colour of the skin. 2dly. That the preternatural whiteness of the skin, often observed in leprosy, bears a striking resemblance to that morbid condition of the skin, among some negroes, distinguished by the name of *albinos*, which has been suspected to be a modification of leprosy. 3dly. By the blended appearance of white and black sometimes observed in cases of leprosy. 4thly. By the similarity of the morbid insensibility of the nerves, in leprosy, to the constitutional insensibility common among negroes. 5thly. By the strong propensity to venereal gratifications, which equally distinguishes the leprous and the negro constitution. 6thly. By the big lip and flat nose of the negroes, which are likewise symptoms of the leprosy. 7thly. By the analogy between the woolly hair of the negroes, and the trichoma or plica polonica of the Poles, which is a symptom of leprosy.

*An Inquiry into the comparative Effects of the Opium Officinarum, extracted from the Papaver Somniferum, or White Poppy, of Linnæus; and of that procured from the Lactuca Sativa, or common cultivated Lettuce, of the same Author. By* John Redman Coxe, *M. D. &c.*

Dr. Coxe's first experiments on these two species of opium were made on solutions of them in water, alcohol, and in a mixture of equal parts of both. And the results convinced him that the two species are very similar in their qualities.

After subjecting them to a variety of chemical tests, he still found the similarity to hold good in a remarkable degree.

By introducing the watery solutions and spirituous tinctures of each species of opium under the skin, and in contact with the muscles of frogs—into the stomach and rectum, and into the cavity of the abdomen, of the same animal—and likewise by bringing them into contact with the eyes and brain—he discovered that both species possess nearly the same powers.

### *Experiments and Observations on the Atmosphere of Marshes.* *By* Adam Seybert, *M. D.*

It is the object of this paper, first, to determine whether or not the air of marshes differs from that of other situations; secondly, to ascertain what are the causes of the differences which are found to exist; and, thirdly, to make observations and remarks.

I. It appeared from a number of experiments on air, obtained immediately as it was disengaged from the marshy soil, that carbonic acid gas enters largely into its composition—that hydrogen gas is an ingredient in it—and that no oxygen gas is present.

It was found that air, obtained at the height of several feet above marshes, contains little or no hydrogen gas—that the proportion of carbonic acid gas is pretty considerable—and that a large quantity of oxygen enters into its composition. Hence the author is induced to believe that the air *above* marshes is not considerably different in its properties from the common atmosphere in other situations, where animals respire with ease, and enjoy perfect health, except the proportion of carbonic acid gas being greater, the gravity of which permits it to rise only to an inconsiderable height.

II. What are the causes of the peculiarities found to exist in the air of marshes?

Putrefaction of the animal and vegetable matters upon the soil of marshes is considered by the author as the great cause of the changes observed to exist in the air of them. That this is so he infers from the following circumstances:—"Marshes have no noxious influence during the winter season. They cause disease when the circumstances are present which promote putrefaction; as a proper degree of heat, a due quantity of moisture, and the contact of atmospheric air, or substances capable of affording oxygen, as water."

Many experiments to ascertain the action of mud, obtained from marshes, on atmospheric air, were made at different times, by our author, during the summer and autumnal months of the years 1796 and 1798. He observes that these "experiments teach us that mud vitiates the atmosphere in a very powerful manner. They also enable us to account for the presence of the elastic fluid forming the atmosphere of marshes. It appears that the carbon of the mud unites with the oxygen of decomposed water, and forms the carbonic acid gas, whilst the hydrogen gas is set at liberty."

III. The remainder of the paper is devoted to inferences and concluding remarks.

In order to arrive at any just conclusion concerning the effects of marshes on the atmosphere, the author recommends the investigation of their composition. They are found to consist of more or less water—of different proportions of dead animal and vegetable matters—and of the earthy substances composing the original soil. Heat, moisture, the contact of atmospheric air, and rest, are circumstances attendant on marshy situations during the unhealthy seasons. From this assemblage of materials and agents, it might be supposed *a priori*, our author observes, that the following effects would result: 1. That hydrogen gas would be disengaged. 2. That oxygen, combining with carbon, would form the carbonic acid gas. 3. That azote would unite with a portion of hydrogen, and thus produce ammonia; whilst another portion of it would, during its combination with oxygen, form the nitric acid. And, 4. That when sulphur and phosphorus were present, they, with hydrogen, would form the sulphurated and phosphorated hydrogen gases.—Dr. Seybert considers the presence of hydrogen gas, and of carbonic acid gas, in the atmosphere of marshes, as established by undoubted proofs. Ammoniacal gas he supposes to be one of the products of putrefaction; but he doubts the presence of it in the air of marshes, on account of its ready combination with water, and its proneness to unite with carbonic acid gas into a carbonate of ammoniac. As to nitric acid, though doubtless a product of putrefaction, he concludes that it is immediately absorbed by the neighbouring waters. He expresses conviction, that sulphurated and phosphorated hydrogen gases do not exist in the air of marshes.

On the whole, Dr. S. considers marshes as necessary to keep the atmosphere *in a proper degree* of purity: for not only the impure atmosphere, but the too pure also, is deftructive to animals. And he imagines marfhes to have been formed by the Author of Nature in order to operate againft the powers which vegetables and other caufes poffefs of purifying the atmofphere, fo that the oxygen may exift in a proper proportion fit to fupport animal life and combuftion.

*(To be continued.)*

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## Art. V. *A Phyfiological Treatife, &c. By* Jofeph Young, *M. D.*

[Continued from page 285, and concluded.]

HAVING already examined that part of this work which refpects aftronomy, we now proceed to the fecond part, which treats of a number of phyfiological topics, and delivers rules and precepts for the management of many important difeafes.

In the firft place the author confiders the earlieft ftage of life in the incipient animal, and fhows the means by which circulation is performed in the firft rudiments of it, before the veffels are completely organized.

