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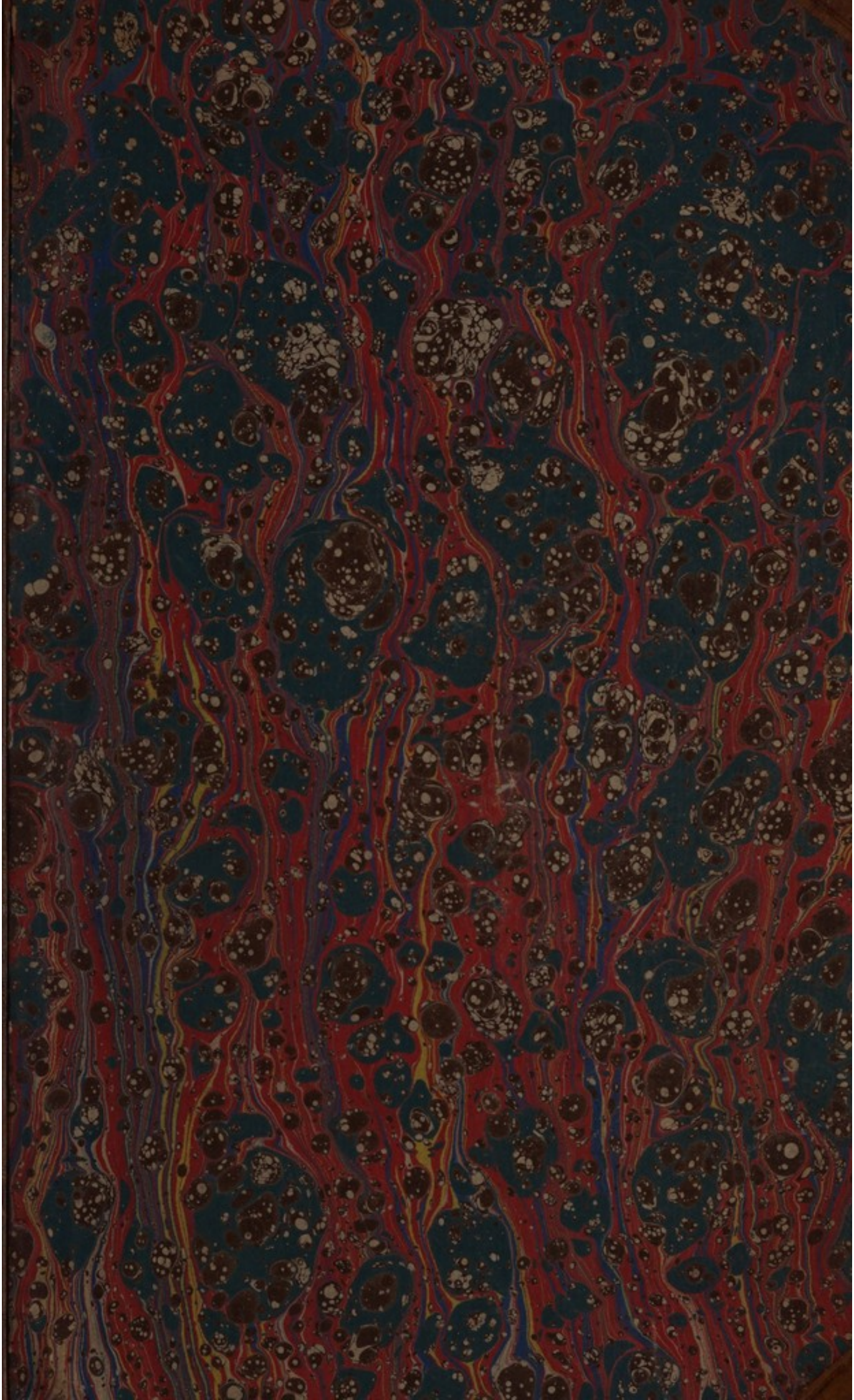
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March 25th 1839
Bath

MEDICAL TRACTS,

READ AT

THE COLLEGE OF PHYSICIANS

BETWEEN THE YEARS

1767 AND 1785.

BY

SIR GEORGE BAKER, BART. M.D.

F.R.S. AND F.A.S.

COLLECTED AND REPUBLISHED

BY HIS SON.

LONDON:

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THE following Papers were originally read at the College of Physicians, at different periods, and they are now printed collectively with a view of rendering them more useful to the world than they could be when scattered in detached pieces through the miscellaneous pages of the Medical Transactions.

Several of the Tracts will shew, that the attention of the Author was very particularly directed to the consideration of the pernicious effects of lead, and the diseases which, in a manner unperceived and unsuspected, arose from it. Being a native of Devonshire, he had occasion to observe, that the inhabitants of that County were generally subject to a fatal disease, of a peculiar character, the symptoms of which had a strong affinity to those produced by a solution of lead; and he exerted himself, in a most zealous manner, to combat the

rooted prejudices and customs of a great majority of his countrymen, and to prevent, if possible, the use of that destructive mineral in the machinery employed in the process of making Cyder. It is a fact, well ascertained, that a malady, which from its former prevalence in the County had acquired the name of the Devonshire Colic, is at this time hardly known to exist there. Thus, by the acuteness of his observation, he discovered the cause of a most afflicting and fatal disorder; and by his perseverance in recommending the disconti-

nuance of a long, and generally prevailing usage, he was the fortunate means of preserving the health and the lives of thousands.

In the commencement of the practice of inoculating the small-pox, he published a pamphlet on that subject, intitled, "An Inquiry into the merits "of Inoculation," which is alluded to in one of the Papers of this collection; but the object of it being to recommend a plan, which has since been generally adopted, the occasion of that little work, which possessed

much interest at the time, has been so entirely superseded, that it has been deemed superfluous to republish it in the present collection.

In offering these select Tracts to the public, the Editor may be permitted to add, that the revered Author of them was, in his early studies and researches, as well as in the practice of his profession, possessed of a peculiar judgment and penetration, united with a liberality, and candour, which could not fail to engage the friendship and esteem of his contempora-

ries. His great delight was in objects of literature, and in the society of literary characters, among whom his talents shone conspicuous. He was remarkable for a most tenacious memory and for the elegance of his classical taste; and his works were distinguished by the easy flow and purity of their style, both in the English and the Latin language.

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MISCELLANEOUS PAPERS.

I. *An Inquiry concerning the Cause of the Endemial Colic of* Devonshire.

Read at the COLLEGE June 29, 1767.

A VERY small acquaintance with the writings of physicians is sufficient to convince us, that much labour and ingenuity have been most unprofitably bestowed on the investigation of

remote and obscure causes: while those, which are immediate and obvious, and which must necessarily be admitted, as soon as discovered, have been too frequently overlooked and disregarded. Such a spirit of refinement in theory has, in several instances, been the parent of dangerous errors in practice: men are apt to be as partial to their own conceits, as to their own offspring; and those opinions seldom fail to govern at the bed-side, which have been the result of much contemplation in the closet. It is with true pleasure I acknowledge, that this spirit is a fault, not so much to be imputed to the present, as to

the last age. We have now learned not to indulge ourselves in visionary speculations, but to attend closely to nature. We observe diseases in themselves; and trace the powers of medicines in their effects on the human body; and experiment is the great *basis* of our reasoning. In many cases indeed, from our very limited knowledge, we are still obliged to allow, in some degree, the doctrine of the empiric sect, *non-interesse quid morbum faciat, sed quid tollat;* yet are we far from being such empirics, in the modern sense of the word, as to pay no regard to those causes, which are manifest and within

our reach; such causes more especially, as lead us directly either to the cure of diseases, or, what is more desirable, to the prevention of them.

Of this last kind is that cause, to which, I apprehend, the provincial disease is owing, which is the subject of the present inquiry. And, if I am not mistaken in my notion, the maxim will hold good in this instance, and in an higher sense than is usually intended by it, that *cognitio causæ morbum tollet.* Reform but the mischievous practice, which occasions the disorder, and it will cease of course: it will be no longer

endemial, and peculiar almost in one part of England; and in other parts, perhaps, by the same means, be less frequent than it is. But I flatter myself, I shall be doing an especial service to the inhabitants of my native county, if, by giving them notice of a mischief, of which they are not aware, I may induce them to avoid it, and may at once promote the health and prosperity of my countrymen.

The earliest account of the Devonshire colic, which I have met with, is in Dr. William Musgrave's *dissertatio de arthritide symptomatica*, published in

the year 1703. In the fifth section of the tenth chapter *de arthritide ex colica*, is the following passage: "Alia vero colica, "apud Damnonium, ex pomaceo immiti et acido, nimis "usurpato, derivatur; id quod "ex eo liquet, siquidem illos "solum infestat, qui potioni isti "assuevere, eademque ratione "qua sunt assueti: sic ut iis "tempestatibus, quæ pomaceo "abundant, crescat, et in vulgus ea grassetur; contra vero, "Pomona copiam negante, rarius observetur."

It seems here very particular, that Dr. Musgrave should say so much of this colic, which

he represents to be the effect of crude and sharp cyder; and make no mention of those essential and pathognomonic symptoms, by which it is at this time distinguished. Are we to suppose that when Dr. Musgrave lived, it had not been observed to terminate in palsy, or epilepsy? That he was well acquainted with a disease exactly similar to this, namely the colic of Poitou, is very certain; for in the fourth history of the same tenth chapter, he mentions the case of a gentleman, who "ætatis flore, "colica, quam pictonicam ap- "pellant, aliquandiu vexatus, "ex more et progressu istius "mali ordinario, incidit in pa-

" ralysin ; artus exinde marci-
" dos, graciles, ἀκινήτους habens ;
" per reliquum vitæ clinicus.
" Paralysi sub ejus initium ac-
" cesserunt dolores erratici, in-
" certi, horum, illorum artuum
" internodia cruciantes, autum-
" no, et tempestate pluvia maxi-
" mopere sævientes, et ad amus-
" sim rheumatismum simulan-
" tes."

It is indeed possible that Dr. Musgrave might not often have seen the colic, in its extreme ill effects, which he mentions as peculiar to the drinkers of cyder ; for, as I am informed, orchards were not in those days much cultivated in the country

near Exeter, where Dr. Musgrave resided: and there was no county-hospital as yet established. Dr. Huxham also testifies in the year 1739, that there was then ten times more cyder made and drunk in the county, than there had been about thirty or forty years before.

But whatever is deficient in Dr. Musgrave, is abundantly supplied by Dr. Huxham. His *opusculum de morbo colico Damnoniorum*, which he first published in the year above mentioned, contains a very full description of this malady. He informs us, that, "in the beginning of the

"autumn 1724, a season parti-
" cularly remarkable for an
" abundance of apples, it spread
" itself over all the county of
" Devon, among the populace
" especially, and those who
" were not very elegant and
" careful in their diet; and
" that, though it may not rage
" with the same degree of vio-
" lence, and may affect a much
" less number of people, yet it
" infests that county more or
" less every autumn."

It does not appear, that this author began to make observations on the air and epidemic diseases, until the year 1728, that is, four years after the time of

the remarkable epidemic colic of Devonshire. We ought, therefore, the less to wonder, why we have received from him no determinate and uniform evidence whether or not the air had any influence on this disease. In the tenth page of his treatise, we are informed, that " it was " *most* violent when northerly " winds prevailed ;" whereas, in the twelfth page of the same treatise, we find, that " it was " *equally* violent in dry and " moist weather ; during the " prevalency of a south or a " north wind."—And immediately afterwards, " indeed in a " dry and cold season, sharp and " northerly winds blowing, the

" griping pains were observed " to be *most* vehement."

Any intelligent reader, who shall peruse Dr. Huxham's description, will readily determine the *morbus colicus Damnoniorum* to be precisely the same disease, which, in the year 1617, was described by Francis Citois, a native of Poictiers, afterwards physician to the king of France, and to the cardinal Duke de Richlieu, under the title of *novus et popularis apud Pictones dolor colicus biliosus*. Indeed it seems to be acknowledged by Dr. Huxham himself, that what is called *colica Pictonum*, " which kind of " malady," he says, " is very

" common in the West-Indies," is similar to the disease which he describes ; " arising from a " similar cause, to wit, too great " an use of the very acid juice of " lemons, and requiring much " the same method of cure."

Dr. Huxham refers the cause of the Devonshire colic principally to a very gross, essential acid salt, or tartar, with which the * expressed juice of apples,

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* There was such an abundance of apples in the year 1724, that vast quantities of them were thrown to the hogs : " But the " swine-hogs, as well as the swine-men, " suffered from the gluttonous abuse of the " apples ; and all of them wasted greatly in " their flesh, and many died." *Treatise on the Devonshire colic, page* 13. Whether or

whilst unfermented, abounds. He thinks that " by long and " frequent drinking a liquor of " this kind, such a quantity of " crude, gross tartar is thrown " into the blood, that it thence " becomes very acrid ; and not " only the blood, but from that " impure source, all the hu- " mours thence secreted. So

---

not the swine-hogs, who thus suffered by *the apple diet*, were affected with the colic of Devonshire, we have no information. If they really were thus affected, such an observation would greatly help to establish Dr. Huxham's opinion with respect to the cause of this disease. That it is not confined to the human species, is very certain ; for it is well known that dogs and cats, those especially who live in the houses of painters, are particularly subject to it.

" that instead of a very soft, lu-
" bricating *mucus* separated by
" the glands, discovered by Dr.
" Havers, we have as it were
" a sharp, coagulated matter,
" whence arises a great pain in
" the joints, and impotence of
" their motion.—Instead of an
" exceeding soft lymph to mois-
" ten the nerves, a corrosive
" ichor; and hence epileptical
" attacks. Moreover, the blood
" being saturate with such a
" great quantity of salts, they
" attract one the other strongly,
" and form greater *moleculæ* than
" can pass through the lympha-
" tic arteries, scarce indeed
" through the sanguineous ca-
" pillaries; hence various ob-

" structions, and great irritation
" on the nervous extremities.
" At length even the very bile,
" that variously-useful balsam
" of the body, becomes corrup-
" ted and quite enervated by
" the super-abundant apple-acid,
" though in its natural state it
" was designed to correct acidi-
" ty. The power of the bile
" being thus destroyed, and
" being turned almost into a
" *coagulum*, it stagnates in the
" gall-bladder, and hepatic ducts.
" But, being exposed to the
" heat of the body, and agi-
" tated by the motion of the cir-
" cumjacent parts, it is again
" dissolved, and grows daily
" more and more thin and acrid.

" The acid salt added, though it
" might otherwise, in some
" measure, temperate the alca-
" line acrimony of the bile, yet,
" being continually agitated by
" the heat and vital actions of
" the body, at length even in-
" creases the acrimony. In
" this dissolved state, the bile,
" whether green or black, is
" either resorbed into the blood,
" or thrown into the intestines.
" When mixed with the blood,
" it occasions pains, anxieties,
" and spasms: besides, it cor-
" rodes the tender vessels, and
" is greatly injurious to the
" brain. When it passes into

" the guts, it occasions vomit-
" ing and colic.*"

---

* Much is said by Dr. Huxham concerning the origin of the black and porraceous bile: upon a presumption, that the acid, which he supposes to be predominant in the blood of cyder-drinkers, has a power of making those changes in the bile, even when first secreted. That acids, in the first passages, will make the bile porraceous, is very certain: but when *those who are conversant in anatomical dissections have found black and porraceous bile in the gall-bladder and biliary ducts*, they have not always agreed with Dr. Huxham in their conclusion; for I could bring several authorities to shew, that such changes in the colour of the bile, in the gall-bladder and ducts, has been referred to a putrid cause; nay, that by some they have been supposed constantly to attend the plague and pestilential fevers; in which cases acidity has not generally been suspected.

This is a short specimen of Dr. Huxham's doctrine, extracted from a translation of his treatise, which was published with his own approbation. For the remainder of his very ingenious theory I shall refer you to the treatise itself; observing only, that you will there find a sentiment, which is not more true in general, than it is justly applicable on the present occasion—"Sine experientia vana "omnis theoria, bella sit ut-"cunque."

For although I always pay that deference, which is due, to the authority of this celebrated physician, I have for some

time conceived doubts concerning the solidity of his doctrine. When I consider, that this colic of Devonshire is precisely the same disease, which is the specific effect of all saturnine preparations; and that there is not the least analogy between the juice of apples, and the poison of lead; it seems not to me probable that two causes, bearing so little relation to one another, should make such similar impressions on the human body.

But, lead itself being certainly of such a nature, as to be abundantly answerable for all the ill effects, complained of

from the cyder, my thoughts were naturally carried to the search of it ; and well might I expect to find it, in some way or other, combined with that liquor.

No author whom I have had an opportunity of consulting, has given any intimation of having conceived the same suspicion with myself, except only the anonymous author of *Examen d'un livre qui a pour titre T. Tronchin de colica Pictonum.**

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* In consequence of this vague intimation, contradicted by himself, the author of this pamphlet has lately claimed the merit of having been the first, who conjectured, that the colic of Poitou is produced by one

This writer indeed hints in a cursory manner, " Il est possi-
" ble, que les vins, dont parle
" Citois, et les cidres, dont parle
" M. Huxham, aient été, sans
" qu'ils l'aient pu découvrir, al-
" térés avec la litharge ou quel-
" que autre matière semblable."
It is evident, however, from what he afterwards says, in the forty-sixth page, that he was very far from having formed any settled opinion on this subject. " *Ces trois causes*, scavoir la
" bile, les matières minérales

---

simple cause only. In the second volume of *the Medical Transactions*, page 433, the reader will find this claim stated, and the reasonableness of it considered.

" venimeuses, et les vins verds
" et austères, quoique différentes
" en apparence, produisent,
" malgré ce qu'en peut dire M.
" Tronchin, des coliques à peu
" près de même espèce."