The animal fpirits, duly prepared, according to our author, are the plaftic means by which the incipient embryo is produced out of an unorganized mafs of animal gluten. He confiders them as the link of connection between the foul and body, operating through the mechanifm of the nerves and living folids. He fuppofes them to be fecreted in the brain—to confift of the moft highly attenuated parts of the lymph, united with the electric matter—to be the fpring of heat, life, fenfation and mufcular motion in the animal fyftem—and the fole caufe of circulation in the lacteals, lymphatics, &c.

In the next place the author proceeds to treat of the *vis medicatrix naturæ*—of his doctrine of *vinous fermentation*—and of *digeftion* by means of *alimentary fermentation* and the gaftric liquor. He likewife offers his opinions concerning the organization of the animal fyftem by fluids—concerning cold and its effects on animals—and concerning the generation of heat in refpiring animals.

Having laid down his general doctrines on thefe fubjects, he then goes on to treat of particular difeafes. He gives directions for the management of *frozen limbs*, by immerfing them in fpring-water for fome time before the application of warmth. His theory and practice in *dyfentery* are next preſented to the reader. In the management of *cancers* he places much dependence upon the root of the ſharp-pointed dock, uſed internally by way of infuſion, and externally by application of its expreſſed juice; and he alſo thinks well of arſenic, and the phytolacca, or poke.

*Cynanche maligna* is the next ſubject of diſcuſſion. As a ſpecimen of the work, we quote the following practical directions concerning that diſeaſe:

" If the diſeaſe is at firſt attended with great heat and thirſt, add two table ſpoonfuls of the beſt yeaſt to a pint of a ſtrong infuſion of good ground barley malt (in boiling water), after the infuſion gets to be about milk warm, of which the patient may take a wine glaſs full every hour while it is fermenting; and, at the ſame time, uſe the following gargle:—Take the root of the yellow or ſharp-pointed dock half an ounce, Virginia and Seneca ſnake-roots of each one drachm and an half, Peruvian bark ſix drachms, myrrh and ſal ammoniac of each two drachms, ſal nitre one drachm, honey three ounces; infuſe the roots and bark in one pint and an half of boiling water, rub the myrrh in a mortar with two ounces of camphorated ſpirit of wine, until it is pretty well diſſolved, and when the infuſion is milk warm add the ingredients, together with two table ſpoonfuls of good yeaſt; and while it is fermenting the patient ſhould gargle it in his throat frequently; and if the tonſils are ulcerated they ſhould be frequently waſhed with a ſmall ſwab, made by rolling old ſoft linen about a ſmall ſtick. And when the throat is very ſore pour boiling water on the inſide bark of the red elm until it grows ſlimy, and hold ſome of it frequently in the mouth, and gargle it, which will yield great relief.

" When the violence of the fever has abated, if there are yet evident ſigns of putrefaction remaining, take Peruvian bark ſix drachms, Virginia ſnake-root and contrayerva of each two drachms, bruiſe them in a mortar, and infuſe them in a pint and an half of boiling water, and when it is milk warm ſtrain it off, and add two ounces of ſugar and two table ſpoonfuls of yeaſt; and while it is in briſk fermentation let the patient take a wine glaſs full every ſecond or third hour.

" But in the country, where theſe ingredients cannot be obtained, I am certain that a gargle, made by infuſing an ounce of the inſide bark of the wild cherry-tree, and half an ounce of freſh ſharp-pointed dock-root, bruiſed, in a pint of boiling water, and ſweetened with honey, and an infuſion of the cherry bark and wild alſpice, uſed in the ſame manner as above directed, would anſwer a very valuable purpoſe; uſing the mucilage of the red elm bark, as above directed, to prevent irritation.

"Good Port wine and water, ſweetened with loaf-ſugar, may be taken to advantage, as a cordial, if the heat of the body is moderate."

The remainder of the work is devoted to cynanche trachealis—to ſmall-pox by inoculation—to yellow fever—to anaſarcous dropſy—to putrid fevers—to confluent ſmall-pox—to mania—to fiſtula lachrymalis—to fiſtula in ano—to ſcrophula—and to phthiſis pulmonalis.

In the treatment of putrid fevers Dr. Young relies greatly upon the virtues of yeaſt. In mania, after blood-letting, cathartics and emetics, he recommends a free uſe of camphor combined with vinegar by the mucilage of gum arabic, a mild and indulgent treatment, &c.

The work is concluded by the following ſentiments of philanthropy, which muſt impreſs every reader with reſpect for the venerable author.

"In the preceding ſtages of my life I have been actively employed in the ſervice of my fellow beings; but, being worn out and ſuperannuated, I offer them this little book, probably as my laſt tribute; and if its utility but equals my intention, it will add one more gratification to a perſon who wiſhes every created being every degree of happineſs and pleaſurable ſenſation which their beneficent Creator has fitted them to enjoy."

# Medical and Philoſophical News.

## DOMESTIC.

### USE OF ALKALIES IN CANCERS.

*Extract from a Letter of Dr. J. Barker to Dr. Mitchill, dated Portland (Maine), March* 12, 1801.

"BESIDES the beneficial effects derived from the uſe of alkaline remedies in FEBRILE diſeaſes, I have, for a few years paſt, found them to be of ſingular efficacy in certain *ſurgical* caſes, as well as in other maladies. My experience ſeems to verify your important ideas concerning the proneneſs of animal matter to grow *acid* under certain circumſtances; as alſo the propenſity which the pus of ulcers has to abſorb oxygen, and to become *ſour*.

"Six years ſince, a peaſant in a neighbouring town was afflicted with painful cancerous tumours in his face, which diſcharged a very corroſive humour. Several of theſe tumours were extirpated with the knife; and mercury was employed both externally and internally, as well as cicuta, with a view of correcting this humour, and of diſpoſing the ſores to heal. The ſores, however, would not heal upon this plan. Indeed, the humour increaſed in degree of virulency and corroſive power, notwithſtanding that the external applications were reinforced with vitriols, lead, various unguents, and even *arſenic*.

"He remained for a conſiderable time in this forlorn condition, laid aſide all means, and conſidered his diſeaſe as irremediable.

"I then directed a ſtrong lixivium of wood-aſhes to be applied. This readily ſtopped the progreſs of the corroding humour, alleviated his pains, and allowed the ſores to heal. By this means the cancerous humour was ſubdued, and rendered harmleſs; ſo that, in a ſhort time, the ulcers healed, and a radical cure was effected.

"Since this event, it has become a common practice in this part of the country, not only among phyſicians, but others, to eradicate cancers with a ſtrong ſolution of pot-aſh, as well as with the lixivium of aſhes.

"This lixivium is made by boiling a gallon of common ley down to a pint. A doſſil of lint, impregnated with this ley, and applied to the cancerous tumour, ſoon alleviates the pain, and converts it into a black lump, which, by a common digeſtive poultice, readily ſeparates from the ſound fleſh. The ſore then heals by a ſimple dreſſing.

"I have employed alkaline remedies in ſeveral caſes of *ſcrophula*, both externally and internally, with very great advantage."

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## ALKALINE REMEDIES IN SYPHILIS.

The prevailing opinions, for two or three years, in Europe, have been ſtrongly in favour of curing lues venerea by oxygen and acids. The virus of this formidable diſeaſe is confidently ſaid to be decompounded, or neutralized, or expelled from the body, or the conſtitution to be rendered proof againſt it, by means of remedies abounding with the principle of acidity in a very ſeparable ſtate. Of theſe, the Medical Repoſitory contains ample accounts. In America we cannot learn that the acid practice has, in any inſtance, alone wrought a cure of lues. It is inſufficient without the aid of quickſilver. The general rule of ſucceſsful management is to eradicate the ſyphilitic poiſon by means of mercury; and, in caſe the conſtitution of the patient wants oxygen, to preſcribe acids alſo. In ſome habits they will do good, in others no good at all, and in others certainly harm. For a radical cure of the diſeaſe, they are not to be relied on.—It is remarkable how practiſers run into extremes. No longer ago than 1786, the ſecond edition of Mr. PEYRILHE's octavo volume on a *new remedy* againſt venereal diſtempers was publiſhed at Montpellier, and reviewed in the *Journal de Medecine* of Paris, for the month of December that year. This new remedy was the VOLATILE ALKALI, on the antiſyphilitic virtue of which the author wrote an able diſſertation. He was Regius Profeſſor of Chemiſtry and Botany in the College of Surgery in Paris; and his book, which contains the account of his own experience with *ammoniac*, is allowed by the critics to be full of valuable and nice practical remarks. And yet this work is diſregarded in Europe, and, we may ſay, in America is almoſt wholly unknown.

## ADULTERATIONS OF PEARL-ASH.

*Extract of a Letter from Mr. William Henry, of Mancheſter, in Great-Britain, to Dr. Mitchill, concerning the Adulterations of American Pearl-aſh, dated February* 2, 1801.

"It is now nearly thirty years ſince my father introduced ſome improvements into the proceſs for preparing magneſia, which were approved by the London College of Phyſicians, and publiſhed in their Tranſactions. Calcined magneſia being, at that time, a medicine extremely difficult to be procured genuine, and, conſequently, very little in uſe, my father, with the advice of ſome of the leading members of the College, undertook the manufacture, and has continued it to this day. About four years ago I joined him in the buſineſs, and have made conſiderable improvements in the proceſs (chiefly in the mode of purifying the alkali), which enable us to offer to the public an article of very ſuperior quality. There is one impurity, however, very frequently found in the alkali, which, of late years, has thrown conſiderable difficulties in our way; and which no one, of the almoſt numberleſs experiments I have made, has inſtructed us to ſeparate. This is the carbonate of lime, for which, in ſmall proportion, the carbonate of pot-aſh has ſo ſtrong an affinity, that no chemical expedient I am acquainted with can wholly detach it. This carbonate of lime may be diſcovered in an alkali in the following manner: Mix a ſolution of the beſt American pearl-aſh with one of ſulphate of magneſia; waſh the carbonate of magneſia very well, and expoſe it, in open day, to a very ſtrong heat for a ſufficient length of time. The calcined magneſia ought to be perfectly inſipid; but it will often be found to have a very pungent and cauſtic taſte; and on digeſting it with diſtilled water, a true lime-water will be obtained. Now, as the ſame ſulphate of magneſia, with a ſolution of pearl-aſh, from a different barrel, or a different manufacture, will afford a magneſia perfectly inſipid after calcination, and which imparts no impregnation to water, it is clear that the defect muſt have been in the alkali. The lime, contained in carbonate of pot-aſh, cannot, on account of its ſtrong affinity for carbonic acid, exiſt in the ſtate of pure lime, and muſt, therefore, be preſent in a carbonated form. On mixing the alkaline ſolution with one of ſulphate of magneſia, this carbonate is precipitated along with the carbonate of magneſia; and the impurity does not become perceptible to the taſte till the carbonic acid is expelled from both by calcination.

" Of late years this defect in pearl-ashes has become almost universal; and during the last eight or ten months we have not been able to meet with any American pearl-ashes fit for the manufacture of calcined magnesia. That the adulteration is not practised in this country, I satisfied myself by remaining some time in Liverpool, and trying samples from the warehouses of the most respectable merchants there, whose assurances that the ashes were really as imported I cannot possibly doubt.