But to return to Dr. Huxham. In endeavouring to explain the nature of the apple juice, he is led to a comparison of our cyder with the Rhenish and Moselle wines ; which, he informs us, agree in containing an abundance of crude tartareous salt. And he adds, " their
" native salts seem very near
" alike ; and, examined by the
" microscope, appear exactly of

"the same figure." But how much soever our cyder may agree with Rhenish and Moselle wines in the particular circumstance of containing a large quantity of essential salt, of a similar figure; no argument, from analogy, will here be valid, unless it can be shewn also, that Rhenish and Moselle wines have ever produced the colic of Poitou, in an unadulterated state. It is indeed certain, that this disease has been common in the countries where those wines are much drunk; but it is as certain that the merchants have long practised the art of adulterating them with litharge.

I have frequently found in these wines evident marks of a saturnine impregnation.

But, if pure cyder be the cause of this disease, as being an acid, I must here take leave to ask a few questions, which I am at a loss to answer on that principle. Why then is the colic of Poitou very little known in the eastern countries, where the Turks, whose religion obliges them to abstain from wine, drink every day large quantities of a very acid sherbet? Does the experience of jockeys, who, in order to reduce themselves to a certain standard of weight by sweating,

are said to drink largely of vinegar, strengthen such an observation? Do we find it to be true, that children, and valetudinary people, and particularly chlorotic girls, whose first passages abound with acid, are on that account subject to this species of colic? Is not a *diarrhœa* or *cholera*, the ordinary effect of *the immoderate and very long use of the summer and autumnal fruits*? And is it not a common observation, that Must relaxes and liquefies, and, if drunk largely, is apt to produce dangerous fluxes? Does not the passage of Hippocrates, cited by Dr. Huxham, testify, that γλεῦκος ὑπάγει καὶ διαχωρέει? What reason can be given, why

the poorer inhabitants of the counties of Worcester, Glouces-ter, and Hereford, who use, as their common drink, a weak acid cyder, are subject to no such colic? Is it sufficient to reply, that, in Devonshire, the apples do not ripen, among other reasons, because the trees are planted too near to each other; but that, in Hereford-shire, and in the neighbouring counties, the trees being more judiciously planted, the fruit is brought to more maturity? Or, that, in the counties last men-tioned, the apples are kept till they are rotten, by which means the acid is subdued, and becomes innocent? Is it ratio-

nal to have recourse to *the moisture exhaled from the vast Atlantic ocean*, in order to shew, why the air of Devonshire is unwholsome, and the apples sour? Is it not proved by the experience of the inhabitants of Scotland, that very large quantities of a small beer may be drunk, even in the act of fermentation, without producing an epidemic colic? Why is this disease no longer endemic in the province of Poitou? Is it that the grapes are brought to more maturity, than they were formerly? Has the sun more power now, than in the time of Citois? Is it reasonably to be suspected, that the essential salt of a vi-

nous liquor can raise such tumults in the bowels, whether by corrupting the bile, or otherwise; when it is vulgarly known even among the workers of the lead mines in Derbyshire, that patients, afflicted with this same disease, do not receive a more immediate, or a more effectual relief from any medicine whatever, than by taking large and repeated doses of this very essential salt, the *cremor tartari;* and when it appears that Dr. Hillary greatly depended on it, for the cure of the dry-belly-ach, in the West-Indies? And lastly, can we possibly allow, that a cause, si*milar in its nature to the acid of*

lemons, is productive of this disease in our own country ; after having been informed both from the West-Indies, and the colonies of North America, that the juice of lemons and limes is not only much trusted to for its cure, but that it is even esteemed to be a preservative from it ?

ZELLER, in his *docimasia, signa, causæ, et noxa vini lithargyrio mangonisati*, gives an account of the revival of the adulteration of wine by litharge in the dutchy of Wirtemberg, in the beginning of the present century. In this dissertation he asserts, that though the wines in the neighbourhood of Tubingen, were as

acid as vinegar, the inhabitants had long drunk them with impunity, till this fraud was introduced. " Constat viciniam " nostram, ubi alias montes la- " crymantur acetum, et istius- " modi vina immatura et acida " per plures annos, imo lustra, " ab incolis et militibus largiter " hausta fuerunt, ab omnibus " tamen his symptomatibus pe- " nitus liberam fuisse, cum a " fuco quoque libera fuerit: imo " in ipsa hac nostra civitate, " quæ ante duo lustra truculen- " tia hac tantum non oppressa " fuit postquam fraudem hanc " plurimi, tam vietores, quam " caupones, tecte quidem exer- " cuerunt, omnes isti, qui a cau-

" ponibus vinum vel non eme-
" runt, vel in eorum ædibus non
" biberunt, a torminibus et
" cruciatibus hisce immunes
" evaserunt ; licet eorum do-
" mestici per aliquot annos au-
" sterum et acidissimum hause-
" rint vinum, ut acidius gustari
" vel dari nequeat ; aliis inte-
" rea, quos dulcedo inescavit,
" miserrime patientibus, aut en-
" ervatis, elumbibus redditis,
" pendulis artibus et resolutis
" incedentibus, aut neci tradi-
" tis ; plurimi enim miserrime
" perierunt."

There is indeed an experiment, mentioned by Zeller ; but it seems to prove nothing

against the general wholesomeness of acids. Upon his having given to a dog three ounces and an half of very strong vinegar, the respiration of the animal immediately became sonorous and difficult: and he died in the third hour after he had swallowed the vinegar, having thrown up great quantities of froth, which at last was mixed with blood. The dog being opened, no signs of inflammation appeared in the stomach: the mischief is described to have been in the lungs only. Some of the vinegar probably found its way into the lungs; and suffocation seems to have commenced in the very act of swal-

lowing. Whereas Brunnerus, (*Ephemerid. Germanic. an.* 4. *observat.* 92.) who killed a dog with an ounce of powder of litharge, boiled in vinegar, found the effects of that poison to be principally in the stomach, intestines, urinary bladder, and the other *viscera* of the *abdomen.*

I shall only add one more observation concerning acids. Physicians who have resided some time in the hotter countries, have testified, that there are no better remedies against spasms, dysenteries, and the other endemeal diseases in those climates, than the acid vegeta-

bles, with which nature has most liberally supplied them. This opinion is expressed in a strong manner by Jacobus Bontius in his *Historia naturalis Indiæ orientalis*, *lib.* vi. *cap.* 27. "Videtur Natura voluisse ex "professo multas acidas et con- "stringentes herbas e terra "producere, contra violentos "et endemios morbos, dysente- "riam nempe, choleram, et "spasmum, plerumque a bile "ortos: ut quasi digito mon- "straret, ubi hæc vel similia "mala nascuntur, ibi locorum "remediorum manifesta et eti- "am occulta qualitate pugnan- "tium penuriam non fore."

It seems therefore, upon the whole, not to have been without sufficient foundation, that I had for some time suspected, that the cause of this colic was not to be sought for in the mere acid cyder ; but in some adventitious, either fraudulent, or accidental, adulteration with lead.

Upon inquiry into the state of the disease, I found that it is very common all over the county of Devon : but that it particularly infests those parts of the county, where the greatest quantities of cyder are made. I likewise found that it is not only common among the lower

class of inhabitants, and those who drink largely of the unfermented juice, and the new cyder; but that it is much more frequent among people of all ranks than in other parts of England; and that it is far from being entirely confined to the autumnal season. Not long ago I had an opportunity of seeing several wretched victims to this cruel disease; who answered to the representation drawn by Citois. "Per vicos, "veluti larvæ, aut arte progre- "dientes statuæ, pallidi, squal- "lidi, macilenti conspiciuntur, "manibus incurvis et suo pon- "dere pendulis, nec nisi arte

" ad os et cæteras supernas par-
" tes sublatis, ac pedibus non
" suis, sed crurum musculis,
" ad ridiculum, ni miserandum,
" incessum compositis, voce
" clangosa et strepera."

I lately received from Dr. Andrew of Exeter the following account of all the patients, under this disease, received into the Devon and Exeter hospital since September 1762.

From Sept. 1762 to Sept. 1763 - -	72
Sept. 1763 to——1764 - -	75
Sept. 1764 to Lady-Day 1766 - -	86
Lady-Day 1766 to July 6, 1767 - -	52
	285

Of this number 209 were cured.

Dr. Andrew likewise instructs me that patients are brought to the Devon and Exeter hospital from all parts of the county; but chiefly from those parts, where most cyder is made.—That the most violent symptoms of this disorder, such as pain and costiveness, are generally removed before the sick are brought to the hospital; and that nothing commonly remains but a paralytic weakness in the arms. He adds, "I "have known this complaint "cured radically; though, I "confess, a return often hap-"pens. When the disease "proves obstinate, we always "endeavour to get our patients

" into the hospital at Bath : the
" Bath water, though not a spe-
" cific, being esteemed by us
" the most effectual remedy,
" both internally and externally
" used."

Upon farther inquiry, I find that eighty patients, under the effects of the Devonshire colic, were received into the Bath-hospital in the course of the last year ; forty of whom are said to have been cured, and thirty-six sent away greatly relieved. I am assured likewise from that hospital, that the proportion of such patients sent from Devonshire, to those from the counties of Hereford,

Gloucester, and Worcester, is generally as eight to one.

In some letters, which I have lately received from Dr. Wall of Worcester, the following facts are asserted. "The "counties of Hereford, Glou- "cester, and Worcester, are "not, so far as I know, sub- "ject to the colic of Poitou, or "any other endemic illness, "unless it may be the rheuma- "tism; which, I think, the "inhabitants of Herefordshire "are more liable to, than "those of some other counties. "There is no lead, which can "give occasion to that colic, "used in any part of the *appa-*

" *ratus* for grinding or pressing
" the apples, or fermenting the
" liquor. Once indeed, in a
" plentiful year of apples, I
" knew a farmer, who, wanting
" casks, filled a large leaden
" cistern with new cyder, and
" kept it there, till he could
" procure hogsheads sufficient
" to contain the liquor. The
" consequence was, that all,
" who drank of it, were affec-
" ted by it as lead workers usu-
" ally are. We had eleven of
" them, at one time, in our in-
" firmary.

" I have lately had two or
" three patients in that distem-
" per, occasioned by their hav-

" ing drunk cyder made in a
" press covered over with lead.
" But this fact of a cyder-press
" covered with lead, is a singu-
" lar, and perhaps the only in-
" stance of the kind in this part
" of England. It happened in
" a part of the county of Wor-
" cester, adjoining to Warwick-
" shire, where very few apples
" grow; and the bed of the
" press being therefore cracked
" by disuse, the sagacity of the
" farmer contrived this cover-
" ing, to prevent a loss of his
" liquor. In general, the cy-
" der-drinkers with us are heal-
" thy and robust; but for the
" most part lean. The liquor
" is clear, and passes off readily

" by urine and perspiration ;
" which enables the common
" people to drink immense
" quantities of it when at la-
" bour, to the amount of several
" gallons in a day. I have
" heard it observed by a physi-
" cian, late of this place, who
" was much employed in the
" cure of lunatics, that more of
" those unhappy persons came
" to him from Herefordshire,
" than any other place. The
" fact, if true, may possibly
" arise from the quantity drunk
" rather than the quality."

Were the *apparatus* for making cyder the same in all the cyder-counties, it would ap-

pear, at first sight, very unaccountable, that the inhabitants of one county in particular, should experience such terrible effects from the use of this liquor, while those of the others drink it with impunity. But if we examine the several methods of making cyder in the different parts of the kingdom, and the utensils employed in it, we shall be able to conclude, with a strong degree of probability, what, at least in part, occasions such a remarkable difference.

Dr. Wall informs me, that in some parts of the counties of Hereford, Gloucester, and Wor-

cester, the mills, in which the apples are ground, being sixteen eighteen, or twenty feet in diameter, consist of several pieces of stone or timber, joined together by means of iron cramps, fastened with lead: but, that these cramps are fixed only in the *bed* of the mill, or on the outside of the curb; and not in the groove, where the apples are ground. The same gentleman, however, observes, that, if many apples, full of juice, are suffered to lie long on the bed of the mill (where they are usually placed in an heap, in readiness for the groove) some of which may perhaps be rotten, others bruised in the gathering,

and a moisture spread over the whole, from the fermentation and sweating of the fruit, it may perhaps be doubted, whether some parts of the lead, used in the cramps, may not be dissolved ; though it must be, at most, in a quantity extremely small ; there being but very little lead used in the junctures ; and the surface, exposed to the fruit, being almost imperceptible. But I am informed by another person, that, in many parts of Herefordshire, and the neighbouring counties, the stones composing the mills, are joined together with a putty ; which putty is no other than a mixture of oil and whit-

ing; and that neither iron nor lead are originally used in the construction of them. However, if any of the joints, in wearing, happen to start, it is admitted, that they are repaired with iron cramps, fastened with lead.

In many parts of the county of Devon, the circular trough, used in grinding the apples, is composed of several pieces of moor-stone, cramped together with iron, and fixed by melted lead, poured into the interstices, on the inside of the groove. These stones are not always wrought with much art; and sometimes, being of irregular and

unequal figures, they do not correspond with each other; so that considerable chasms are left between them; and these chasms are filled up with lead. The apples therefore, ground by the pressure of the roller, come immediately into contact with no small quantity of this poisonous mineral. I have heard only of one trough, which is made of a single stone.

It is likewise common, in several parts of the county, either to line the cyder-presses entirely with lead, in order to prevent their leaking; or to make a border quite round the press for receiving the juice of the

apples, and conveying it into a vessel, of wood or stone, placed underneath. In many other places, it is common to nail sheet lead over any cracks or joints in the presses ; and likewise to convey the juice from the presses in leaden pipes.

When I first entered upon this enquiry, I was of opinion that whatever mixture of saturnine parts there might be found in the cyder of Devon, it was wholly to be referred to the accidental use of that metal in the troughs and presses. I had indeed been informed, that it is the practice of some farmers, in managing their weak cyder,

made early in the year, before the apples are ripe, to put a leaden weight into the cask, in order to prevent the liquor from being sour ; and that this cyder is the common drink of their servants and labourers. But I was willing to believe, that such a pernicious method of adulteration (a crime, which both in France and Germany is punished by death) was not often practised by our countrymen. That it is not practised with any consciousness of the mischief of it, I still hope and believe. But it is certainly common with dealers in cyder, when the liquor frets too much, and is thereby in danger of be-

coming acetous, to rack it into a leaden cistern*. And I have good authority to add, that even the use of cerusse, in correcting acidity, is well known by the farmers and merchants.

I was in hopes, that a custom, to which Mr. Phillips alludes in his excellent Georgic, had subsisted only in the imagination of the poet:

—" nor let the crude humours dance
" In heated brass, steaming with fire intense;
" Although Devonia much commend the use
" Of strengthening Vulcan."

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* I have lately been informed that this method is likewise practised in Herefordshire.

But I have received very positive information, that it is a common practice in Devon, to boil the juice of the apple before fermentation, with a view to increase the strength of the cyder, and to prevent its advancing to the acetous state. This custom seems to have been first introduced, in imitation of the management of wine in some countries; where, we are informed, it is usual to boil the unfermented liquor with the same intention.* According to the testimony of Neuumann, the strong full-bodied, rich, sweet wines, such as the malm-

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* This method of managing wine ap-

sey, canary, and some of the Spanish and Hungarian wines, are generally a mixture of fermented and inspissated Must; the latter being added to increase the richness of the liquor, and prevent the fermentation from running beyond its due limits. And we are informed by the same author, that several of the Italian wines, called by the general name of

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pears to have been very antient. We meet with several allusions to it in Virgil:

"Aut dulcis musti Volcano decoquit humorem,
"Et foliis undam trepidi despumat aheni."

Georg. lib. i. ver. 295.

And in Georg. lib. iv. ver. 269.

—"Igni pinguia multo
"Defruta."

Columella is copious on this subject.

vini cotti, by means of decoction, continue fit for drinking a year or two, although they have suffered scarcely any degree of fermentation, and are little more than boiled Must. This process is only applied to thin watery juices, extremely prone to ferment, and which fermentation, when once begun, can scarcely be suppressed, till it has run beyond the vinous state.

Hoffman accounts for the strength and sweetness of many of the wines of Italy, in the following manner. " Dependet " dulcedinis, nec non virium " causa potissimum ex eo, quod

" in more habeant vel ex
" uvis maturis selectis in
" aëre parumper exsiccatis ea
" præparare, vel ipsa recentia
" musta igne leni aquositate in
" auras emissa inspissare, et
" tunc fermentationi exponere.
" Hoc artificio vina majorem
" acquirunt dulcedinem, quan-
" doquidem, mustum quo dulci-
" us et spissius est, eo minus
" vehementem subit ebullitio-
" nem, quæ alias plerumque
" aciditatis nimiæ genitrix est."
(*De præstantibus Europæ vinis, cap.* i. *art.* xi.)

It will very easily appear, how this method of boiling the Devonshire Must does necessa-

rily expose it to an impregnation of lead. It is customary in almost every country, to make the upper parts of the boiling vessels of lead; as the capacity of the vessel may be thus increased, at a less expense, in the part where it is not exposed to the fire. In the state therefore of ebullition, the mere vapour of the acid Must, although the liquor be not supposed to reach up to the lead, will certainly dissolve the metal; and, in the state of sugar of lead, it will trickle down the sides of the vessel, and be united with the boiling juice. Here then we discover an additional reason, why the liquor,

heated in this manner, should have its fermentative quality restrained, and should acquire an artificial sweetness. It is well known, that, a few years ago, this very practice produced *the Devonshire colic* in the county of Kent. Some cyder, which had been made in a gentleman's family, being thought too sour, was boiled with honey in a brewing-vessel, capped with lead. All, who drank this liquor, were seized with this disease; some more, others less violently. One of the servants died very soon in convulsions; several others were cruelly tortured a long time. The master of the family in particular,

notwithstanding all the assistance which art could give him, never recovered his health; but died miserably, after having, almost three years, languished under a most tedious and incurable malady.

There is at this time, or at least there very lately was, on an estate belonging to His Grace the Duke of Somerset, in the parish of Bury Pomeroy, a leaden cistern of very large capacity. During many years, as I am credibly informed, the juice of the apple, as soon as expressed, was conveyed to this cistern, and remained in it, until it was fit to be removed

into casks. At last it was discovered, that this was a most pernicious practice; for that those, who drank the cyder, thus prepared, were most cruelly tormented by the Devonshire colic; and that many died. The leaden cistern therefore was no longer used; and, in consequence, the disease became less frequent among the inhabitants of Bury Pomeroy.

I have frankly been informed by a gentleman of the county of Devon, that it has been a custom, long practised in his own family, to restrain the fermentation of cyder, by throwing into it a certain quantity of su-

gar of lead; but he is by no means convinced, that any ill consequences ever followed this practice; and he insists that his family are not more subject to the colic, than their neighbours.

It is very certain, that, in various parts of the county of Devon, there are those, who possess certain secrets for the management of cyder; the general object of which secrets is, to correct the sourness and austerity of that liquor. Indeed, there is great reason to fear, that pernicious methods of adulterating vinous liquors are too well known, and too much practised

in every part of this kingdom. I have several times discovered marks of a solution of lead in the English *made* wines. In a small *compendium* of housewifery, intitled, *The art of making wines, from fruits, flowers, and herbs, all the native growth of Great Britain*, by William Graham, late of Ware in Hertfordshire, under the article of *Secrets belonging to the mystery of Vintners*, page 30, I have lately found the two following receipts.

"*To hinder wine from turning.*

"Put a pound of melted lead "in fair water into your cask, "pretty warm; and stop it "close."

" *To soften green wine.*

" Put in a little vinegar, " wherein litharge has been well " steeped, and boil some honey " to draw out the wax. Strain " it through a cloth and put a " quart of it into a tierce: and " this will mend it, in summer " especially."

This little book, having gone through six editions, may be supposed already to have done some mischief: and the editor of it would act humanely, if he would, in future editions, not only suppress the secrets of the mystery of vintners, but shew how dangerous such receipts

may be to the health of mankind.

I determined, therefore, to make use of the first opportunity, which might occur, of satisfying myself by experiment, whether or not there might be in fact any solution of lead discovered in the cyder of Devonshire. Happening to be, in the month of October 1766, at Exeter, I procured some of the expressed juice of apples, as it flowed from a cyder-press, lined with lead, in the parish of Alphington. On this I made and repeated several experiments, by means of the *atramen-*

tum sympatheticum or *liquor vini probatorius ;* and of the volatile tincture of sulphur. The experiments satisfied me, that the Must did contain a solution of lead. The same experiments were made on some cyder, made in the parish of Alphington, of the preceeding year. This likewise shewed evident signs of lead contained in it ; but in less proportion than in the Must.

But, being unwilling to come to any decisive conclusion, solely on the authority of my own trials ; more especially as I had been under the influence of a preconceived opinion ; I

brought with me to London some of the same Must, which I had examined at Exeter, in a vessel of stone-ware. This Must, together with some Devonshire cyder of the preceding year, purchased of the maker (who assured me that he used no lead in any part of the *apparatus*, except only what was applied in composing the trough, as was mentioned above) were the subject of the five first experiments, which will hereafter be described. In making these, as well as several others, on the same subject, Dr. Saunders kindly gave me his assistance.

Before that I give an account of the several experiments, which we made, it may be proper to make an observation or two, which will perfectly explain the mode of union, which takes place between wine or cyder, and lead.

The expressed juice of the ripe grape, or ripe apple, contains a considerable quantity of acid, united with a sugar. This acid having undergone the saccharine fermentation, the whole is gradually converted into an alcohol or inflammable spirit. But if the original juice, or Must, be crude and acid, without having much saccharine

matter in it, the native acid is with difficulty assimilated ; or, when it arrives at the proper period of assimilation, it does not remain there stationary, but hastens on to the acetous fermentation. When lead is added to such wines, or cyders, their acidity is covered ; a sweetness is communicated to them ; and their progress to the acetous fermentation is checked.

The richer wines, of which the original juice contains a large proportion of saccharine matter, are less liable to adulterations of this kind, than the poorer wines of northern climates, such as the Rhenish and

the Moselle wines, and our English cyder.

It is farther to be observed, that the vegetable acid, either in its native state of Must, or in its fermented state of vinegar, or in its intermediate state of cyder, very readily receives an impregnation from lead, whether it be applied in form of metal, or of *calx*. We are therefore to consider lead, when united with wines, as in the condition of *saccharum saturni*.

By attentively observing the variety of changes produced by certain bodies, when added to a solution of *saccharum saturni;*

and by applying these observations to the wines, which are the most frequent subjects of this adulteration, chemists have been enabled to detect such frauds, wherever they have existed. We now proceed to our experiments.

Experiment I.

A small quantity of Devonshire cyder being exposed upon clean paper to the fumes of the volatile tincture of sulphur, became immediately of a darkish colour. And we could only imitate this colour by exposing a dilute solution of *saccharum saturni* to the same fumes. A small quantity of Herefordshire cy-

der, exposed in like manner to the same fumes, exhibited no such appearance, until a few drops of a solution of *saccharum saturni* were added to it.

Observation I.

From this experiment we are to understand, that the acid, before united with the lead in the cyder, and the volatile alkali in the tincture of sulphur, mutually attracted each other; and that it was the precipitate of the lead, united with the sulphur, which produced the dark colour above-mentioned.

Experiment II.

A small quantity of *hepar*

sulphuris (prepared by digesting together in a sand-heat one ounce of orpiment, and two ounces of quick-lime, with twelve ounces of water, in a close vessel) being added to some Devonshire cyder, in a few minutes occasioned a darkish colour in the body of the liquor; and the whole became very opaque. No such change was produced in the cyder of the county of Hereford, until a few drops of a solution of *saccharum saturni* were infused; when the same appearance likewise was perceived.

Observation II.

The reasoning, made use of

in the former observation, is applicable here. The decomposition of the *saccharum saturni* and of the *hepar sulphuris* was effected by the same laws of elective attraction.

Experiment III.

To a small quantity of Devonshire cyder a few drops of *hepar sulphuris* (prepared by boiling equal parts of fixed vegetable alkali and sulphur together in water) were added; and a precipitation of a very dark colour was produced.

When Herefordshire cyder was treated in the same manner, the precipitate produced was as

white as milk; and it was only upon the addition of a few drops of a dilute solution of *saccharum saturni*, that a precipitate of the same colour with the former could be obtained.

Observation III.

There is some nicety required in making this experiment. The *hepar sulphuris* is not to be added in any large quantity: for, as all the lead is precipitated, upon the first addition, it is easy to perceive the several successive shades of colour in the precipitate, until all the lead is separated; and then the precipitate, upon a farther addition of *hepar sulphuris*, as-

sumes the whiteness of the precipitate obtained from the Herefordshire cyder, which intitles it to the appellation of *lac sulphuris*. If a large quantity of *hepar sulphuris* be at once added the whiteness of the too copious precipitate is such, as to render the dark colour of what is first precipitated imperceptible.

Experiment IV.

Some Devonshire cyder was examined by means of the volatile tincture of sulphur, as in Experiment III: and a very dark coloured precipitate was obtained. A similar precipitate could not be obtained from

Herefordshire cyder, until a weak solution of *saccharum saturni* had been added to it.

Some of the Must (taken from the press in the parish of Alphington) treated in the same manner, produced precipitates of a deeper dark colour. This sufficiently shews, that the solution of lead in the Must, was stronger than that in the cyder.

It is a matter of no consequence, whether the lead, the existence of which is proved, was applied to the cyder in its state of Must, or in that of a vinous liquor. However, as the Must afforded more considera-

ble signs of impregnation than the cyder, it should seem probable, that the lead was incorporated with the Must; and that, as the acid, during the fermentation, is in a great measure converted into alcohol, a proportional quantity of lead would necessarily be precipitated.

The same experiments were afterwards tried on several other specimens of Devonshire and of Herefordshire cyder, from the cask as well as the bottle. The result of them was constantly and uniformly the same as has been described, except only in three or four instances. Three bottles of diffe-

rent kinds of the former shewed no signs of having been impregnated with lead ; and one of the latter, which I very lately examined, gave a darkish precipitate.

It has been proposed by several authors, to detect such adulterations of wines by means of the vitriolic, or of the muriatic acid ; which, by uniting with the lead, will make it precipitate. But it is ascertained, by the experiments of Professor Gaubius, that trials made with the acids, are less conclusive than those which have been described.

Experiment V.

In order to put the matter entirely out of doubt, an extract was made from eighteen common quart bottles of Devonshire cyder of the preceding year, (first strained through a linen cloth) which had been in my cellar more than three months, but had been only a fortnight in bottles. This extract, being assayed with the black flux, a quantity of lead, weighing four grains and an half, was found at the bottom of the crucible.*

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* As a doubt has arisen concerning the validity of this fifth experiment, I shall lay

Experiment VI.

Two pounds of pearl-ashes were dissolved in water; and the solution, having been filter-

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before the reader every circumstance relating to it. Two small granules of lead having been observed in a former extract, which was made from eighteen bottles of Devonshire cyder, it was immediately suspected, that these granules could be no other than *shot*, used for the purpose of cleaning bottles and left in them by accident. This extract was therefore thrown away: and the cyder, used in the fifth experiment, was strained through a cloth, in order to prevent a possibility of any *shot* being found in the extract. Dr. Saunders informed me that, in the cloth through which the liquor had passed, there were two or three such granules of lead. Therefore in order to determine, whether or no the cyder, which had been the subject of

ed, was added to three gallons of Devonshire cyder, drawn from a cask. The liquor be-

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our experiments, owed its saturnine impregnation to this accidental cause, the tests were applied, in the manner before mentioned, to some of the same cyder, taken from a bottle, which, we were sure, had not contained any *shot*: for the bottle was very carefully examined, after having been broken in the presence of several gentlemen. The change of colour, on the application of the tests, was precisely the same, as in the former experiments.

However, in order to obviate all cavil, another experiment was made. The first part of this sixth experiment, namely, what relates to the precipitation and filtration, was performed intirely under the direction and management of Mr. Hewson. The latter part was performed by Dr. Saunders, in the presence of Mr. Hewson, and of Dr. Ruston.

came turbid, shewing marks of a precipitation. It was then filtered: and the filtering papers, together with the powder, which was left on them, were burnt in a brass mortar, and afterwards burnt in a crucible, being stirred with an iron spatula in order to promote the union of the particles. The contents of the crucible were then exposed on a sheet of clean paper, and were carefully examined. Some very small globules were here found; which, being melted in a clean crucible, were reduced into one mass, which was evidently malleable lead. The quantity was a little more than one grain.

In order to determine, what proportion *saccharum saturni* bears to lead, the following experiment was instituted.

Four ounces of *saccharum saturni* being put into a retort, and a receiver being applied, there were distilled over about one ounce and an half of an oily acescent liquor. The remainder being exposed, with a small quantity of *phlogiston*, to a degree of heat sufficient to melt lead, one ounce and seven drachms of malleable lead were obtained.

In the latter end of the last century, when the physicians

of Germany (particularly Vicarius, Cockelius, and Brunnerus, whose dissertations on this subject may be found in the *Ephemerides Germanicæ*) had taken great pains to discover the true cause of the epidemic colic, which, to use the language of Brunnerus, (*Dec. 3. an. 4. observat.* 92.) "non magis ægrotantium "viscera, quam medentium ani-"mos, torserat;" and when they had at last demonstrated that this disorder was wholly to be referred to small acid wines, adulterated with litharge, there appeared a certain writer, a physician of Copenhagen,*

* It is recorded of this physician, whose

who endeavoured to exhibit a specimen of his reading and ingenuity, by maintaining a bold paradox. This man, in very pompous language, and with an air of the greatest con-

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name was Seerup, that, although, in reality a man of very moderate parts, and less learning, he, by means of a certain authoritative, over bearing, dictatorial manner, both in his writings and common conversation, passed among many of his countrymen and some foreigners, as a person of the most extraordinary abilities, and a perfect oracle in physic: that, thus flattered, he grew old in error and in obstinacy; his vanity and self-importance never suffering him to abandon any opinion, which, through ignorance and inexperience, he had once adopted. It is no wonder, therefore, that the reputation of this man's writings did not long survive the author.

fidence, asserted in his *Triumphus Lithargyriatorum*, that no danger was to be apprehended from wines in which litharge was dissolved; and that all the ill effects, supposed to have been derived from that cause, were really to be attributed to the austere acid of wine made of unripe grapes. This opinion he endeavoured to defend by the authority of Drawitzius, Sennertus, Van Helmont, Theodorus Zwinger, Wepfer, Boyle, and several other writers. He likewise quoted many authors, to shew the salutary effects, produced in the human body by the internal use of lead; and insisted, in virtue of

their testimony, that it had cured affections of the spleen, arising from an acid cause ; the hypochondriacal disease ; sudden inflammations ; colics occasioned by the *bilis æruginosa ;* obstinate quartan fevers ; ulcerations of the lungs, as well as of other parts ; and the plague itself. He brought other authorities to shew, that the *aqua saturni* had been of very great use in disorders occasioned by worms ; that the *spiritus saturni* had cured the leprosy ; that Paracelsus held it to be a specific remedy in madness ; and that in the small pox, and all other inflammations, it had been proved to be an efficacious medicine ; that

it was the great sudorific medicine of Faber ; that it was Mynsicht's secret for the cure of *phthisis*, and diseases of the spleen and colic ; that the great success, which had attended the practice of Petrus Matthias, was to be ascribed to the use of *saccharum saturni ;* and other preparations of lead : and, lastly, that a constipation of the belly could not justly be attributed to *saccharum saturni ;* since Antonius de Heide asserts, in his medical observations, that he cured that disorder by administering to his patients five grains of it mixed with crabs-eyes.

But it is presumed that, the

presence of lead in the cyder of Devonshire being demonstrated, there is no one, at this time of day, likely to revive the argument of Seerup, and still to insist on the deleterious quality of the acid: for a poison is discovered, which is experimentally known to be adequate to all those dreadful effects so pathetically described by Dr. Huxham. It is likewise presumed, that no opinion, unsupported by facts, by experience, or analogy, (how respectable soever the character of its author may be) will be admitted in evidence, in contradiction to the authority of a fact, for which we have the

decisive and indisputable testimony of our senses.

The general character of lead, and of the preparations of lead, when given internally, has been, that they cool; incrassate; repel; absorb, and obtund acrimony. And it is very well known, that their real power has, in many instances, seemed to answer to such a general character; for there are scarcely any medicines, which produce their effects more immediately, or with greater certainty, in colliquative sweats, in fluxes, and in hæmorrhages. But it is as well known, that the relief given, which, for the

most part, is only temporary, has been frequently followed by violent pain in the bowels, obstinate costiveness, suppression of urine, tremors, spasms, palsy, asthma, and suffocation. And although, if we give credit to the testimony of credible writers, we must allow, that patients, of certain constitutions, may have taken these medicines with success, and with impunity; yet surely physicians cannot be too cautious in avoiding the use of medicines, the effect of which, for aught that they can presume to ascertain, may be more formidable than the very diseases to which they are opposed,

That preparations of lead were formerly very fashionable medicines, we may judge from the oldest dispensatories; in which we find an almost infinite number of magisteries, elixirs, and balsams, that have that metal for their *basis*. We are informed by Mr. de Haen, that the use of these medicines is much more common even now, than is generally imagined. He thinks that the number of patients, affected by the colic of Poitou, is immensely increased by such means. He mentions the *formula* of a medicine compounded of one scruple of *saccharum saturni*, one drachm of cerusse, and six ounces of

water. By this medicine, taken *cochleatim*, a patient, he says, was cured of a *gonorrhœa*; but he was soon afterwards seized with the most excruciating pain in his bowels, followed by a vomiting of his excrements. He adds, that this man, though he escaped death, did, even so long as three years after, lament the reliques of that most dreadful cure. I could quote from my own experience more than one instance, in several respects similar to this which I have taken from Mr. de Haen's *Ratio Medendi*.

What then can we think of the practice of the Chinese, who

very frequently administer internally various preparations of lead, to which they ascribe extraordinary virtues? The observation, made in this respect by Mr. Malouin, in his *Chymie medicinale*, seems judicious. " En " réfléchissant sur l'usage inté- " rieur que les Chinois font du " plomb, on est porté à croire " que ces peuples sont diffé- " remment construits ou tempé- " rés ; ou que leur plomb dif- " fère du nôtre."

Dr. Huxham finds it difficult to allege the reason, " why the juice of apples in one year produces a costive belly, with violent colical pains ; in ano-

ther, a loose belly with scarce any gripes attending." Now I have been informed by others, that small quantities of new cyder will frequently produce a *diarrhœa* in any, and in every year. And Citois observes, that the colic, which infested the inhabitants of the province of Poitou, was often attended, "per initia præsertim, cum "alvi frequenti, sed non ita co- "pioso, fluore, sæpius cum ejus- "dem adstrictione." M. Doazam, who writes on this disease in the *Journal de Medicine* for the month of October, 1760, affirms that "Il en est plusieurs, qui "non seulement n'ont point "éprouvé de constipation, mais

" même qui se sont plaints d'un " flux de ventre." The same thing is sometimes observed in the case of painters, and of other workmen employed about lead. Some of them are cured by a spontaneous looseness of the belly. Mr. James Wilson, in the Essays and Observations physical and literary, published at Edinburgh, Vol. I. Art. 22. gives an account of a disease, called by the miners Mill-reek, which all the inhabitants of *Lead-Hills* are subject to, but particularly those, whose daily business it is to melt down the lead ; and he observes, that, in the first stage of this disease, a *diarrhœa* sometimes makes a cure.

A question may be asked, "If the mischiefs occasioned "by cyder, particularly when "it is new, arise from the poi- "son of lead dissolved in it, "how happens it, that all, who "drink this liquor, do not suf- "fer in proportion to the quan- "tity of the poison swallowed; "and that some people, who "have long accustomed them- "selves to it, have never ex- "perienced any of its bad ef- "fects." This difficulty, which subsists in its full force, what- ever general cause be supposed, I do not take upon me to ac- count for: possibly it is re- solveable only by recurring to that inexplicable *idiosyncrasia*,

in which there is so remarkable a difference among men. Be it remembered, at the same time, that the case is not singular, but exactly paralleled by that of the foreign wines; and that the physicians of Germany, who in the latter end of the last, and in the beginning of the present century, wrote concerning the adulterations by litharge, found reason to make the same observation. The words of Zeller are, "Multi "tamen, imo innumeri ab eo "læsi non fuerunt, utut ad "ebrietatem usque illud hause- "rint; alii leviter tantum."