" The lime, I conceive, is purposely introduced into the ashes by the American manufacturers, not with the intention of a fraudulent adulteration, but with some view to the improvement of the article. It is, perhaps, added to the ley, with the view of clearing and strengthening it; and part of it, being chemically dissolved, will adhere to the clear ley, and even to the dry alkali. Now, a very few grains of carbonate of lime, in a hundred weight of pearl-ashes, will totally unfit them for the preparation of magnesia; and a small quantity of mortar, from the brick-work of the ovens, will spoil a very considerable quantity of alkali. We are peculiarly anxious to obtain a supply of pearl-ashes, in the manufacture of which every source of lime has been carefully avoided. We should even wish a careful trial to be made of each barrel, or, at least, of each lot of barrels of one boiling, before the ashes were sent to us. This trial might be conducted as follows:—Dissolve four ounces of pearl-ash (we use none but the first sort) in four ounces of distilled water, and four ounces of sulphate of magnesia in the same quantity of water, mix the two solutions, and wash off the sulphate of pot-ash by repeated affusions of hot-water, which should be quite free from carbonate of lime or sulphate of lime: dry the magnesia, and calcine it during two hours in a strong fire. If the calcined magnesia, when mixed with a little water, be absolutely tasteless, the ashes will answer. To ascertain their purity decisively, digest about a dram of the calcined magnesia in half an ounce measure, or more, of distilled water, for half an hour, shaking it occasionally; filter the liquor, and blow air through it from the lungs, by means of a tobacco-pipe; and to another portion add a little oxalic acid. If neither of these tests indicates lime, the magnesia is pure, and the ashes may be purchased.

" To bring within a short view what I have to request, I subjoin the following queries:

" 1. By what means does the carbonate of lime gain admittance into the American pot and pearl-ashes?

"2 If the source of it be known, is it one that can be easily avoided?

"3. If the lime be purposely added, and this addition be, in general, necessary, could we not have ashes manufactured expressly for our use, without this admixture?

"4. Is the exportation of the unlixiviated wood-ashes permitted; and could we not obtain a purer alkali by importing these wood-ashes, and lixiviating them ourselves?

"5. Would you, or any other person you might point out, undertake to make, carefully, the necessary experiments, on the pearl-ashes intended for us, before they are sent from America? For such assistance we should be ready to make a liberal compensation.

"6. Supposing that it is possible to have an alkali made purposely for our own use, how long a time would elapse between the order from New-York to have them manufactured, and their being sent from an American port?"

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### DISCOVERIES IN MINERALOGY.

MOLYBDÆNA has been repeatedly found in the granitical rocks, which abound in the southern parts of the State of New-York.—Beautiful ZEOLYTES have been lately discovered at Hobocken, filling up veins in the rocks of Telgstein and Jade, which abound thereabout—and by the blowing down of a tree in the town of New-Marlborough, west of Poughkeepsie, and near the bank of the Hudson, a *parcel of coal has been laid bare.* Smiths have worked this in their forges, and find it to be of a good quality. The specimen of it sent us, burned very well, affording much blaze, and emitting a bright light. Future researches and experiments can only determine whether this valuable material exists there in quantity sufficient to supply the metropolis, and lessen the extravagant and increasing price of fire-wood.

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### EXTINCT SPECIES OF ANIMALS.

G. Cuvier, member of the National Institute, and Professor in the College of France, is engaged in a very extensive work upon the species of quadrupeds whose bones have been found in the interior parts of the earth. Our readers will recollect that the State of New-York is now the theatre of the latest discoveries that have been made of fossil bones; the particular accounts of which, as contained in the letters addressed to Dr. Mitchill, are inserted in our present volume, p. 211. Mr. Cuvier has undertaken to settle the controversy concerning theſe animal relics. He ſays that the ſtrata of every country upon earth contain bones different from thoſe of the animals which now inhabit their ſurface: that, with the ſingle exception of ruminant animals, all the complete foſſil bones which he has ſeen are different from thoſe of quadrupeds now alive: that of theſe he has been able to aſcertain *twenty-three ſpecies*, all certainly unknown at this day, and which appear to have been entirely deſtroyed, though their bones evince their exiſtence in former ages.

Theſe ſpecies of creatures, whoſe races are now extinct, M. Cuvier divides into two claſſes—1. Thoſe which have been determined by others; and, 2. Such as have been ſettled by himſelf. In the firſt he enumerates the following: 1. The *Siberian animal* which affords foſſil ivory. 2. The *mammoth*, differing from the former chiefly in the ſize and points of its grinders. 3. The *long-headed rhinoceros*. 4. That animal of the *tardigrade family* called *megatherium* and *megalonyx*. 5. An extinct ſpecies of *large bear*. 6. *Another ſpecies* of the bear. 7. A *carnivorous animal*, intermediate between the wolf and hyæna. 8. A *creature a-kin to the mooſe*, whoſe horns meaſure fourteen feet from tip to tip. 9. The great *foſſil tortoiſe*. 10. The *maeſtricht crocodile*. 10. A *ſort of dragon*. 12. An unknown kind of reptile or cetaceous animal.—In the ſecond claſs, the chief of which have been diſcovered in France, Mr. Cuvier places the following ſpecies: 1. The animal whoſe *teeth, when impregnated with copper*, form the occidental turquoiſe. 2. A *tapir*, differing from that of South-America only in the form of its grinders. 3. *Another tapir*, of a gigantic or elephantine ſize. 4. A *ſpecies of hippopotamos*, of about the ſize of a hog. 5, 6, 7, 8, 9, 10. Six foſſil ſkeletons of an unknown ſpecies between the rhinoceros and the tapir, from the plaſter-quarries in the neighbourhood of Paris. 11. A ſpecies of crocodile, conſiderably like that of the Ganges.

But theſe are not all which the earth contains: there are *parts* of ſkeletons of which M. Cuvier cannot ſpeak with equal aſſurance; but of which, however, enough is known to encourage a hope that the liſt of zoological antiquities will be ſoon lengthened. Of theſe, ſome reſemble the bones, 1. Of the tiger. 2. Of an hyæna or ſea-calf. 3. Of the fallow-deer. And others of uncertain characters; as the petrified bones, 1. Near Verona. 2 and 3. Two ſorts in the Rock of Gibraltar. 4. In the vicinity of Dax. 5. Near Orleans. 6. Near Aix and Cette. 7. In the iſlands of Dalmatia, &c. And, 8. All other *uncertain bones* found in the peat-moſſes of all parts of Europe and Aſia. In the courſe of a ſhort time M. Cuvier hopes to determine the exact place in the ſyſtem to which theſe doubtful ſpecies are to be referred.

M. Cuvier ſolicits information on theſe ſubjects from all parts of the world. He wiſhes to procure the bones themſelves, or figures of them, or correct deſcriptions in words.

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### THE AMERICAN BISON.

An animal of this ſpecies has been for ſome time exhibited in New-York. He is a male, and was taken on the weſt ſide of the Miſſiſſippi. He has a ſhaggy covering of hair on his pate, under his jaw, along his neck, and on the back part of his fore legs. His ſhoulders are very much elevated, ſo that the depth from the withers through to the briſket is greater, in proportion, than, perhaps, in any other creature. The hinder parts taper away, and are comparatively of a diminutive ſize. This biſon has covered a number of our domeſticated cows. He is ſtrong, and ſo capable of defending himſelf, that though he has often been baited by two bull-dogs at once, they have not been able to faſten him. He was taken when a calf, and is now ſo docile as to be eaſily managed by means of a ring in his noſe. He feeds upon graſs, hay, &c. like common neat cattle.

Some of the naturaliſts who have ſeen this animal have doubted to which of the *ſpecies* of the BOS family he belongs. It ſeems to be ſettled among the zoologiſts, that the genus of BOS is divided into *two important* ſpecies—the biſon and the buffaloe. To the biſons belong the varieties known by the names of *bonaſus* by Ariſtotle and the Greeks, of *urus* by Cæſar, of *aurochs* by the harſh modern imitators of that Latin name, of *biſon* by Pliny, of *bos ferus* by Strabo, and of *zebu*, or ſmall Barbary cow, by travellers from Africa. Theſe are affirmed to intermingle and breed with each other, and their offspring are not mules, but can perpetuate their race. To the *buffaloes*, who ſeem to have been unknown to the ancients, belongs that ſpecies of ox who, about the ſeventh century, was imported from Africa into Italy, and domeſticated there, and known latterly by the very improper appellation of *bubalus*. Theſe have no ſexual or other intercourſe with the biſons; and are deſtitute of the elevated ſtructure of the ſhoulders.—Our neat cattle are the deſcendants of the biſons—not of the buffaloes.

The figure of the bison, in Goldsmith's second volume of his History of the Earth and animated Nature, has a nearer resemblance of the variety we are describing than any we have seen. The figures of the urus and bison, in Bewick's History of Quadrupeds, are of the same general character; and the latter, particularly, has a near likeness to this native American. The withers of the former are not high enough. In two editions of Buffon and Daubenton's Zoology (vol. xxiii.), which we have consulted, there is a figure of the buffaloe, but not of the bison. Pennant, in his Arctic Zoology, vol. iii. has described the bison very well; though it is presumable there are more varieties of the breed than we are yet acquainted with. It is a remarkable fact, that with such a creature in their neighbourhood, of a temper so very docile, and capable of becoming so singularly useful to man, the aborigines of the western continent seem never to have thought of taming it! The domesticated kine of America are all descended from the milch cows of Europe. The bisons still continue in their savage state, and constitute one part of the cattle of the forests; while the offspring of imported cows, turned out to range at large in the wilds of Brazil and La Plata, and gradually returning to the state of freedom and fierceness, forms the other.

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## METHODS OF DECOMPOSING MURIATE OF SODA (COMMON SALT.)

M. Carendeffez has made many experiments on this subject, with the intent to procure separately both the acid and the alkaline basis of sea-salt. He thinks he has made some observations which are peculiar to himself.

Substances capable of decomposing this neutral salt are divided by him into classes. In the *first* are five substances—*pot-ash*, *barytes*, *oxyd of lead*, *lime* and *iron*. In the *second* class he places such things as can effect the decomposition, though in an indirect manner: these are six—the *boracic*, *phosphoric*, *arseniac*, *nitric*, *sulphuric* and *tartaric* acids. The latter of these decomposes not only the muriates of potash and soda, but likewise the sulphates and nitrates of these alkalies, so as to form acidulous new compounds with them respectively, convertible into oxalic acid by the aid of the nitric. In the *third* class he ranks the *sulphates of pot-ash*, *of alumine*, *of copper*, *of iron*, *of magnesia*, and *of ammoniac*; and the *sulphures of the same metals*.

He also finds that the nitrates of silver and of quicksilver have the like property, as well as clay and all the earthy sulphates. These experiments show how far chemistry has penetrated in this inquiry; and he who undertakes the decomposition of sea-salt, has it now in his power to choose from these modes of operating the one which to him shall appear preferable. Though soda is found *native* in Egypt, Barbary, Turkey, Persia, India, Siberia, Hungary, and some other places, it has long been highly desirable to obtain it *by art.* The river Belus, in Judea, whose sand is remarkable for the manufacture of glass, is mentioned by the historian Tacitus. This sand is said to be a natural mixture of the silicious girt with soda; and it is upon the shore of this stream that Pliny places the fabulous story of the accidental discovery of the art of making glass by the Phenician merchants. We mentioned, in page 82, that in Egypt the muriate of soda seemed to be decomposed by the carbonate of lime.

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### SHORT PROCESS FOR MAKING STARKEY'S SOAP.

This kind of soap consists of the combination of an *essential oil* with a *fixed* alkali. The old process for making it was difficult and tedious, requiring long trituration. M. Geoffroy discovered that the difficulty of combining the two materials arose from the employment of the *carbonates* of the alkalis instead of the naked or caustic salts. For if ten parts of pot-ash, deprived of its carbonic acid, be rubbed in a hot mortar with eight parts of oil of turpentine, the soap may be formed at once. M. Carendeffez employs the same proportions; but he powders the caustic pot-ash very fine, passes it through a silk seive, and forms instantly this compound, which is esteemed, by many, an excellent external remedy for rheumatisms, &c.

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### MORE PROOF OF THE UTILITY OF ADMINISTERING OXYGEN IN SCURVY.