I shall only add, that it will

not be easy to determine the exact quantity of lead dissolved and incorporated with cyder, unless an essay be made soon after the adulteration has been received. For it seems probable, that, as was the case of the German wines, which, after a few months, lost that apparent but pernicious, improvement, which fraud had given them, the cyder also may, in some time, deposit the greatest part of its poison. But that a very small quantity of this poison is capable of producing most terrible effects is certain also from what was formerly observed. For, a calculation having been made, according to the method of

adulteration described by Cockelius, it was found, that a measure of wine, called *mensura Wirtenbergica major*, which Reiselius estimates at sixty-four ounces, scarcely contained half a grain of litharge.

POSTSCRIPT.

When I first undertook the unpopular task of exposing what appeared to me to be a most dangerous provincial error, I was well aware, that much cavil and contradiction was to be expected; and that it would be very difficult to establish a truth, however clearly demonstrated, in opposition to the prejudices, the passions, and the interests of men. I have accordingly heard of several objections, made to my opinion; some of which are founded on

false facts, and misrepresentation; others have indeed, at first sight, a specious appearance; but, when submitted to a more accurate examination, seem to lose all their validity, and importance. In hopes of preventing any farther disputation on this subject, I have stated the principal objections; and have subjoined my answers to each of them.

It is affirmed, that, in many parishes of Devon, the mode of compressing the apples, which I have described, is gone into disuse; and that, instead of the trough and roller, a machine, commonly called the *mill-engine*,

or *the hand-engine*, is employed for that purpose. This is admitted to be a fact; particularly in the eastern parts of the county. But I have received clear information from several persons of credit, that, although no lead enters the structure of that machine, yet the vessel, placed to receive the apples, ground by it, is, in several parishes, lined with lead. As often as such a vessel is used, there can be no reason to imagine, that the danger, arising from lead, is remo ved by *the mill-engine*, substituted to the trough and roller.

It has been suggested, that the apples are frequently com-

pressed in wooden troughs. Having made a very strict inquiry, I do not find, that troughs, made entirely of wood, are now in use; the stone-troughs, having been experienced to be more convenient. I find indeed, that the stone-troughs are generally enlarged round the top with wood; and that the two parts are joined together by means of long iron nails, driven through the wood into the stone; and that melted lead is poured into holes in the stone, made for its reception, with a view to fasten the juncture.

It is denied, that sheet-lead

is nailed over any press in the county, one at Alphington excepted. To this I reply, that, in the year 1766, there were in several parts of the county, cyder-presses lined with lead. I am authorized to mention several parishes in the South-hams, where such presses were then used. But in the three parishes of Ide, St. Thomas, and Alphington adjoining to, and intermixed with each other, not fewer than thirty presses, lined with sheets of lead, were to be found.

An experienced physician informs me, that he has found that several of his patients, re-

ceived into the Devon and Exeter hospital, who laboured under the colic of Devonshire, had never drunk any cyder; and that the cyder, which others had drunk, was made in pounds, which had no lead in any part of their composition.

However improbable it may appear to those, who know that cyder is the common drink, especially of the lower class of people in Devonshire, that an inhabitant of that county, received into an infirmary, should never have drunk any cyder; yet I will admit, that this assertion may possibly have been founded in truth. And I an-

swer, that, although it is my opinion, that a solution of lead, incorporated with the common drink of the inhabitants of Devon, is the reason why the colic of Poitou is more endemial there, than in other parts of England ; yet I would not be understood to mean, that the inhabitants of Devon are exempted from the various other means, by which experience has taught us, that the same poison will be communicated. It is well known, that in the several counties of Northampton, Lincoln, Rutland, and Leicester, very little or no cyder is drunk ; and yet in each of those counties, have I seen pa-

tients affected by the colic of Poitou. It will be hereafter shewn that the poison, which is the specific cause of that colic, may by divers means be admitted into the human body ; and although, when it occurs in an inhabitant of the county, in which it is endemial, it should seem most probable, that it has been conveyed by the means of cyder ; yet it cannot be doubted, but that the various means of conveying that poison may operate there, which prevail in the other counties of England.

" That the cyder, which " others had drunk, was made " in pounds, which had no

" lead in their composition," may likewise be admitted to be true; and yet, if we consider that more than one way has above been pointed out, by which that liquor may reasona bly be supposed to be adulterated with lead, this evidence may perhaps appear to have no great force.

" If," says a very learned friend, " the quantity of lead, " which was obtained by your " assay, were, in general, dis- " solved in our cyder, scarce " any one of our great cyder- " drinkers, who must daily " swallow a grain or two of " dissolved lead, could escape

" the dry colic ; and, in conse-
" quence, this county must
" have been long since depo-
" pulated."

I have reason to think, that the cause, which I have assigned, is as general, as the effect produced ; but as to the exact quantity of lead, which may, in general, be dissolved in the Devonshire cyders, that I by no means undertake to determine. If, from what has been said, it shall appear to be a probable supposition, that Devonshire cyders, in general do contain even the smallest quantity of lead, the inference, which I have drawn, will not, I think,

be disputed by any one, who knows what is the genuine, the specific operation of that mineral, when taken into the human body. And be it remembered, that, whatever cause of the endemial colic be supposed, it is undoubted, that equal quantities of that cause do not produce equal effects on all constitutions; and that many great cyder-drinkers have never been attacked by the disease. Be it likewise remembered, that the argument, urged by my friend, against a metallic solution, will be as valid against a poisonous acid; nor can we account for the reason, why the county has not been depopula-

ted by one general supposed cause, any more than by the other.

The same gentleman insists, that the servants of those farmers, who have a great deal of lead in their pounds and presses, are not more subject to the colic, than those of their fellow-parishioners, who use no lead at all; and that the servants and labourers of those, who make very poor, crude, sour, cyder, are, of all persons, the most afflicted by this disease. The first part of this evidence is directly contradicted by that of several persons of accuracy, who have communi-

cated to me their observations. It may likewise be considered, as, in some manner, contradicted by the authority of Dr. Wall; who, in a cyder-county, where the dry colic is almost unknown, attended several patients, under that disease, occasioned by cyder, adulterated by means of sheet-lead, nailed over a press; and who likewise testifies, that all who drank the cyder, which had been kept in a leaden cistern, *were affected by it, as the lead workers usually are.* Dr. Ingen-Housz, who was very lately in Normandy, inquired whether or not any lead is used there in the *apparatus* for making cyder; and he was inform-

ed, that no lead is employed for that purpose in any part of that province. He likewise was informed, that, in the hospital at Rouen, there are generally many patients, under the colic of Poitou, such as potters, painters, and other workers of lead; but that there is in Normandy no endemial colic, which can be attributed to cyder. And, as to the latter part of my friend's evidence, if we recollect what has above been said of the several pernicious methods of making, and of managing cyder, which prevail in the county of Devon, the most probable conclusion will be, that if crude, sour cyder be

most productive of the colic, the reason is, not only because the greatest acidity of the solvent will produce the strongest metallic solution ; but likewise because both the farmers and dealers in cyder have unfortunately learned, that, among all the various things, which have been tried, lead is the most certain and effectual corrector of the sourness and austerity of their cyder.*

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* I here appeal to the conscience of one person, in particular, whose zeal has induced him to oppose my opinion in print, whether it be not true that he has for many years sold sugar of lead to the farmers for the purpose of correcting sour cyder?

It having been suspected, that iron might possibly be dissolved in the cyder of Devonshire, many experiments were instituted on solutions of iron in different vegetable acids, in mineral waters, and in cyder. Hence it fully appeared, that all the strong solutions of iron in vinegar and cyder, became, even without any addition, of a deep black colour; and that, even when they were highly diluted, they shewed more or less of a livid tinge; very different from the strongest solutions of lead, which, of itself, rather made the liquor of a lighter colour.

It appeared likewise, that on dropping into any of the lighter chalybeate solutions, the smallest quantity of either of the two tests, abovementioned, a deep inky colour was immediately the consequence, with more or less of a dark precipitation; but that the change of colour, and the precipitation, produced by the solution of orpiment, were the most remarkable. This perhaps might be owing to the astringency of the lime-water in that composition.

When the same quantity of the same tests was applied to the strongest solutions of lead, under every similar circum-

stance, the result was entirely different. In these solutions no tinge of an inky colour was produced ; but constantly more or less of a dark brown colour.

It appeared likewise, that, a strong infusion of an astringent vegetable being poured on solutions of iron and of lead in the same cyder, in the smallest equal quantities, the solution of iron was immediately changed to an inky colour : but that the solution of lead shewed no discoloration.

It may therefore be fairly concluded, that the smallest quantity of iron can hardly

exist in cyder, without being discovered both by the solution of orpiment, and an astringent vegetable infusion. It may also be concluded, that cyder, in which such an infusion makes no change of colour, does certainly contain no iron in its composition: that the same cyder, changing to a brownish colour, on the addition of the solution of orpiment, at once shews an impregnation of lead: and that, although the solution of orpiment makes an evident change of colour, and a copious precipitation in solutions both of iron and lead in cyder, even in small quantities, yet the colours of the two liquors are, in

all their gradations, as plainly to be distinguished, as are those of ink, and Madeira wine ; and consequently can never deceive persons, conversant with such experiments.

It may farther be observed, that all the precipitations, produced by the tests, or by an astringent infusion, when applied to solutions of iron, upon standing, became blacker ; but that solutions of lead, thus treated, were seldom changed to a darker colour.

It is likewise remarkable, that an addition of more of the tests (after a certain quantity

had been instilled) to the solutions of lead, did not in any degree heighten the colour of the liquor: whereas all the precipitates, produced by the tests, and by an astringent infusion, applied to solutions of iron, were always heightened in their colour, upon the addition of more of the precipitating liquor.

But (what will put the matter in question out of all doubt) various specimens of Devonshire cyder, which, on the application of the tests, had evidently appeared to have been impregnated with lead, when tried by an astringent infusion, shewed

no signs of a chalybeate impregnation.

In fine, it has been shewn, that a solution of lead is frequently to be discovered in the cyder of Devon. The various means, by which this liquor may be supposed to be thus adulterated, have been pointed out. That this is a cause sufficient to produce the Devonshire colic, cannot be controverted; and it seems to me most probable, that, as it is adequate to the effect, so it is the sole cause of that disease. Does not such a supposition appear to be agreeable to the general simplicity and uniformity of nature? In

this opinion however, I may have erred ; but I shall be happy even in my error, if it shall excite some more successful inquirer to investigate, and to discover a truth of so much real importance to human society, and particularly so to the inhabitants of those parts of the world, in which this very formidable disease is endemial.

II. *An Examination of several means, by which the poison of Lead may be supposed frequently to gain admittance into the human body unobserved, and unsuspected.*

Read at the COLLEGE July 13, 1767.

ALMOST every day's experience furnisheth physicians with examples of painters, and plumbers, and the other numerous artificers, employed either in manufacturing the several preparations of lead, or in applying them to their respective uses; who, after having suffered the most extreme torments from the colic of Poitou, are

restored to health, and remain free from that disease, so long, at least, as they quit their usual business, or pursue it with greater caution. But there is a chronic species of this malady, still more formidable in its effects, which not unfrequently occurs ; and to which, as far as I have observed, persons of thin, tender, irritable habits, are particularly subject. The first beginnings of it are slight, and generally are, therefore, not much regarded. In this state, it is sometimes referred to causes which do not exist; and opposed by medicines, which perhaps tend only to co-operate with the disease. In

the mean time, it steals on by slow progression ; each successive paroxysm becomes more severe than the former: and the patient is at length reduced to the most deplorable state of infirmity. His muscles waste ; his limbs are contracted ; his respiration is difficult ; and, after having, a long time, dragged on a most miserable existence, he dies, generally either convulsed, or apoplectic. In the first case, I mean that of the workers of lead, it should seem, that a large quantity of the poison is taken into the body, and at once produceth violent effects ; in the latter, that it is gradually, and in small quanti-

ties, accumulated in the constitution ; that it acts slowly and imperceptibly ; and lays a foundation for irreparable mischief, before any alarm is taken. According to the testimony of Boerhaave, " tanto pejus afficit, " quo irrepit tectius ; nec se " manifestat, nisi devictis jam " corporibus," (Elem. Chem. vol. ii. proc. 170.) In the first case, it makes its attack in the manner of an open enemy. Those, concerned with it, well know the dangers and difficulties, with which they are to contend ; and can even prepare and guard themselves against its power. In the latter case, it acts as it were by

stratagem; secretly incorporates itself with our food and liquor; and has thus an opportunity of undermining the first principles of animal life: becoming the parent of a most cruel disease, which with all our care, circumspection, and experience, it is very difficult for us either to prevent, or to remedy. Zeller has the following observation concerning the effects of wine, impregnated with litharge, on some of those people, who drank only small quantities of it. "Quibus "potus hic vel quotidianus est, "vel frequentior, non tamen "adeo largus ad inebriationem "usque, illico quidem exinde

" non læduntur, sensim autem " sensimque varia experiuntur " mala ; quæ, cum ab initio le- " via sint, neque curant neque " animadvertunt ; successive " autem dolorem hypochondrii " sinistri, ventriculi gravita- " tem, inflationem, et tabem " sentiunt." It was probably from an observation of such slow, but certain effects of lead, that the French and Italians took the hint of preparing their celebrated poisons, called *poudres de succession ;* the basis of which has generally been supposed to have been that mineral. Zeller mentions a certain chemical operator, near the confines of Bohemia, who, af-

ter having diligently applied himself to the composition of poisons, did, by the means of lead, combined with some more volatile and corrosive substance, prepare a most slow poison ; which, given to dogs, and other animals, had the power of destroying them, without producing any violent symptoms, and after several weeks or even months. " Confirmavit " hoc excellentissimus D. Præ- " ses, mihique retulit se qua- " tuor istiusmodi venenorum " lentorum descriptiones vidis- " se, quarum quamlibet satur- " nus ingrediatur, paucis addi " tis aliis acidis acribus, in exi- " gua tamen dosi, ita ut in

" quovis saturnus basin con-
" stituat."

Notwithstanding the severe laws, which are still in force, both in France and in Germany, against the adulteration of wines, by the means of litharge, we still frequently find that the small French white wines, and the Rhenish and Moselle wines, bear marks of this most pernicious fraud. And, in confirmation of this fact, Dr. Warren informs me, that in the year 1752, thirty persons, belonging to a family* at that

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* The family of the late Duke of Newcastle.

time in Hanover, were seized with the colic of Poitou, in consequence of having drunk a sweet French white wine, in which some preparation of lead had been dissolved.

That such an adulteration is ever wilfully practised on vinegar, there is no reason to suspect ; for it would tend to destroy the most essential quality of that liquor. However, I have met with several specimens of vinegar, which have evidently appeared to be impregnated with lead. Whether it might have been thus adulterated by means of glazed earthen vessels, in which it

might possibly have been kept, or by what other means, I must leave undetermined It is certain, that a liquor, so commonly used with our food, cannot be too cautiously guarded from a poison, which it so easily dissolves.

In Holland, and perhaps in other countries, it has been customary to correct the more offensive expressed oils, so as to substitute them to oil of olives, or oil of almonds, by means of this metal. And we are informed by M. de Haen, that some years ago, when the mortality among the cattle had made butter extremely dear,

some farmers, in the low-countries, had a practice of adding to the weight of it by a quantity of cerusse. What would be the effects of such oil and such butter, taken into the stomach, it is very obvious to conceive.

The custom, which prevails in many parts of this country, of keeping milk in leaden vessels, seems liable to a similar objection. One would naturally imagine, that it cannot turn sour in such vessels, without dissolving some of the metal. But on applying the *liquor probatorius*, to some milk which I had kept in a leaden

vessel six days, I perceived no such discoloration of it, as shewed any saturnine solution.

It should seem likewise, that leaden vessels, or wooden vessels lined with lead, which are used in many families, for the purpose of keeping salted meats, ought not here to pass unnoticed. But Dr. Darwin, of Lichfield, informs me, that he applied the *hepar sulphuris* to some brine, taken from a leaden cistern, in which salted beef had been long kept; but that he observed no extraordinary discoloration. Here he suspected, that the lead might possibly have been pre-

cipitated by some putrescent parts of the flesh. He therefore steeped some bits of lead in salt and water, many days. But, on examining this water by means of the test, he saw no signs of a solution of lead. Upon a repetition of Dr. Darwin's experiments, I have found the result of them to be in no way different from what he mentions. I cannot, however, dismiss this subject, without observing, that in glazed earthen vessels, in which salted meats have been kept, I have sometimes seen evident marks of a corrosion.

But it cannot be doubted,

that culinary vessels, lined with a mixture of tin and lead, may communicate pernicious qualities to acid foods. This custom of lining copper vessels with tin, with a view to prevent any disagreeable taste, or bad effects from verdigrise, we find to have been very ancient. Pliny, in his natural history (lib. xxxiv. cap. 17.) expressly mentions, on what principle this method was practised. "Stannum, illitum æneis vasis, "saporem gratiorem facit, et "compescit æruginis virus." It appears likewise, that tin and lead were frequently compounded for the purpose of lining copper vessels, in the time of

Pliny. Galen, in his first book *de antidotis*, complains of this as a dangerous mixture ; and, on that account, we find him giving very particular directions, in what vessels his *pastilli theriaci* were to be kept. The intire passage to which I allude, is as follows. *Ἡ δὲ ἀπόθεσις ἐν ἀγγείῳ κασσιτερίνῳ, ἢ ὑαλίνῳ, ἢ χρυσῷ γινέσθω. Τὸ μὲν οὖν ὑαλίνον καὶ τὸ χρυσοῦν οὐδεμίαν ἔχει τὴν δόλωσιν· τὸ δὲ κασσιτέρινον μίξει μολύβδου δολοῦται. Τὸ τοιοῦτον οὖν φεύγειν προσήκει, οὐ μόνον ἐπὶ ταύτης, ἀλλα καὶ τῶν ἄλλων ἀντιδότων ἁπάσων.* However unnecessary this caution of Galen may appear to have been, with respect to the keeping the *pastilli theriaci*, supposed already dry, in a vessel

compounded of tin and lead; it will hardly be doubted, but that great mischief may be apprehended from the use of such a metallic mixture, when applied to many culinary purposes; if it be considered how readily lead is dissolved in all the vegetable acids, as well as in oily and fat substances.