It was mentioned in our present volume, p. 79, that a method had been discovered of procuring the citric acid in a concrete state. The application of this discovery to the cure of scorbutic diseases is confidently related by Dr. Trotter, Physician to the British fleet, in a letter to Mr. Coxwell, of London, the discoverer:

"*Plymouth-Dock, July* 13, 1800.

"SIR,

"With much pleasure I now inform you of the complete success of your concrete acid of lemons in the cure of the ſcurvy, which, in every reſpect, has equalled, if not ſurpaſſed, the uſual effect of the freſh lime, lemon, or Seville orange-juice.

"It is no ſmall ſatisfaction to myſelf, from the nature of my ſtudies for the laſt ten years, to find that my ſervice has been protracted to ſee the final blow to this ſea diſeaſe. In juſtice to his majeſty's navy at large, I have therefore addreſſed the board of admiralty on the ſubject, and I have announced the ſucceſs of my experiments to the medical world, through the London Medical and Phyſical Journal. You are extremely welcome to make what uſe you think proper of this letter.

"I am, with much reſpect,
"Sir, your very humble ſervant,
"T. TROTTER, M. D."

It ſeems, from this teſtimony, that the lemon-juice loſes none of its virtue during the preparation. To be enabled to carry oxygen, thus concentered and impriſoned, into the holds of ſhips at ſea, for the invigoration of ſickly mariners, is a great improvement in nautical medicine, and will have a tendency to leſſen a large proportion of the diſtempers to which ſailors are victims.

It is in this, and the kindred forms of febrile diſeaſe, that we believe the acid remedies recommended by Profeſſor Reich (p. 314 & ſeq.) would be particularly ſerviceable. And the *citric* promiſes much more ſucceſs than the *ſulphuric* and *muriatic* acids. Reich's general reaſoning on the ſubject has great appearance of truth in it, as far as *one certain form* of malignant diſtemper extends; but he would be more likely to win the aſſent of his readers, if he limited his doctrine to *the ſcorbutic form of fever*, as Trotter does, inſtead of extending it to fever univerſally. That acids are highly ſerviceable in many kinds of febrile malady, there is as full evidence as of any fact in phyſic. What theſe ſtates of body are, both Reich and Trotter have, in their reſpective publications, attempted to explain. In Dr. S. Brown's (of Boſton) Treatiſe on the Yellow Fever, there is a letter of Dr. Mitchill's, not publiſhed any where elſe, containing ſome ideas of that diſtemper as prevalent at New-York in 1798; *one* of the forms of which is thus deſcribed:

"Symptoms of torpor, liſtleſſneſs, coma, low delirium, moderate heat, *little*, and, in ſome inſtances, *no* pain; extreme muſcular debility, want of irritability, deſtruction of the vis inſita, dulneſs of ſenſation and perception, yellowneſs of the eyes and ſkin in moſt caſes, without pain in the right hypochondrium, ſhortneſs of breath, with little or no ſpecial diſorder, either in the blood-veſſels or alimentary canal. This train of ſymptoms forms one of the moſt inſidious modes of the diſtemper, the patient declaring, that little or nothing is the matter with him, though verging faſt upon diſſolution. In ſuch a dangerous ſtate of the conſtitution, I have, from much obſervation and much reflection, been led to believe, that the *nerves* and *muſcles*, as well as the *blood*, are *over*charged with ſepton, or *under*charged with oxygen; whence a rationale of the torpor, &c. can be eaſily deduced. The indication of cure, then, will be the ſame as in ſcurvy; that is, to introduce oxygen and to ſubduct ſepton. For, I believe, and you will, I think, find it true, that the form of diſeaſe now under conſideration might, with propriety, be denominated *acute ſcurvy*, in contradiſtinction to the *ordinary* or *chronic ſcurvy*, and receive a ſuitable treatment. I have preſcribed *neutral mixtures*, *lemonade*, *cyder*, *peaches*, *pears*, and *apples*, for ſeveral patients, moſtly to try whether this idea is founded in fact."—*Brown's Treatiſe, &c. p.* 10.

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## NITRIC ACID NOT TO BE RELIED ON TO CURE LUES VENEREA.

Dr. Rodgers, Profeſſor of Obſtetrics in Columbia College, and Lecturer on Clinical Medicine in the New-York Hoſpital, has made many trials with nitric acid in ſyphilis. The general reſults of his experience, both in the hoſpital and in his private practice, are, that this acid does not appear to exert its good effects where the conſtitution is in much tone, or where the inflammatory diatheſis prevails; that its benefits are moſt evident where the habit of the body generally, or any particular part thereof, has been much debilitated by the long continuance of diſeaſe, or by the operation of remedies; and that it is not to be relied on as an antiſyphilitic remedy, eſpecially in recent caſes, or where the patient is of a ſanguine temperament, though it is often of the greateſt ſervice in all debilitated and diſoxygenated habits, where, *after the uſe of quickſilver*, the body has acquired great irritability, and may be ſaid to be MERCURIALIZED. The communication of Profeſſor Rodgers, on this ſubject, will be inſerted in the firſt number of our fifth volume.

## PLAGUE NOT CONTAGIOUS.

Dr. D. Whyte, in a communication made near the end of the year 1800, from the Pera of Conſtantinople, declares his conviction decidedly, that the plague is in no inſtance either an incurable or contagious diſeaſe. Some of the perſons, interrogated by Mr. Howard, ſeemed to entertain a ſimilar opinion. Latterly, theſe doubts are more boldly expreſſed even in Europe. In all the accounts of the plague we have ſeen, even in the quartos of the Ruſſels, there is very little to be found of thoſe ſubjects, concerning which, a ſenſible inquirer wants information; we mean of the food, way of life, dreſs, habitations, materials of building, manner of waſhing clothes and cleaning houſes, and of the phyſical geography of the places where the plague prevails. Until theſe are known, we can never know much, correctly, of the plague of Aſia. The accounts given of it by the Franks are, beyond a doubt, very partial, or imperfect in ſome reſpects and exaggerated in others; and, for the moſt part, tinctured with prejudice or enmity againſt the Turks. There is ſtrong reaſon to believe, that great miſchief is engendered *on board* the filthy veſſels engaged in the Mediterranean trade; and it is well known, that ſome of the cells and apartments of Lazarettos, are among the fouleſt of human abodes. Ships rendered foul by innate poiſon; this poiſon, concentrated and worked up to great malignity by confinement during a quarantine, and the paſſengers and crew immured in an execrable peſt-houſe, are enough, of themſelves, to produce a plague in any region almoſt of the globe. There is ſtrong ground to believe, that the moſt conſiderable ſhare of the plague complained of among the Chriſtians, is both produced and perpetuated under *their own ill-judged regulations*, and then moſt prepoſterouſly ſaid to be imported from Syria, Egypt, or Greece, where, among the Mohammedans it is pretended, its contagion is never extinguiſhed; but it is high time to get the better of theſe deluſions. A little more ſcience, and a few good obſervers will decide this queſtion, and reſcue philoſophy, commerce and navigation, from the terrors of imported contagion.

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## NOXIOUS QUALITY OF THE SALIVARY DISCHARGE.

*Communicated to the Editors of the Medical Repoſitory by Mr. Abel Catlin, of Lichfield (Connecticut.)*

"The deleterious effects of the *ſeptic acid* are," writes Mr. Catlin, "I think, ſatisfactorily aſcertained, and ſcarcely need a proof be offered to confirm the doctrine of the exiſtence of that principle, which is capable of deſtroying animal nature; and was it not for the curious and well-defined manner in which it operated in the following inſtance, I would wave the communication, as unneceſſary to eſtabliſh a doctrine that bids fair to be long retained by the philoſophical world.

"During the laſt Auguſt and September I ſuffered a long and violent fever, attended with very malignant and nervous ſymptoms; and though then incapable of any obſervation myſelf, I had the ſymptoms and circumſtances of the diſeaſe very accurately related to me by the gentlemen who attended me. The detail of theſe I conſider it unneceſſary to mention for the purpoſe of the particular object of this communication. That object I expreſs thus:—Sometime about the height of my diſorder, the expectoration and ſalival diſcharge, which were very great, *did, for one day, and two hours of the next, inſtantly kill every fly that in any manner came in contact with them,* (which, from the ſeaſon and other circumſtances, were very numerous). A ſweat that then broke out terminated its noxious effect on the flies.

"It will be needleſs to mention the excoriating effect of a diſcharge thus virulent on my mouth and throat, and to expreſs my wonder and gratitude, that a ſyſtem, fraught with ſo deadly a principle, ſhould ſurvive."*

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*For the four following articles we are obliged to Dr. John Vaughan, of Wilmington, in the State of Delaware.*

PARTURITION.

In 1797 I was called to a woman in labour; and, ſhortly after my arrival, ſhe had a daughter: and while I was ſeparating this child, and handing it to the midwife, two boys were born with a ſingle pain. They lay parallel to each other, and the navel ſtrings were wrapped about their necks, and knotted as completely as if it had been done by art.

They appeared to have been ſtrangled at about the ſeventh month of geſtation.

There was but one placenta, into which the umbilical chords of the boys entered in contact, while that of the girl was three or four inches diſtant.

The laſt year has been remarkable, in this neighbourhood, for tedious and difficult labours. The difficulty was generally

* Was not quickſilver adminiſtered in this caſe? EDIT.

owing to a rigidity of the *os uteri*; and in ſeveral caſes, to which I was called as a coadjutor, the midwives had neglected the evil until the orifice of the womb was puſhed back towards the *ſacrum*, and the child's head protruding, with the womb before it. But by reſiſting the deſcent of the child during the pains, and very gradual preſſure upwards in their abſence, until the *os uteri* was brought over the vertex, and afterwards preſerving it in a proper ſituation, the womb dilated, and all difficulty was overcome.

In ſeveral caſes of rigidity of the *os uteri*, without inverſion, blood-letting anſwered a valuable purpoſe in producing relaxation. In one deplorable caſe of this kind, to which I was called in the evening, after drawing eight ounces of blood from the arm, which produced faintneſs, I endeavoured to dilate very gradually; but the pains were intolerable, and in about an hour the unfortunate woman was attacked with ſevere convulſions. My ſituation was now perplexing in the extreme. The attendants gave her up for dead, and left the room; and, being without aſſiſtants, I tied up her arm, and let it bleed in the bed until the ſpaſms ceaſed, and immediately delivered her of a very large child. It was ſaid to weigh 28lbs.—This woman had a ſpeedy recovery.

The only fatal caſe of parturition which I have had the misfortune to witneſs was ſo peculiar that it deſerves communication, and may be an uſeful leſſon to others as well as myſelf.

Mrs. ——, the mother of two or three children, was delivered of twins at eight o'clock in the evening; and a tumour remaining in the uterus, the midwives (there were two) ſuppoſed there was a third child, and ſent for me at two next morning. On examining the uterus externally, it was of an irregular form, and of a ſufficient ſize to excite ſuſpicion of a third child. But the woman not being ſenſible of any motion in the uterus, and free from pain—and having met with ſome previous caſes where the effuſion of blood, from a partial ſeparation of the placenta, into the uterus produced a conſiderable tumour, I decided in the negative, and wiſhed to bring away the placenta as ſoon as convenient. However, the midwives and relations controuled, and propoſed ſending for another phyſician; and he agreeing with the midwives, I gave up to the deluſion; and while we were waiting for a return of labour, the poor woman expired without a ſtruggle or a groan. On examination after death, I found the placenta partially ſeparated, and the uterus filled with coagulated blood.