Upon inquiry into the composition, which is ordinarily used for lining copper vessels, I find it to consist of block-tin and lead, in different proportions, laid on with a solution of crude *sal ammoniacus*, or resin. It seems probable, that this composition is made with more

or less lead in an arbitrary manner, as the artist chooseth. There is one person in this town, who professeth to line his copper utensils with block-tin, without any other metallic addition. Others, of the same trade, insist that this cannot be done. Some even justify the mixture of lead; and contend that, by the means of it, the metal acquires a brighter colour, more like silver. Upon examination, I find, that it is much more difficult, as well as more expensive, to line vessels with pure tin only; that the metallic composition, being more malleable, is more easily spread

over the copper; and that to lay on pure tin requires a peculiar dexterity, which few or none of the common artists are masters of. And I am informed, that, even when the common artists do honestly intend to line their vessels in the best manner, although they do spread a coat of pure tin on the surface of the copper, clean scowered, and washed with a solution of the crude *sal ammoniacus;* yet they do not possess the art of finishing their work perfectly, unless by covering the surface with a composition, in which there is a very large proportion of lead, namely, the proportion of ten ounces of

lead to sixteen of tin; which increased quantity of lead brings the composition very near to the common standard for tinning copper vessels.

I have in my possession several specimens of the metallic mixture, used for this purpose, which I collected from different shops. That lead made a part of this composition, was manifest from its softness, easy fusibility, and easy calcinability. But in order to prove this with greater certainty, I filled the same bullet-mould exactly with the melted metals mentioned below. Their weight in air was as follows.

No. 1. Pure block-tin, 190 grains.

No. 2. A composition made of sixteen parts of tin, and ten of lead, 217 grains. Increase 17 grains.

No. 3. Tinning metal, of one shop, 212 grains. Increase 22 grains.

No. 4. Tinning metal, of another shop, 218 grains. Increase 28 grains.

No. 5. Pure lead, 286 grains. Increase 96 grains.

But I am informed by a person, conversant in this business, that, in order to determine, whether or not the metal, used for the purpose of cover-

ing copper vessels, contains a mixture of lead, no other experiment is necessary, than to rub the surface of it with a finger; which, when lead enters the composition, always contracts a livid, blackish colour; but is not discoloured, when rubbed on pure tin only.

In order to determine, whether sauces are ever really impregnated with lead in the common culinary vessels, I ordered a mixture to be made of butter, water, and salt; and one eighth part of distilled vinegar to be added. This composition, after it had remained twenty hours in the tinned vessel, in

which it was made, and heated, was again exposed to the fire; and a small portion of it being examined by the volatile tincture of sulphur, became immediately of a dark brown colour. A small quantity of the *hepar sulphuris* (prepared in the manner already described) having been dropped on another portion of the same sauce, occasioned a discoloration still darker.

Another sauce, exactly of the same composition, was prepared in the same vessel; and was immediately examined in the manner before mentioned. The result of these trials was

nearly similar to that of the former. Only the discoloration was less dark.

Another sauce was made in the same vessel, exactly of the same materials, and in the same quantities; to which the proportion of distilled vinegar, above-mentioned, was added, after it was poured into a glass vessel. Upon this mixture the same trials were made with both the tests. But no such change of colour was observed. The *hepar sulphuris* only made it whiter, than it had been before that addition.

The gradation of colours in the three sauces, on which the

trials had been made, was so evident, that a person, who had not been present, when they were made, had no difficulty in determining, which sauce contained the greatest quantity of lead; which had the least; and which had none.

The same sauce, having been prepared in a silver vessel, was kept in it twenty-four hours. But, on the application of the tests, its colour was not affected.

The same trials were afterwards made on some clear soup, made at a tavern, in the prepa-

ration of which several acid vegetables had been used. Both the volatile tincture of sulphur, and the *hepar sulphuris* produced in it a dark colour.

In Neuuman's chemical works, translated by Dr. Lewis, page 460, there is a note subjoined by the editor, respecting the habitude of tin to the acetous acid; Neuuman having found that this metal does not dissolve in vinegar, and Margraaf having affirmed that it dissolves in it with ease. From some experiments, which Dr. Lewis made on plates of tin, put into common vinegar, and into the acid juices of fruits, he

concludes, that, although tin may not be soluble in these acids, with regard to the purposes, for which the chemists want such a solution ; yet that tin, or tinned vessels, however pure the tin be, will give a metalline impregnation to light vegetable acids, suffered to stand in them for a few hours.

I do not undertake to decide a question, concerning which men of such chemical experience have differed in their testimony. But it seemed necessary to determine, whether or not any solutions of tin, in the vegetable acids, could deceive us in our trials with the tests.

Therefore the following experiments were made.

I. Into some vinegar, in which a thin piece of block-tin had been left twenty-four hours, were instilled several drops of the solution of orpiment. Only a deep yellow colour was produced.

II. Into an equal quantity of the same vinegar, the same quantity of the solution of orpiment was instilled. The colour of the mixture was exactly the same, as in the former experiment.

Hence it appeared, that the

vinegar had received no addition from the tin, which was demonstrable by that test.

III. To the vinegar, of the first experiment, after it had stood near three weeks on the tin, the same quantity of the solution of orpiment was added. The appearance of the mixture was exactly the same, as in the first experiment.

IV. A few drops of the volatile tincture of sulphur were added to the vinegar, of the first, and of the third experiment. No change of colour was produced, which was not

equally produced by the same addition to pure vinegar.

V. In order farther to determine, whether any solution of tin in the vegetable acids could possibly deceive us in our trials with the tests; I put into a sand heat, common vinegar, essential salt of sorrel, juice of lemons, with a thin plate of tin in each. These, after maceration for twenty-four hours in B. A. were examined by means of both tests. But neither of them shewed any discoloration, except what the same tests had before produced in pure vinegar.

It is, therefore, fairly to be concluded, that pure tin yields nothing to vegetable acids, which can make our experiments on common tinned vessels, by means of the tests, fallacious.

From what has been premised, does it not seem reasonable to imagine, that the health at least of persons of tender constitutions, may sometimes receive injuries from the use of acid sauces and soups prepared in such vessels? Particularly, is it not probable, that the bowels of children may frequently suffer from their food, in this manner impregnated with lead?

And, in general, may it not justly be concluded, that some of the slighter disorders of the first passages (which one practitioner may perhaps attribute to indigestion, another may call, by a fashionable term, *bilious*, *nervous*, *scorbutic*, or by other terms, too often expressive of nothing, but our own ignorance) may be the first effects of a concealed poison? And may not some part of that benefit, which our health usually receives, on our quitting, for some time, the accustomed place of our residence, arise from the circumstance of our quitting the daily use of something deleterious, which we

may have been accustomed to swallow with our daily nourishment ?

Nor is there less danger to be apprehended from the use of the common glazed earthen vessels. It is well known, that the *calces* of lead are more easily dissolved in the vegetable acids, than the crude metal. Vinegar, boiled with the glass of lead, or in the glazed earthen vessels, the glazing of which is principally lead, becomes strongly impregnated with the pernicious qualities of the metal ; and yields, on evaporation, a true *saccharum saturni*. But this glazing is very considera-

bly acted upon even by cold vinegar. And hence it is manifest, that the custom, which I apprehend to be too common, of keeping pickles in such vessels, cannot but be dangerous to health. And the same observation may, on the same principle, be made on a practice, which, I find, prevails, particularly among the lower class of people, of baking their fruit-tarts in a cheap kind of glazed earthen ware. A friend of mine lately informed me, that, having observed a currant-tart, in such a dish, he expostulated with the mistress of the family on the danger, which might be apprehended from this

custom; and that she answered, that "she gave the preference "to that sort of earthen ware "upon a principle of frugality; "it being a fact commonly "known by all good house-"wives, that fruit, baked in "those vessels, requires a much "less proportion of sugar to "sweeten it, than when baked "in any other vessel what-"ever."

Here then is a remarkable instance of a most insidious poison, taking as it were an advantage of our necessities, and recommending itself to us by means of a quality, which at once favours œconomy, gratifies

the palate, and may lay the foundation of a painful, lingering disease, more formidable than death.

When the distillation of simple waters was first introduced, we find that leaden alembics were used, on the following principle ; because lead, on account of its frigidity, was supposed to have a power of very easily converting the vapour, arising from plants, into water. Matthiolus, who contends, that more water may be distilled by a leaden alembic than by one made of any other metal or matter, mentions, that some inconveniences had been experi-

enced from lead applied to this use; namely, that the water, thus extracted, was apt to taste of smoke, and not to retain the peculiar flavour of the plant or flower; that it was apt to acquire a sweet taste from the lead; and was not only disagreeable to the sick, but that it sometimes brought great mischief on the breast, the stomach, the liver, and the other *viscera*, having contracted a deleterious quality from the metallic vessel.—" Fit quidem, ut " superficies ipsa" *(scilicet plumbei alembici)* " in cerussam tenu- " issimam vertatur; quæ de- " inde, aquis sese immiscens, " illis dulcedinem addit. At-

" que id videre est in albo tali-
" um aquarum sedimento; præ-
" sertim ubi aquæ per plum-
" beum alembicum recens para-
" tum meaverint. Nam vas,
" quod diu in hoc opere usur-
" patum est, obducta circum-
" quaque quadam veluti gypsea
" crusta, non ita facile a vapo-
" ribus deraditur et in cerus
" sam vertitur." *Pet. And. Matthiolus de ratione distillandi aquas ex omnibus plantis.*

Although leaden alembics are now entirely out of use, it would appear, that this observation of Matthiolus was well founded. That an acid arises during the latter part of the

distillation of simple waters, is very certain. This is manifest from its frequently coming over impregnated with copper, when the alembic is not properly tinned. And Boerhaave, in his *elementa chimiæ*, *vol. ii. proc.* 171, has proved, that lead is convertible into cerusse, even by the very mild acid, which first arises in the distillation of vinegar, and which indeed scarce manifests to the taste any marks of acidity.

It seems not improbable, that, if we had an opportunity of making an accurate inquiry, we might see reason to conclude, that the disease, called popularly

the dry-belly ach, which is common as well in the northern colonies of America, as in the islands of the West-Indies, ought to be referred wholly to lead, as its cause. Those physicians who have mentioned this disease in their writings, have, in general, considered its cause in a vague, undeterminate, unphilosophic manner. They generally bring together several causes, very different from each other; which are not proved to be adequate to the effect produced. The following is the language, which we generally meet with in books. "New "rum, and a great quantity of "fresh and unripe lemon and

" lime juice, made into punch,
" seem to be commonly the
" causes of this disorder in the
" West-Indies; as distillers of
" rum, boilers of sugar, and
" over-seers, are chiefly sub-
" ject to it: the first, who are
" generally of the poorer sort,
" from immoderately drinking
" new, hot rum; the second
" and third from taking cold,
" after sweating in hot boiling
" houses, and drinking very
" strong punch, made with
" fresh limes, and newly dis-
" tilled rum." I am informed by an intelligent person, who resided some time in the island of Jamaica, that very few, if any inhabitants of the West-

Indies, who are nice in the choice of rum, that is, who drink it of a proper age, are afflicted by the dry-belly-ach; and, that the persons, particularly subject to this malady, are under-servants, and those slaves, who attend the boiling, and the distilling houses. But this gentleman likewise supposeth, that there are other causes, which concur in producing this effect, particularly the crude, unripe lemons and limes, with which these people make their punch. He likewise observes, that the people, who are the most tormented by the dry-colic, are such as are obliged to work, or attend, day and night,

in the boiling houses, during the crop-season, surrounded by a constant atmosphere of smoke from the boiling sugar, and subject to perpetual streams of cold air, from the doors and windows, which are always open.

In the island of Jamaica, as I am informed, the sugar coppers are rimmed with lead ; and the spouts are lined with the same metal. The still is copper tinned ; the still-head tin or pewter ; as is the worm of the refrigeratory.

My information from the island of Antigua is, as follows.

" The sugars are boiled in cop-
" per vessels; the skimmers
" and ladles are made of cop-
" per; the wall, in which the
" coppers are hung, is covered
" with lead. The molasses is
" received in a wooden cistern,
" and carried to the still-house
" in wooden pails; fermented
" in wooden vessels; distilled
" in copper stills, with pewter,
" or copper heads tinned; and
" pewter worms. The worms
" and stills are commonly sent
" from London, and from Bris-
" tol, to the island of Antigua."

What is, in general, the composition of the metallic mixture, used for the purpose

of lining copper-vessels, has already been fully explained. As I am instructed, all the pewter, that is prepared in this country, the very best kind of it only excepted, contains a quantity of lead. That, made in Holland, contains a very large proportion of this metal. The very best pewter is said to be a compound of tin, and the martial regulus of antimony; in the proportion of one hundred pounds of the former to seventeen pounds of the latter. The worms and stills, which are sent from hence to the West-Indies, are said to be made always of the inferior

sorts of the composition, called pewter.

My suspicions, concerning this subject, have been greatly confirmed by the authority of Dr. Franklyn of Philadelphia. That gentleman informs me, that, at Boston, about forty years ago, leaden worms were used for the distillation of rum. In consequence thereof, such violent disorders were complained of by the drinkers of new rum, that the government found it expedient to enact a law, forbidding the use of any worms, except such only as were made of pure block-tin. This law

having been enacted, the dry-colic was much less frequently heard of than before. But the law was complied with only in part ; for, from that time to the present, instead of block-tin, they have used a pewter, containing a large proportion of lead. Dr. Franklyn likewise informed me, that the colic of Poitou is not so frequent a disease in any of the colonies, as it was formerly ; and that the reason, commonly assigned, is that the people now drink their punch very weak in comparison with what they were formerly accustomed to ; which used to be rum and water in equal quantities. He added,

that they now also drink their punch, with more juice of fresh limes in it; and, as that juice, joined to certain laxative medicines, is at present their common remedy, when any are seized with the disease, so it is generally considered as the best preservative against it.

I am likewise informed by a gentleman, who resided many years in the Bahama-islands, that the dry belly-ach has hardly been known in those islands, since the inhabitants have left off the distillation of rum. The same gentleman informs me, that the people of the Bahama-islands drink very large quanti-

ties of small punch, made extremely acid by the juice of limes ; many of the labouring people to the amount at least of two gallons every day.

It is hoped, that what has here been thrown out concerning the most probable cause of the colic, which is endemial both in the West-Indies, and on the continent of America, may appear to those, who have opportunities of making a more accurate inquiry, to be not unworthy of their attention.

One instance of the great caution of Galen, with respect to the use of lead, has already

been mentioned. In another part of his works, after having recommended pure rain water, as the most proper for the preparation of a medicine, of which the heads of poppies were the *basis*, he particularly directs, that water, flowing through leaden pipes, is to be avoided. *Τὸ ὕδωρ, διὰ τῶν μολυβδίνων σωλήνων ὀχετευόμενον, φευκτέον. ἰλύματα γάρ τινα τοῦ μολύβδου κατὰ τοῦτο περιέχεται. Διὸ καὶ οἱ πίνοντες ὑποστάθμην τοῦ τοιούτου ὕδατος δυσεντερικοὶ γίνονται.* But, long before the time of Galen, Vitruvius *(de architectura, lib. viii. c. vii.)* had published a very strong remonstrance against leaden pipes, when used for the purpose of

conveying water. " Multo sa-
" lubrior ex tubulis aqua, quam
" per fistulas: quod per plum-
" bum videtur esse ideo vitiosa,
" quod ex eo cerussa nascitur:
" hæc autem dicitur esse nocens
" corporibus humanis. Ita si
" quod ex eo procreatur, id est
" vitiosum, non est dubium,
" quin ipsum quoque non sit
" salubre. Exemplar autem ab
" artificibus plumbariis possu-
" mus accipere, quod pallori-
" bus occupatos habent corpo-
" ris colores. Namque cum
" fundendo plumbum flatur,
" vapor ex eo insidens corporis
" artus, et indies exurens, eri-
" pit ex membris eorum sangui-
" nis virtutes. Itaque minime

" fistulis plumbeis aqua duci
" videtur, si volumus eam ha-
" bere salubrem."* The commentators have differed in their opinions, with respect to this passage. The Marchese Gagliani defends Vitruvius. " Pare,
" che l'acqua sola non sia ca-
" pace di estrarre dal piombo
" la cerussa; ma non poten-
" dosi negare che è quasi im-
" possibile trovare acqua che

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* Palladius (August. tit. xi.) maintains the same opinion. After having considered the several other methods of conveying water, he adds, " ultima ratio est
" plumbeis fistulis ducere, quæ aquas nox-
" ias reddunt. Num cerussa plumbo at-
" trito creatur, quæ corporibus nocet hu-
" manis."

" non contenga alcune, an-
" corchè insensibili, parti-
" celle, o acide, o saline, con-
" viene uniformarsi, ne' casi
" che si può, al sentimento di
" Vitruvio." On the other hand the French commentator, M. Perrault, opposeth to the opinion of Vitruvius. " Qu'il
" n'y a aucune apparence, que
" l'eau puisse changer le plomb
" en cerusse, puisque même
" elle n'altère, en aucune façon,
" le cuivre, qui est bien plus
" aisé à rouiller. Car on ne
" voit point, que les robinets
" des fontaines soient rongés
" par l'eau, après avoir servi
" cent ans."