There is one circumftance to which I requeft the attention of my obftetric brethren, *the effects of vomiting during labour.* It is proverbial with the old women, that vomiting is a favourable fymptom, and I have frequently feen a tedious labour terminated by fpontaneous vomiting:—hence, the following query has arifen. Would not emetics, or naufeating dofes of ipecacuanha, be ferviceable in removing rigidity of the os uteri, and in dilating the vagina and *os externum?* The effects of naufea, in moderating febrile action, are univerfally admitted, and we are authorized to infer, that it would be highly ferviceable in many cafes of parturition. The peculiar fufferings of the fex demand our fpecial attention, and we fhould be affiduous in our endeavours to leffen their violent pains.

## AURA EPILEPTICA.

Mifs M——, at the age of puberty, was attacked with fpafms in the fore finger of the right hand, which gradually extended up the arm to the right fide of the head, affecting the mufcles of the eye lids particularly. During one of thofe paroxyfms, I placed her on the infulating ftool, in connection with the prime conductor of an electric machine, and drew fparks from the affected hands. In a few minutes the fpafms ceafed, and returned but once afterwards.

## GUTTA SERENA.

In February laft I was applied to by a young lady, who had loft her fight without any manifeft caufe or apparent injury to the eyes. Electricity prefented itfelf as the moft probable remedy; and I at firft drew fparks from the eye-lids with a wooden point, and afterwards with a metallic one. Its effects were immediately beneficial, and a few electrifications cured her.

## LUSUS NATURÆ.

In the fall 1797, I was fent for to a negro child that had an extra finger on each hand, growing at right lines from the little fingers. They were about $\frac{3}{4}$ths of an inch in length, contained an artery and vein, had perfect nails, but were deftitute of bone. They were taken off by ligature.

A few weeks fince I diffected a child aged thirteen months, that had been diftreffed with difficult refpiration from its birth. On diffecting off the integuments, to expofe the cavity of the thorax, I was furprized to find it deftitute of a fternum, and the ribs united by a fmall cartilage. The lungs were flatten. ed—the pericardium contained an unufual quantity of liquor, and the heart was preternaturally large. The abdominal vifcera were, alfo, much difeafed—the liver enlarged, and rifing upwards againft the mediaftinum, leffening the thoracic cavity; but the fpleen was fmall and dark coloured.

## NEW PUBLICATIONS INTENDED.

The Medical Faculty of the Univerfity of Pennfylvania have it in contemplation to make a collection of the beft Inaugural Differtations of their graduates, and to republifh them in volumes. The propriety and ufefulnefs of this was hinted in the review of one of their collegiate exercifes, in Med. Rep. vol. ii. p. 197, firft edit. The ingenious and excellent matter which many of them contain, render them valuable articles for fuch a Thefaurus.

Profeffor Woodhoufe intends to publifh an American Difpenfatory. It will confift of three parts. 1. An elementary treatife on Chemiftry, and its application to Pharmacy. 2. A hiftory of fubftances employed in Materia Medica, with an account of a number of the active indigenous plants of the United States, and a theory of their action on the human body. 3. An account of the beft medicinal preparations employed in private practice, in hofpitals, and of various foreign pharmacopœias, with a plate of chemical apparatus. Dr. Woodhoufe expects to put it to prefs fome time in the enfuing autumn, or next fpring.

Dr. Barton, Profeffor of Materia Medica, Natural Hiftory, and Botany, in the Univerfity of Pennfylvania, will fpeedily put to prefs, a work, entitled, "*Elements of Botany.*" This work, the plan of which is effentially different from that of the elementary works on Botany now in ufe, will be elegantly printed, in one volume large (royal) octavo, of at leaft 280 pages, and will be illuftrated by a number (not lefs than eighteen) of plates, engraven by an able artift.

## NEW COURSE OF LECTURES.

Dr. Meafe, of Philadelphia, intends to deliver, in the enfuing autumn, a courfe of Lectures, "*on the Application of the Principles of Natural Philofophy and Chemiftry, to the common Purpofes of Life.*" Thefe Lectures will be nearly on the plan of thofe delivered by Dr. Garnett in the "Royal Inftitution" of Great-Britain.

# FOREIGN.

## NITROUS ACID AND OPIUM IN DYSENTERY.

IN the *Medical and Phyfical Journal* for May, 1800, there is a remarkable paper on the treatment of dyfentery, by a combination of nitrous acid and opium. The author (Dr. Hope, of Chatham) intimates a fufpicion, that the dyfentery and yellow fever are produced by the fame caufes, operating under different circumftances. In all the cafes, reported in this paper, where the efficacy of this new mode of treatment was obferved, the difeafe was fomewhat advanced, and the more common remedies had been all ineffectually prefcribed. The firft occurrence of this acid to the author's mind was fuggefted by the fymptoms of extreme thirft in a cafe of dyfentery, and the addition of opium was merely intended as a corrective of the acid. The fignal advantages, however, of the compofition, foon induced him to extend the ufe of it. The formula was as follows:—℞ Acid. Nitr. ʒ ij. Opii gr. ii. Aq. puræ, ℥ ij. M. ft. cap. coch. 1. m. ter quatervedie in vehiculo.

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## REPUBLICAN LYCEUM AT PARIS.

During the year 1800, which was the fixteenth from its eftablifhment, the branches of knowledge taught, and the names of the Profeffors in this inftitution, were the following:

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|---|---|
| 1. Experimental Phyfics, or Natural Philofophy, | Profeffor Citizen Butet. |
| 2. Chemiftry, | Fourcroy. |
| 3. Natural Hiftory, | Cuvier. |
| 4. Anatomy and Phyfiology, | Sue. |
| 5. Hygiene, or the art of preferving health, | Moreau. |
| 6. Technology, or the application of fcience to arts and trades, | Haffenfratz. |
| 7. Education, and the phyfical and moral faculties of man, | Le Roy. |
| 8. Literature, | La Harpe. |
| 9. Hiftory, | Garat. |
| 10. Public or Political Economy, | Roederer. |
| 11. Moral Philofophy, | Degerando. |

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|---|---|
| 12. The art of Deſigning, particularly in Architecture, both ancient and modern, | Legrand. |
| 13. Engliſh Language, | Roberts. |
| 14. Italian Language, | Boldoni. |

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