It therefore appearing to me of importance to determine, which of these two contrary opinions is founded in truth, I kept some water of the river Thames, some water of the New River, and some spring water in three leaden pipes, and agitated the contents of each pipe, almost every day, during two months. I then very carefully examined the three several waters by the means of the tests above mentioned. But there appeared not in either of them any discoloration, which could be supposed to manifest a solution of lead. I afterwards tried the same experiments on some water of the New River, which had been

kept a fortnight in an old rusty leaden pipe, long used for the purpose of conveying water. But I could not even here find any sufficient reason to suspect a saturnine solution. Some water likewise, collected from the hollow parts of the leaden covering of a church, shewed no marks of lead when examined in the same manner. The caution therefore of Vitruvius and of Galen, as likewise that of Aëtius (who condemns the use of rain water, which has flowed down from a roof, covered with lead) could not but appear to me unnecessary, except in a case where a quantity of vegetable acid might be sup-

posed to render the metal dissoluble in water; by which means, as we are informed by M. Tronchin, an epidemic colic, similar to that of Poitou, was occasioned in the city of Amsterdam. But Dr. Heberden has lately shewn me some water, which has been twelve years kept on bits of lead. The phial, in which this water had been preserved, had not only a copious white precipitation at the bottom of it, but its sides also were almost covered with a crust of the same colour.

On a little of this water (which was quite pellucid) I dropped a small quantity of the

solution of orpiment. It immediately became of a very dark colour; and, after having stood a few hours, deposited a deep black sediment.

The same water, having the same quantity of the volatile tincture of sulphur dropped into it, became of a clear reddish brown, not unlike that of the common Madeira wine.

I filtered a little of the same water, and then dropped into it the same quantity, as before, of the solution of orpiment. But it produced no sensible change of colour; nor did an increased quantity of the solution make

any other change in it, than what would have been made in any other pure filtered water.

Exactly the same *phænomena* were observed, upon the addition of the volatile tincture of sulphur to a little of this filtered water. No other change of colour was produced, than what any other liquor of the same colour, mixed with pure water, would have occasioned.

Hence it appears, that lead is not capable of solution in water, even in twelve years, but only of mixture and suspension. But it likewise appears proba-

ble, that so much lead may be thus mechanically mixed with, and suspended in water, as to communicate to it noxious qualities. So that we see the reason, why the *ὑποστάθμη τοῦ τοιούτου ὕδατος, the sediment of such water*, may, according to the observation of Galen, render those, who swallow it, *δυσεντερικοὺς subject to disorders in the intestines*

Hieronymus Mercurialis is of opinion, that the ancient Romans in general, were very apprehensive of the dangers, arising from the common use of lead. His observations, on the remains of the aqueducts of Rome, induced him to think,

that the old inhabitants of that city avoided, as much as possible, leaden pipes, particularly for conveying that water, which was not only to serve for the purposes of cleanliness, but likewise for the preparation of their food. Indeed he can scarcely imagine, that the water, which was brought from the mountains of Tybur, (the modern Tivoli, sixteen miles from Rome) was much, if at all used in the preparation of their meat and drink , since Galen, who was a curious observer of every thing relating to that city, asserts that all the water, conveyed to Rome from Tybur, was crude, and unfit for boiling

food ; adding, that Rome was furnished with many very excellent springs, useful to the sick as well as to those in health.

Not long ago, M. Thierry, regent of the faculty of physic at Paris, published his short notes and observations, concerning the colic of Madrid and its neighbourhood. We are here informed, that this colic, which is described as assuming the characteristics of that, which raged in the province of Poitou, towards the end of the sixteeenth, and in the begin ning of the seventeeth century, is very frequent at Madrid, and

in great part of New Castile in Spain. In his general view of the causes, which conspire to render this disease so frequent in those parts, he entirely excludes a cause, to which it has generally been ascribed, namely, sour wines; insisting that the wines of la Mancha, which are principally drunk in Castile, never become sour; and moreover that the honesty of the people would not suffer any such criminal frauds to be practised, as might endanger the lives of the inhabitants of whole cities. He likewise contends, that the food is, in general, wholesome in its nature, and that it is used with great

moderation. But, according to this author, the unequal temperature of the air, and the elevated situation of Castile, are the principle causes of that disease; which M. Thierry informs us, is, on that account, less frequent at Toledo, than at Madrid and Alcala; and is hardly known on the borders of Navarre. And, if we could run over the whole globe, he thinks it probable, that we should find this disorder more frequent under the tropics, than in regions nearer to the poles; and always more frequent in the middle of every country, or near the coasts bordering upon the ocean, than near to

rivers, or the Mediterranean sea.

Not to enter into a discussion of this author's theory, which is evidently liable to various objections, I shall content myself with observing that, to examine very particularly, whether or not that poison, which is known to be sufficient to the effect produced, is not by some general unsuspected means taken into the stomach, would be a very interesting inquiry to the inhabitants of Madrid, and its neighbourhood. For, notwithstanding what M. Thierry has asserted, may not there be, either by means of fraud, or of

accident, in the wines, drunk at Madrid, a saturnine adulteration? We learn from Hoffmann, "vina, quæ circa Ma-"drid proveniunt, austerius-"cula esse, minus dulcia, et "citius etiam acescere in calidis "locis." And Neuumann informs us, that most of the Spanish wines are composed of fermented or half-fermented wine, mixed with inspissated Must, and variously manufactured; or of an infusion of dry grapes in weak Must. If, according to the testimony of Hoffmann, the wines, about Madrid, are austere, and apt soon to turn sour, they cannot by any means be more effec-

tually corrected, than by a poison, which, almost in every country, has been applied to that use. And if we are rightly informed by Neuumann, that the Spaniards inspissate their Must by decoction; from what has been observed in a former dissertation, it will be obvious to conjecture, by means of what accident the wines thus manufactured, may have power to occasion an endemial colic. May it not reasonably be imagined, that some part of this endemic evil may be owing to glazed earthen vessels, which are generally used at Madrid, for almost all culinary purposes? A physi-

cian, who has long resided in Portugal, is of opinion, that the frequency of the same disease, at Lisbon, is principally to be ascribed to that cause. But it is probable, that, at Madrid, where it is much more frequent, various other means may prevail, whereby the same poison may be taken in by the inhabitants, together with their nourishment. This subject deserves the strictest examination.

In order to confirm the general doctrine, which has been advanced in these papers, concerning the pernicious effects of lead, taken internally, I here subjoin instances of much mis-

chief done by very small quantities of that mineral. The three first were communicated to me by Dr. Heberden. The last I owe to the favour of a learned physician, of undoubted credit.

How very small a quantity of lead will sometimes bring on the peculiar mischief, which it occasions in the human body, appeared in the case of one, who after frequently making bloody water for five years without pain, or inconvenience from going in his carriage over the stones, for the next two years made no other; at the end of which he died. Upon

opening the body, the substance of the left kidney appeared to be changed into little bags full of *sanies* and blood; but no stones were found in the urinary passages; nor had any ever been voided. While the blood was coming away in such an extraordinary quantity, the patient was advised to put himself under the care of one who gave him a grain of sugar of lead, morning and evening, for four days, and then once in two days for three or four days more. The discharge of blood was not at all checked by the sugar of lead: but this small quantity was sufficient to bring on loss of appetite; intolerable

uneasiness of the stomach and bowels; want of sleep; costiveness; and a paralytic weakness of the hands, which continued upon him for three weeks. The same quantity given to a patient, in a little different manner, four grains being taken in a day for three days, occasioned intolerable uneasiness in the bowels for some months.

A woman, who had a *fluor albus*, took, by the advice of a nurse, one drachm of sugar of lead in the space of nine days. In consequence of this, she was afflicted with great pains all over her body, for above half a year, but not particularly in her

stomach and bowels, except after eating; and the *fluor albus* was not at all restrained.

Dr. Heberden observes, that all people are not equally affected with equal doses of this poison; and that this property belongs to it in common with all the nervous poisons; every one of which, as is daily experienced in *opium*, affects different people very differently.

He observes likewise, that it is greatly to be wished, that lead could be given with more safety; as it possesses powers, which are often much wanted, and which are not to be found

in any other simple. One of the persons, mentioned above, by taking four grains of sugar of lead, had a flooding stopped, which had lasted for two months, unchecked by all the most powerful astringents in common use. But, he adds, the good effects are not so certain as the mischief; and, in most cases, would be far overbalanced by it.

A gentlewoman, aged about thirty-three years, had been, for two years, subject to almost a constant *hæmorrhagia uterina;* for there had been, during that time, very few days, in which she had been quite free from it.

For several days together, she frequently lost half a pound of blood in a day. Some time before this disease began, she had suffered a difficult and dangerous labour ; but having had no extraordinary hæmorrhage at that time, or for some months after it, she could not attribute her disorder to that cause. She had tried several medicines without effect. She had particularly taken the peruvian bark, both in the extract, and in the decoction ; which did not stop the flux. A large spoonful of Eaton's styptic taken twice a day, stopped it for several days ; but it heated her so much, that she could not

continue the use of that medicine. A physician was consulted on the seventh of February, 1761. He found, that, for several days past, she had daily lost at least eight or nine ounces of blood. She was now pale, weak, and emaciated. She had observed no difference with respect to her disorder, from the effect of any food ; and had equally suffered, whether she confined herself at home, or went out to take the air in a coach. He ordered the *emplastrum roborans* to be applied to her loins ; and the following draught to be taken twice a day.

R. *Corticis peruviani, in pulverem contriti, unciam unam ;*
Aquæ puræ, uncias sedecim :
Decoque ad uncias duodecim, et cola.
R. *Hujus decocti, sescunciam ;*
Tincturæ corticis peruviani simplicis drachmas duas ;
Tincturæ saturninæ, guttas viginti ;
Syrupi balsamici, drachmam unam misce.

On the tenth of February, the dose of the *tinctura saturnina* was increased to thirty drops ; and the draught, with that addition, was taken twice a day. On the twelfth, finding that though the medicine had agreed well with her stomach, yet the flooding was not considerably abated, he prescribed, instead of the draught, one

large spoonful of the following mixture, to be taken every morning and evening.

R. *Aquæ puræ, uncias tres;*
Sacchari saturni, grana decem;
Spiritus vitrioli tenuis, gutta duodecim.
misce.

After she had taken four doses of this mixture, the flooding was much abated; but she complained of pains in the bowels, and of a sensation, as if they had all been drawn to her back; and likewise of pains about her stomach, and a straitness in breathing. Judging these to be symptoms of the colic of Poitou, occasioned by the

saccharum saturni, he ordered the following draught, to be taken immediately.

R. *Aquæ alexeteriæ simplicis, sescunciam;*
Tincturæ senæ,
Electarii lenitivi, singulorum drachmas duas. misce.

This medicine opened her two or three times. The physician then ordered an oily mixture; which she could not keep on her stomach. On the next day he repeated the laxative draught, which still kept her body open. On the next day, though the gripes had ceased, she complained of a sickness of her stomach: and vomited all her food, as well as an

oily medicine which she had taken. At night the physician ordered the following pills, to be taken immediately.

R. *Extracti cathartici, scrupulum unum;*
Extracti thebäici, granum unum.
Dividatur massa in pilulas quinque.

She passed the night tolerably easy, though without sleep. She had no return of vomiting for seven hours; and the next day had two stools. But then she began to vomit all that she had eaten, or drunk. The physician then applied a plaster of *theriaca andromachi*, with some *oleum nucis moschatæ expressum*, to the region of the stomach; but without effect.

At night he repeated the pills, *of extractum catharticum*, and—*thebäicum ;* which had the same effect as before ; that is, they made her pass the night without vomiting, and gave her a motion or two on the next day. In the afternoon, when she was threatened with a return of vomiting, he gave her one scruple of salt of wormwood, together with a large spoonful of juice of lemons, in the act of effervescence. This she threw up ; but afterwards vomited no more.

The physician observes, that this was a degree of the true painter's colic ; and that it ap-

pears, by this instance, that sugar of lead is, in such a case, a dangerous medicine, at least in the dose in which it was here given: but that it must however be remarked, that, during the time of the disorder in the stomach and bowels, the flooding was either inconsiderable, or totally stopped. The *extractum catharticum cum opio*, he thinks, was manifestly of service, by stopping the vomiting, and giving stools.

He understood afterwards, that, in about a fortnight after he had left the patient, upon a return of the flooding, the apothecary had unadvisedly repea-

ted the solution of the sugar of lead: which produced precisely the same bad effects as before. However, she again got the better of her remedy, and continued for some time with her flooding as before.

Some months afterwards the physician saw this patient. She then looked like a person in good health; and said she was so. Her account was, that, after he had left her, she returned to the use of the peruvian bark, although she had taken it ineffectually before. But partly to that, and chiefly to the use of florence-wine at her meals, she herself ascribed her recovery.

From what has been offered on this subject, it may fairly be inferred that lead, taken into the stomach is a poison, I do not say, *ex proprietate naturæ et tota substantia*, but which is capable of doing more hurt than good to the generality of men, in all the known ways of using it; and consequently that it cannot be avoided with too much caution.

But is this metal, even when confined to external uses, entirely innocent, and free from suspicion?* I have some rea-

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* Dr. Petit informs me that M. Goulard's poultice, applied for some time to a

son to doubt, whether litharge, the common *basis* of our plasters, when used for the purpose of dressing issues, has not, in certain irritable constitutions, produced some of the ordinary effects of saturnine preparations, taken internally. There have beem instances of children, thrown into convulsions, by cerusse, sprinkled on excoriated parts. Zeller quotes, on the authority of Moglingius, a remarkable instance of the pernicious effects of litharge, out-

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patient's knee, in St. George's hospital, occasioned violent pain in the bowels, which did not cease, until the poultice had been removed.

wardly applied. " De lithargy-
" rio quoque mihi narravit,
" matronam quandam nobilem
" pulverem ejus, in rubore fa-
" ciei, postquam hic ipsi tan-
" quam singulare et certissi-
" mum arcanum deprædicatus
" fuisset, in petia ligatum, ax-
" illis bis vel ter die aspersisse
" cum præsentaneo effectu ;
" verum exinde subsecuta fuis-
" se dyspnœam, lipothymiam,
" dolores vagos in abdomine,
" vomituritionem, et nauseam."
I have lately met with a most violent and obstinate colic, which seemed to have been occasioned by some litharge, mixed in cataplasm, and applied to the *vagina* with a view to allay

a troublesome itching. And M. Doazam, in the *Journal de Medicine*, for the month of October, 1760, page 302, relates, on the authority of M. Verdelhan, a remarkable case "de la "femme d'un plombier lami- "neur, qui avoit éprouvé une "vive douleur de matrice, en "forme de colique, pour avoir "mis dans sa chauffrette des "petits charbons mêlés de sco- "ries de plomb, et en avoit "reçu inconsidérément les va- "peurs."

That the vapour, which exhales from melted lead, is capable of exciting the disease, which is our present subject, is

a fact, frequently exemplified in the case of plumbers, and potters, and those who are employed in making *shot*. But farther, it is proved by the experience of printers, that the using *types*,* which have been suffered to stand too long before the fire, in order to dry them, has been followed by

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* The types of printers have always some lead in their composition. Whilst I am correcting this sheet, Mr. Nichols, the printer, informs me of the following fact. "A cat, in a printing-office, is sometimes distressed for want of water. In this situation, he licks, every thing, that is in his way, in quest of moisture. If he happen to lick the *types*, immediate madness is the consequence: the certain cure of which is immersion in cold water."

weakness and contraction of the fingers. Nay, from several cases, which have been related to me on good authority, I have had reason to suspect, that the vapour of this metal, even when heated by friction only, has occasioned the colic of Poitou with all its consequences.

Boerhaave, who was particularly apprehensive of the dangers, arising from this poison, gives us a caution against the external application of the *acetum plumbi*, in the following words. " Si dilutum corpori " affricetur, pustulas, rubedi- " nes, erysipelas, phlegmonas,

" multum levat; cuti cando-
" rem, nitoremque conciliat;
" sed corpori nocet, tandem in
" phthisin deducendo, ut tris-
" tissimis sæpe constitit exem-
" plis." *Element. Chem. p.* 3. *vol. ii. proc.* 172. And we want no authorities to testify, that the too fashionable application of cerusse to the skin has been followed by obstinate colics; pains, tremors, and resolution of the limbs; slow wasting fevers; and a pulmonary consumption. For such frequently has been the fate of those, who have thus endeavoured to supply the defects of their persons by a vain and temporary imitation of beauty;

without having reflected, that health, as it is the only real source of beauty, so it is its only real preservative.

As it is observable, that the muscular parts of the human body suffer particularly from the saturnine poison, it may not be unworthy of our curiosity, and it is not foreign to our purpose, to enquire, in what manner they are affected by it.

Our muscles, in general, when in perfect health, are large, firm, and of a purple colour, with a considerable degree of transparency. When the body becomes weakened by

disease, the muscles generally become smaller and paler; more relaxed and flabby, with a tinge of a yellowish green; often entirely losing the purple colour. When a muscle is deprived of all power, or opportunity of acting, as in the case of palsy or of *anchyloses*, it then loses its colour and its size; but it becomes whiter, than in the former case: it is not so gelatinous or flabby: it still retains a transparency: and the muscular fibres become less distinct, as if steeped in a caustic alkali; while the other muscles, the action of which is preserved, retain their natural appearance. But those muscles,

which are become paralytic, either in consequence of working with the *calce* of lead, or having the salts of that metal applied to them in the living body, suffer the following changes. They lose their size; they become dryer, or more tough; and their fibrous texture becomes more distinct, as in a boiled muscle; of a fine cream colour, and perfectly opake. Mr. Hunter, who communicated to me these observations, informed me, that he saw an instance of what is above described in Saint George's hospital. An house-painter was received into that hospital, on account of a broken thigh-bone;

and died in three weeks after the accident. Mr. Hunter particularly examined the muscles of the hand and arm; it having been observed, that those muscles, before death, were remarkably wasted. He found them all of a cream colour; entirely opake; their fibres very distinct; but dryer in their texture, and tougher than what is common. By this case he was induced to think, that all muscles, which have been for some time in a paralytic state, might put on these same appearances. But some experiments, which he has made upon dogs, incline him to an opinion, that those appearances are the peculiar ef-

fects of the poison of lead ; and that muscles, which lose their action from other causes, appear very differently. For he found, that by an application of *saccharum saturni* to the muscles of dogs, he, in a short time, could effect the same changes in them, which he had observed in the muscles of the painter above-mentioned.

It is well known, that quicksilver is often adulterated with lead ; and it is as certain, that sufficient care is not always taken in its purification. It has even been observed, that the use of this substance, as a medicine, has sometimes been fol-

lowed by the peculiar effects of saturnine preparations. It is therefore earnestly to be recommended to all, who apply quicksilver to the human body, to purify it by distillation.

III. *An Attempt towards an historical Account of that Species of spasmodic Colic, distinguished by the name of the Colic of* Poitou.

Read at the COLLEGE July 21, 1767.

PAULUS AEGINETA has been said to have been the first writer, who mentioned a species of colic, prevailing epidemically, and terminating in palsy, or in epilepsy. The testimony of this author is, " that, in his " time, there raged a certain co- " lic, a new disease, which " took its rise in Italy, and in- " fested several parts of the " Roman territory, κατὰ λοιμικήν

τινα μετάδοσιν. In this disease, "many became epileptic; and "others suffered a loss of mo- "tion, the sense of feeling at "the same time not being im- "paired. The greatest num- "ber of those, who had con- "vulsions, died: but the para- "lytic patients, for the most "part, survived, as if by means "of the cause being critically "translated." He adds, that, "many recovered their power "of motion in process of time; "but that others were cured "with greater difficulty." *See the third book of Paulus, chapter* 18 *and* 43.

These passages of Paulus we

find referred to by Avicenna; who likewise records, that the same species of colic had sometimes, in his own days, been epidemic. And, in another part of his book, he says more generally: "Paralysis est cri-
"sis colicæ; et multoties re-
"manet sensus; et qui evadit
"evadit cum paralysi; et na-
"tura quasi illam materiam
"expellit, et reducit ad exte-
"riora."

But is it to be inferred from hence that this species of colic was absolutely a new disease in the time of Paulus? Although he be the earliest author, who mentions it as epidemic, it can-

not easily be allowed, that physicians, who lived before his time, had not taken notice of the same *phænomena* in particular patients.

At what time, and in what place, lead, which is undoubtedly a specific cause of this malady, was first known to mankind, we have no tradition. "Quis plumbum nigrum, et ar-" gentum vivum, et quo in loco " invenerit, non est memoriæ " proditum." *Agricola de veteribus et novis metallis, lib. i.* However, the word μόλιβος occurs in Homer; and we find Hippocrates, in several parts of his works, recommending the use

of lead, and the *scoriæ* of lead, as an epulotic application, and for other external purposes. Litharge of gold and cerusse enter the composition of powders, extolled by that author, as of great efficacy in defluxions of the eyes. It is likewise remarkable, that long before the age of chemistry, we meet with exact directions for making several preparations of lead; and it is curious to observe that the method of preparing cerusse, described even by so ancient an author as Theophrastus, nearly corresponds with the modern process.

But, how much soever satur-

nine preparations might have been used for external diseases, it does not appear, that the internal use of them was recommended by any of the ancient, physicians. On the contrary, we find, that cerusse and litharge are ranked among poisons by Nicander, Dioscorides, Pliny, and Aetius. And Paulus Aegineta ascribes the very same effects to the filings of lead, as to litharge. How careful Vitruvius and Galen were with respect to this poison, has been already mentioned at large in a former Dissertation.

Nicander, the most ancient medical writer, next to

Hippocrates whose works are come down to us, has, in his *alexipharmaca*, given a very perfect description of the effects both of litharge, and of cerusse. Speaking of the former, he describes the colic, as the ordinary effect of that poison, in the following lines.

——— τότε ναρὶ πέσῃ βάρος· ἀμφὶ δὲ μέσσον
Πνεύμα τ' ἀνειλίσσονλα κατ' ὀμφάλιον βρομέῃσιν,
Οἷά περ εἰλίγγοιο δυσαλθέος, ὅς τε δαμάζει
*Ἀνδρας ἀπροσφώτοισιν ἐνιπλήσσων ὀδύνῃσιν.
Οὐ μὲν τῶν γ' ἔρων ἄνῦλαι ῥύσις· ἀμφὶ δέ γυῖα
Πίμπραλαι· ἀυλάρ τε μολίβῳ εἰδήναλο χροιήν.

Under the article of cerusse,

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* Dr. Bentley very ingeniously reads it—'Ανέρας ἀπροφάτοισιν.

the same author mentions the paralytic affection, which is the common consequence of that, and every preparation of lead, taken into the human stomach.

Ἄλλοῖε δ' ὑπναλέος ψύχει δέμας, ἠδέ τε γυῖα
Ὡς τοπάρος δονέει, καμάτῳ δ' ὑποδάμναται, εἴκων.

If, therefore, Nicander, if Dioscorides, and the rest of the ancient writers, whose observations on such poisons agree with those made by Nicander, ever saw the effects which they so well describe, it follows, that they could not be unacquainted with the colic of Poitou. An inquiry into the diseases of miners must undoubtedly have furnished them with

many instances of this species of colic. And indeed, it cannot be reasonably suspected, that Galen would, in several parts of his works, have shewn such an apprehension of the poison of lead, if he had not in his practice met with frequent examples of its most pernicious effects.

Francis Citois, who, I believe, was the first writer, who called the particular species of spasmodic colic, which is the subject of our present examination, *the colic of Poitou*, first published his *diatriba de novo et populari apud Pictones, dolore colico bilioso*, in the year 1617 ; as

appears in his dedication to his patron, the cardinal duke de Richlieu, prefixed to a collection of his treatises called *opuscula medica*. Thuanus, in the fifty-fourth book of his *historiæ sui temporis*, makes mention of this disease, and of Citois as the original writer concerning it. What he says of it, however, is very little more than a literal transcript from that author. Indeed there is reason to doubt whether what is said, in the histories of Thuanus, of the colic of Poitou, be not an interpolation of one of his editors. For Thuanus died in the year 1617, namely the very year in which Citois first pub-

lished his *diatriba ;* and accordingly we find, that the first notice taken of the colic of Poitou by Thuanus, is in a posthumous edition of his work, published in the year 1639.

According to Citois, the *dolor colicus Pictonicus* was a new epidemic disease, in the province of Poitou, about the year 1572 ; and after having prevailed in that province about 60 or 70 years, it became milder, less untractable, and by degrees was translated to other parts of France. In the *appendix* to his *diatriba*, he expressly says, " Morbus iste, velut aves " peregrinæ, alio nunc magna

" ex parte avolavit ; et jam " magis Aurelianenses, quam " nostros Pictavenses vexare " dicitur." And in his dissertation *de usu phlebotomiæ*, he has a chapter *de colico dolore biliosi apud Pictones* NUPER *populari*.

Thuanus fixes the precise time of its continuance, agreeing with Citois, that it began in the year 1572. " Per decennia " recrudescens, usque ad an- " num sextum sequentis seculi " violentior semper incubuit."

Citois, in his treatise on this subject, after having mentioned several new diseases, which had lately been used as the in-

struments of God's vengeance on a sinful world, such as *lues venerea*, *sudor anglicus*, *plica polonica*, and the scurvy, descends to the consideration of the disease in question; having first dropped an hint (seemingly to account for the *phænomenon*) that, to the great astonishment of astrologers, a new star, in the same year, had made its appearance in the constellation of Cassiopea. One cannot help taking notice of somewhat like a contradiction, or at least a want of precision in the history of the disease, as it is delivered by this author. "It was unknown," says he, "from the "time of Paulus, to that of

" Avicenna, a period of 600 or 700 years; and, after having " been unobserved for the " space of full 500 years more, " it revived, with the same, or " or even severer symptoms, " in the province of Poitou." And yet he had before not only asserted, that it had been very common in all the province of la Guienne, but had produced the testimony of several authors to shew, that it had long before been observed at Paris, and in Picardy; and that moreover Silesia, Moravia, and the greatest part of lower Germany, had been too well acquainted with this very cruel disease.

But, in fact, the supposition that the colic of Poitou was a new disease, about the time when Citois lived, is so far from being well founded, that it would not be difficult to prove, by the testimony of authors, the direct contrary to be true. For instance, the disease was mentioned by our countryman John of Gaddesden ; who appears to have written his *rosa anglica* early in the fourteenth century. Joannes Guinterius Andernacus, who published his translation of, and his commentaries on Paulus, in the year 1532, has the following note on that part of the eighteenth chapter of the third book of Paulus, where

the epidemic colic is mentioned. " Quod Paulus suo " tempore accidisse in morbo " colico commemorat, nos quo- " que nostra ætate frequenter " videmus; nempe ex magno " diuturnoque colico cruciatu ar- " tuum resolutionem, præsertim " brachiorum, quanquam et " crurum imbecillitas summa ad- " fuerit." And Coiter, who, in the year 1553, published his *Observationes anatomicæ et chirurgicæ miscellaneæ*, testifies, that in Germany, and particularly in Franconia, and in the country about Nuremberg, this species of colic was, in his time, a frequent disease. Jacobus Oetheus, in the year 1609, gave a

very accurate and circumstantial account of it. He affirms, that it was common in Franconia, in Austria, and particularly in the whole circle of Zwaabe. Paracelsus, who, in the midst of the most incomprehensible jargon, sometimes writes intelligibly, testifies, that "colica vel ex seipsa desinit, vel tollitur remediis, vel terminatur in paralysin." There is, in the same author, another passage, which I shall transcribe, on account of the just observations on this disease, which it contains. "Colica est, cum dolor, ac tormentum in ventre oboritur, cum contractione ejus, et ex-

" crementorum suppressione,
" signisque aliis multis ratione
" stomachi et viscerum cætero-
" rum fientibus. Postea ma-
" lum transit in membra artus-
" que, in quibus hærens manus
" pedesque contrahit plus mi-
" nus, prout morbus magnus, et
" materia copiosa fuerit. Por-
" ro cum vi quadam sese dif-
" fundit ; et vel acuta vel chro-
" nica evadit, prout genera-
" tionis ejus natura est. Tan-
" dem sequitur consumptio
" corporis, mutatio vocis, et
" totius substantiæ imminutio."

From these, and several other passages, which occur in the writings of Paracelsus, it

appears, that this man, who, early in the sixteenth century wandered over Germany, France, and Switzerland, was, perfectly acquainted with the species of colic, which is now under our consideration. For he represents it terminating in palsy, and a consumption of the whole substance of the body.

But it may reasonably be made a question, whether Paracelsus, who was very fond of saturnine medicines, in many diseases, and whose particular doctrine it was, that "Saturnus "purgat febres," did not contribute to render this colic more frequent, than otherwise

it might have been. For, according to the testimony of Libavius, he often left his patients more diseased than he found them ; and it is acknowledged by his disciple Oporinus, that, when he was sent for to any town, in order that he might administer his internal medicines, he was very seldom suffered to make a long stay in it, on account of the general resentment of the inhabitants against him.

If modern times had not furnished similar instances, it would have been matter of astonishment to us, to have heard that Erasmus, the friend, the

correspondent, and the patient of our excellent Linacer, whose great skill in the science of physic he extols in several of his epistles, ever consulted in his own case, so wild, so illiterate an enthusiast, as Paracelsus appears to have been. But it is to be lamented, that in matters which relate to physic, even the most sensible part of mankind has ever shewn a degree of weakness, and credulity, easily imposed on by the self-importance of those who know how to recommend themselves to the world by bold promises; and that diffidence, doubt, and hesitation, which help to constitute the true character of a

philosopher, have ruined both the fame and fortune of many an excellent physician.

A great number of other authors might be cited, who gave a full descripton of the colic of Poitou, before the time of Citois ; so that he ought not by any means to be esteemed the original writer on this subject. And if we consult authors, posterior to Citois, we find almost in every practical book this species of colic mentioned. We have an account in Sennertus, of its having prevailed epidemically, all over Silesia, in the year 1621. Baglivi even affirms, that " ni-

" hil facilius colicæ supervenit,
" quam paralysis." And Willis, in the pathological part of his treatise *de anima brutorum*, testifies that, " affectioni colicæ
" crebro et gravius obnoxii
" demum paralytici evadunt.
" Casus adeo frequens hic ut
" morbi hujus successio inter
" illius prognostica habeatur ;
" nam qui tormina in ventre,
" aut paroxysmos atrociores,
" per intervalla redeuntes, pati
" solent, tandem in habitu cor-
" poris ac membris dolores va-
" gos, deinde postea stupores,
" et denique non raro ἀκινησίας,
" sive resolutiones subeunt."

A reader, conversant only

with books, and not having opportunities of observing diseases in themselves, would be apt, from such general assertions, to conclude, that every colic pain, if violent, does ordinarily, and in the common course of nature terminate in a paralytic affection. If this were really the case, it would follow, that Grashuis has given a true definition of the colic of Poitou, in the following words: "Colica "Pictonum designat dolorem "colicum atrocissimum simul "et pertinacissimum, ex qua-"cunque causa oriundum." *(Grashuis de colica Pictonum tentamen, p. ii.)* But is it confirmed to us by experience, that every

violent pain in the bowels has the same characteristic marks? Do we find, that the *ileus*, or that colic, which is produced by concretions of gall, sticking in the biliary ducts, terminates in palsy? Is palsy the *crisis* of that colic which arises from a gouty, or an hysteric cause? Those, who have attended the most accurately to nature, have made no such observation: and it seems only to be one species of colic, probably derived from one simple, uniform, specific cause, which has palsy and epilepsy for its pathognomonic symptoms.

Paulus refers the cause of the

colic, which he describes as epidemic in his time, to thin acrimonious humours. Citois, in considering the causes of the colic of Poitou, though he cursorily mentions several concurring causes, seems to lay the greatest stress on the sour, unripe, austere wine of that province. This degeneracy of the wine he attributes to the excessive violence of the north wind, which had prevailed for some years; and to frosts, which had begun, before the autumn had been nearly ended; and which had continued until the spring had been far advanced. This opinion he confirms by an observation, that the

mendicant friars of all orders, who were obliged to drink the very worst wines, were more particularly subject to the colic. He gives an history of thirteen friars of the order of St. Bernard, belonging to the abbey Noaillé, who were most severely tortured by this disease ; for that, having before been accustomed to drink the good and wholesome wines of Languedoc, they had been reduced to the necessity of drinking the wines of Poitou, " which " were," says he, " white " wines, very unripe." These religious men, being removed to other provinces, speedily recovered their health.

According to Citois, this disease was more frequent in autumn, than in any other season; more severe to women, than men (though women were less frequently attacked by it); to the old, than young; to foreigners, than natives; in winter, than in summer.

If we examine the writers, who lived before Citois, as well as those who followed him, we find a general suspicion prevailing, that the mischief was done by some noxious quality in wine. Here and there we find an adulteration suspected; but the greatest number of writers, copying one the other,

have referred the mischief to the wine itself; some, on account of its strength and sweetness; others, on account of its acidity. Crato (*consil. med.* 10) giving his advice to a patient, subject to this colic, says, " vi-
" num omne suspectum impri-
" mis autem moravica noxia
" sunt, et nativum quiddam,
" quod hunc morbum conciliat,
" in se continent. Hinc tot
" colicos et paralyticos in Mo-
" ravia videmus. Nec ab hac
" malitia absunt austriaca, nisi
" bene atque sæpe sint elutriata.
" Dulcia, crassa, et turbida plu-
" rimum nocent; rhenensia
" pura, matura, *non contaminata*
" *hominum fraude*, innocentis-

" sima sunt." Wepfer, in the *annus secundus* of the *ephemerides germanicæ*, has given a dissertation on the subject of *paresis post colicam ex vino*. " Patients," " says he, " labouring under a " bilious colic, which is apt to " end in palsy, give me great " trouble; but this happens " abroad, rather than at home. " For the people of Swisser- " land generally drink red " wine, well ripened, and ge- " nerous. If any person, by " chance, happens to be affec- " ted by a colic in the country " about Scafhausen, he never, " to my knowledge, becomes " paralytic; nor can I find that " this has ever been the case

" hereabouts, having examined
" the medical annals of one
" hundred years past. The
" people of this country are
" subject neither to the gout,
" the stone, nor convulsions. I
" have hitherto ascribed such
" an exemption from these dis-
" eases to their drinking our
" wholesome red wines. On
" the contrary, where white
" wines are drunk, this species
" of colic is very frequent;
" viz. in Alsace, near the lac
" de Zel, and in the duchy
" of Wirtemberg. There are
" likewise in those parts a
" greater number of gouty and
" nephritic patients; and peo-
" ple of both sexes are more

" liable to convulsions. There
" is a monastery near us, where
" the fathers drink no other
" than white wine. Scarce
" one of them escapes the at-
" tacks of this colic. Not long
" ago several Dominican friars
" were affected by this disease,
" after drinking the wine of
" Alsace: and, convulsions
" coming on, they were all
" killed by it. I have suspec-
" ted the cause to have been
" the *tænia sulphurata dulcis*, that
" is, bismuth mixed with sul-
" phur applied to the fumiga-
" tion of wine. The same cause
" had formerly been suspected
" by Thomas Jordanus, as the
" source of this disease in

" Moravia; on account of " a supposed similitude in " the effects of bismuth, and " lead."

It seems wonderful to find, how very little, physicians, even of the first reputation, formerly knew of the deleterious qualities of lead. Fernelius, who published his *universa medicina* in the year 1592, although in his seventh chapter *de luis venereæ curatione*, he describes most terrible effects of the powder of lead, given, in the quantity of a pound and half, in the space of fifteen days, to his friend, as a remedy against the gout; (which effects

he attributes to the hidden and inexplicable malignity of that metal; and concludes from that case, that lead ought never to be taken into the body) in the very same page, when he describes the true colic of Poitou, in the case of a painter of Anjou, in the year 1557, plainly shews, that neither he, nor any of the other physicians concerned, understood the true cause of the disease. He supposes it to have been occasioned by cinnabar mixed in the painter's colours; and seems to treat his brethren very contemptuously, for having differed from him in their judgment; some of them having suspected the *pituita vi-*

trea, and others the acrimony of the bile, to be the cause of the disease,

Wherever indeed we turn our eyes among books, we find very great marks of ignorance concerning this subject. Ramazzini, who professeth to have inquired accurately into the causes of those diseases, to which the various artificers are subject, wonders extremely how it should happen, that since lead furnisheth us with excellent remedies, for internal as well as external purposes, the potters should suffer so cruelly from the exhalation of this metal, in doing their work.

(Ramazzinus de figulorum morbis.) But in fact, writers of much greater accuracy and correctness, than Ramazzini, have given instances of a similar inattention on this subject.

The almost general silence of old authors, particularly of the German physicians, with respect to the adulterations of wines, is not easily accounted for. We find, that, in the year 1487, there was a *recessus imperii* promulged at Rotenberg; and, in the year 1498, at Friberg; which was enacted, in the year 1500, at Tubingen; and, in the year 1508, at Frankfort; and, in the year

1577, in the same place; by which decrees it was made a capital crime to adulterate wines with litharge, or to use bismuth in the fumigation of them; it having been, at several periods, represented to the Emperors, that great mischief had been done by such mixtures; and that they had been the cause of insuperable and mortal diseases. It should seem, that these laws were not carried into strict execution; and indeed that, in the latter end of the last century, it was hardly known in Germany that any such laws subsisted; or, at least, that they were regarded as antiquated laws; and that

the principles, on which they had been enacted, were wholly forgotten. For, in the *ephemerides germanicæ*, we find, about the latter end of the last century, the physicians taking pains in inquiring into the cause of an epidemic colic, which had for some time prevailed in various parts of Germany, more especially in the duchy of Wirtemberg. Many causes were suspected, particularly the culinary vessels, on account of copper; which vessels were therefore ordered to be carefully lined with tin. But the disease still continued; and, no cause having been discovered, at length it was impu-

ted to witchcraft. After many fruitless conjectures, it was plainly found out, on what this epidemic disease had really depended. The vintners, in order to correct their sour, austere wines, and make them palatable, had practised a method of mixing litharge with them. Among some, we find it was the custom to throw into their casks litharge in substance. Others first impregnated vinegar with litharge; and then added this vinegar to their wines in a certain proportion. The method, and the proportion are described by Cockelius in the thirtieth observation of the *annus quartus* of the *epheme-*

rides germanicæ. The ninety-second observation of the same year, by Brunnerus, is on the same subject; and the hundredth observation, of the same year, by Vicarius,* contains several curious particulars concerning the discovered adulteration, and its effects on the human body. Reiselius, in the 251st observation of the *annus quintus et sextus*, has more on the same subject. A representation of these facts having

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* This author supposes this method of adulteration to have been a modern fraud; but he acknowledges that he had been informed by the elder Wepfer, that the same fraud had formerly been practised on beer which had turned sour.

been made to the duke of Wirtemberg, by a decree, bearing date March 10, 1696, it was made a capital crime to mix litharge with wine, or even to sell litharge in the shops. But notwithstanding the severity of this law, we are informed by Zeller, that, in the year 1705, the same dangerous experiments were repeated in the circle of Zwaabe, with a view to correct the acidity of the weaker wines. And it is certain, that in France, as well as in Germany, the same adulteration is practised even at this day, in defiance of laws, and in opposition to the dictates of humanity.

I do not undertake to demonstrate that the same frauds were practised formerly on the wines of Poitou ; and that from thence was derived the real cause of the disease, described by Citois. But if we take into our consideration what is said of the *vina pictavensia alba*, by Hoffmann, that " multum convenient cum rhenanis, tantum in " eo inferiora hisce, quod sint " crudiora ;" and that therefore such crude wines were likely subjects of such adulteration ; if we reflect, that, the art of improving wine, by a mixture of litharge, had been practised and prohibited in Germany, many years before the time of Citois ;

if we take into our account likewise, what seems more than probable, that the farmers of Poitou might have endeavoured to make their wines less acid, by a decoction of their Must; and if we compare the genuine effects of the adulterated wine of the dutchy of Wirtemberg with the description of the *dolor colicus pictonicus*, described by Citois; from a very remarkable similarity of circumstances, and of effects, we may perhaps be led to conjecture, that the colic of Poitou, and of the dutchy of Wirtemberg, were produced by one and the same cause.

Upon the same principles, perhaps, we may be enabled to assign a probable reason, why this disease was much less frequent among the ancients, than it has been in more modern times.

The ancients, in manufacturing their wines (which they seem to have done in an unskilful manner) made use of various *condimenta;* with a view to bring them sooner to maturity; to take off their ropiness; to correct their acidity; and, in general, to improve their colour, their smell, and their taste. The substances, applied by them to these

uses, appear to have been innocent. Pliny however, intimates, that the people of the *Narbonensis Gallia* (one of the four quarters of ancient Gaul, which contained Savoy, Dauphiné, Languedoc, and Provence) had secret and pernicious methods of adulterating their wines: and that they "officinam ejus rei fecere, tin-" gentes fumo, utinamque non " et herbis et medicamentis " noxiis." But there seems to be no reason to imagine, that any of the ancients ever made this use of litharge. Nor indeed, being under such apprehensions of its poisonous qualities, would they probably have

dared to have mixed this substance with their liquor, even if they had been acquainted with its power of correcting acidity, and of communicating to the crude wines a finer colour, and more generous flavour.

However, if we inquire into the method of treating the wines, of inferior note, practised by the ancients, we find reason to conclude, that the liquor, thus treated could not be entirely free from a solution of lead.

It cannot easily be ascertained, at what time the method of boiling the unfermented

juice of the grape was first introduced. In reading the ancient poets, we meet with very frequent allusions to such a custom ; and some of the Roman authors, who have professedly written *de re rustica*, have given particular directions, concerning the method of conducting this process. Several likewise of the Greeks, as we are informed by Pliny, namely Euphronius, Aristomachus, Coniades, and Hicesius, had pub lished precepts on the same subject.

According to the rules given by Columella, the Must was to be boiled down, until a fourth,

or a third, or more was consumed; and then several ingredients having been added to it, was generally set apart for a year, as a medicament, to be mixed with wines, as occasion might require with a view either to preserve them to a great age, or to cure them when they were suspected to be in danger of turning sour. Palladius distinguishes this inspissated Must into three sorts; to which he gives different names. The first sort he calls simply *defrutum*; ubi ad spissitudinem for- " titer despumaverit;" the second sort, *carœnum*; " cum ter- " tia perdita, duæ partes re- " manserint;" the third, *sapa*;

" ubi ad tertias redacta descen-
" derit." *(Palladii October, Tit. xviii.)* Columella sometimes seems to make a distinction between *defrutum* and *sapa;* but often uses them indifferently as synonymous terms. But strictly speaking they are different;* *sapa* being *defrutum* reduced to the consistence of a syrup; or, according to Virgil's expression, *igni multo pingue.*

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* The *sapa* is still used in Italy, and is kept in bottles, in order to be put into sallads, and some sorts of sauces. At Naples, it is called *musto cotto;* but in Tuscany, it retains its old name *sapa;* and there, as formerly, they mix with it spices and other ingredients.

It was usual to add a certain proportion of this boiled Must to each *amphora* of the new wine, which required to be medicated ; more or less according to its strength. Some farmers, as Columella informs us, mixed with their new wine one fourth part of *defrutum*. This they were obliged to do on ac count of the weakness of their wine ; which, according to Columella, could not otherwise have been kept sound thirty days.

But it is very remarkable, that leaden vessels are, by several ancient authors, mentioned as proper for the preparation of

this *defrutum*. We find in M. Cato *(de re rustica, cap. cvi.)* the following directions for making Greek wine, at a distance from the sea. " Vinum græcum sic " facito. Musti quadrantalia " xx in aheneum, aut plum- " beum infundito. Ignem, " subdito." And again, *in cap. cvii*, " sapæ congios vj quam " optime infundito in aheneum, " aut plumbeum." But Columella *(de re rustica, lib. xii. cap. xx.)* expressly orders, that the *vasa defrutaria* should be leaden, and not of copper, for this reason; because copper vessels are apt to communicate to the preparation a taste of verdigrise. " Ipsa vasa, quibus sapa

" aut defrutum coquitur, plum-
" bea potius quam ænea esse
" debent ; nam in coctura æru-
" ginem remittunt ænea." The same directions are given by Pliny ; who orders absolutely that the *defruta* and *sapæ* should be prepared " plumbeis vasis, " non æneis."

It is observable, that particular directions are given by Columella, that this decoction should be performed in a cautious manner : and that he re commends a particular attention " ne plumbeum perforetur." And in order to prevent a perforation of the lead, he advises, that the first part of the process

be performed by a gentle fire. He advises, likewise, that the person, to whose care the decoction of the Must is committed, during the whole time of its boiling, stir the liquor continually, in order to prevent any thing sticking to the bottom, which may endanger the vessel. When the vessel can bear a stronger heat, that is when the ebullition begins *(cum aliqua jam parte mustum excoctum in se fervebit)* he directs that a larger fire be made, care being taken that the vessel do not come in contact with the fuel. "If this be not avoided," says he, "either the vessel "will be melted; or, if that

" does not happen, the Must " will be burnt, and contract a " bitter taste."

It will hardly be doubted, but that the juice of the grape, thus evaporated in leaden vessels, must have dissolved some of the metal; and it should seem, that the wine, manufactured in the manner above described, must have been prejudicial to those, who drank it, in proportion to the quantity of *defrutum* or *sapa* mixed with it. Pliny, therefore, had probably found reason for making so severe an animadversion on wine in general. " Tot veneficiis " placere cogitur; et miramur

" noxium esse ?" *C. Plinii Secundi naturalis historiæ, lib. xiv. cap. xx.*

Here then a cause is discovered, which may reasonably be supposed to have sometimes occasioned the colic of Poitou, among the ancients. But it is really astonishing to find, that, notwithstanding all that had been written against lead, and its preparations, not only a popular practice, of boiling this liquor in leaden vessels, should so long have prevailed ; but that such a practice, should stand approved and recommended in the work of a philosopher. Is it not probable, that

Columella (who, in several passages in his book, appears to have been in the interest of the farmers, and a friend* to adulterations) had learned by experience, that a peculiar advantage was gained by boiling Must in lead; and that the *defrutum*, in this, manner prepared, had a particular efficacy in preventing, or in suppressing the acetous fermentation in the weaker wines? Indeed it seems likely, that the farmers

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* "Cavendum est ne conditus sapor "intelligatur: nam ea res emptorem fu- "gat" *Columella in l. xii. c. xx.* "Cura "adhibenda, ut Mustum perenne sit, aut "saltem usque ad venditionem durabile." *Idem in l. xii. c. xix.*

themselves were not unacquainted with the operation of acids on lead; since it appears to have been a common experiment among them to put a plate of lead into a cask of wine, in order to determine, whether or not the liquor was inclined to be sour. "In vitium inclinan-" tis experimentum est lamina " plumbea: mutatur in ea co-" lor." *(Plin. nat. hist. lib. xiv. cap. xx.)*

But, in general, if we inquire into the chances, which the ancients had of being injured in their health by means of the poison of lead, we find them to have been much fewer,

than mankind, in more 'modern times, has incurred; and it appears that such chances have been multiplied among us, in proportion as improvements in several articles of convenience and luxury have been introduced.

Ramazzini informs us, "artificium fictilia vitreandi antiquissimum fuisse, uti ex eruditis e terræ visceribus constat." If, by the words *artificium vitreandi*, Ramazzini meant the art of glazing the earthen ware, according to the present method, principally by the means of a preparation of lead, he probably was mistaken.

The art of forming clay into vessels seems to have been one of the earliest inventions of man; but this method of covering the surfaces of such vessels, I conjecture to be a modern improvement, which the world was not acquainted with, before the age of chemistry. That part of the old earthen ware, preserved in the British Museum, which is supposed to have been of Roman Manufacture, is not glazed. Those vessels, which are called Etruscan, and which are supposed to be of greater antiquity than the Roman, have indeed a paint or polish on their surfaces; but that does not appear to resem-

ble our modern saturnine vitrification.

If then the ancients were ignorant of this art, it seems probable, that their ignorance, in this instance, contributed its part towards securing them from the colic of Poitou. For it has been already observed, that lead, in its vitreous state, is very soluble by acids. And it is well known, that potters, who are exposed to the vapours of this metal, while the process of glazing is performed, are particularly subject to that disease.

Add to this consideration,

that the quantity of cerusse, used by the ancients, must have fallen infinitely short of the present consumption of it; that they were wholly ignorant of various arts and manufactures, in which lead is now used; and that it is not proved by any authority, that they ever administered saturnine preparations, as internal remedies. A comparison of the various fashions and customs, and of the various modes of luxury, which prevailed among the ancients, with those which now prevail, would suggest to us many other probable causes, why this disease, which at present occurs to our observation almost every

day, was not so frequent in past ages. To examine minutely the several parts of such a comparison, would be a curious and an entertaining inquiry.

It would be vain to conjecture, by what means this disease became so general in the days of Paulus Aegineta ; since neither he, nor any of his contemporary writers have left materials, on which a probable supposition, concerning this subject, can be founded. But Avicenna (between whose time and that of Paulus no author is supposed to have described this colic) informs us, by what means it may reasonably be sus-

pected to have infested his contemporaries. For he testifies, that the women used litharge as a domestic remedy for their children; and that it was a common practice to put litharge into water, when it was suspected of being unwholesome. His words are, " Mulieres nos-
" trates propinant lithargyrium
" pueris, adversus alvi fluxum,
" et ulcera intestinorum. Eæ-
" dem subinde ipsum poculis
" aquæ injiciunt, ut vis aquæ
" noxia obtundatur." He, however, calls litharge " lethale
" medicamentum, urinam sis-
" tens, ventrem et ureteres in-
" flans, et distendens, respira-
" tionem coarctans." I find no

earlier account, than this, of lead having been used as an internal remedy even by women, or by empirics. And it seems probable, that from such practitioners the internal use of it, as a medicine, was originally borrowed; and that it was by degrees introduced into pharmacopœias, and the legitimate practice of physicians.

From what has been premised, it appears, that, in the earlier ages of the world, the colic of Poitou, although not unknown, was not a frequent disease; that it was originally described by authors of great antiquity, as the ordinary effect of

the poison of lead; and that during a course of many years, it was no otherwise mentioned in books, than as the effect of that poison. It appears likewise, that, as luxury and refinement, and fraud, increased in the world, this poison had more frequent opportunities of exerting its virulence on the human body; and that therefore the disorder by degrees became more and more common. I am sorry likewise to add, that there appears to be abundant reason to suspect, that the art of medicine itself has contributed its part towards propagating this colic, by borrowing from the class of poisons a substance,

which, however efficacious it may have been in some violent complaints, has not hitherto been convertible into a safe remedy.

IV. *An examination of the several Causes, to which the Colic of* Poitou *has been attributed.*

Read at the COLLEGE August 7, 1767.

THE eighth and ninth volumes of *la bibliothèque raisonnée*, published in the year 1732, contain a long dissertation concerning the colic of Poitou. In the year 1757, there appeared a Latin treatise on the same subject, written by a physician of distinguished reputation. These two pieces, besides other marks of resemblance between them, agree very much with respect

to the remote causes, to which this disease is referred, in both. This induced M. Poissonier Desperrieres, in his letter, inserted in *le journal des scavans*, for the month of February, 1758, to imagine, that both treatises were written by the same author. But it appears, that the dissertation, which is in *la bibliothèque raisonnée*, was the composition of M. Massuet.

In examining the several supposed causes, to which this disease has been attributed, I propose to follow the order, which is observed in the Latin treatise above-mentioned; and I shall hope to be excused by

the learned author, if, after having impartially considered the doctrine, I find myself in no degree convinced by the general reasoning contained in his book.

The first cause, here mentioned, is "the remains of fe- "vers, the crisis of which has "been imperfect; or which "have not been properly trea- "ted."

The author, in order to establish this as a practical observation, first appeals to the testimony of several writers. But it is to be remarked, that Fernelius, who is the first writer cited,

although he does observe, that a colic is apt to succeed tedious fevers, particularly those of a bilious kind, does not here assert, that such fevers are followed by a colic, the nature of which is to terminate in palsy. And indeed, if it can be shewn, that, in any part of his *universa medicina*, he has made such an assertion, nothing more will be proved by a quotation from Fernelius, than that such was the opinion of a very fallible writer.

Ballonius, who is next introduced as having made a similar observation, testifies, that he found this consequence of a

fever particularly in those patients, who, tired of their disease, and desirous at once to extinguish the flame, had recourse to the assistance of women and empirics. What instruments such practitioners made use of in the time of Ballonius, it will be obvious for any person to conjecture, who knows how much several preparations of lead have been extolled by women and empirics, on account of their supposed febrifuge power. Indeed, it was not only the doctrine of Paracelsus, and the other empirics of former times, that "Sa-"turnus purgat febres;" but even physicians, of the first

class, have spoken of lead with very high praises of its efficacy in curing fevers. We find Pitcairn, in his *elementa medicinæ*, placing sugar of lead among *remedia rarescentiam nimiam sedantia*. It is by this author ranked with purified nitre, spirit of sulphur, juice of lemons, distilled vinegar, emulsions of the four greater cold seeds, and *vesicantia*. It was common to give to a patient one scruple of sugar of lead immediately before the expected time of the paroxysm of a quartan fever. And there was a certain preparation of lead, called *butyrum bezoardicum saturninum*, which was greatly trusted

to in malignant fevers. Nay Etzlerus was so fond of lead in all diseases, both acute and chronic, as to have made use of the following very strong expression in recommendation of its virtues : " ex eo conficiun-" tur medicamenta facientia ad " longævitatem."

A case is afterwards cited by our author from Carolus Piso, of a young man, who from a tertian fever fell into a quotidian, attended with colic pains ; which after having continued forty days, were succeeded by palsy in the arm, and afterwards by convulsions, and death. But it is worthy of notice, that

Carolus Piso, in the same page, mentions the termination of a colic in palsy as a common occurrence ; and that he appeals to an observation, made by his father, Nicholas Piso, that, in the province of Lorraine, such a species of colic was particularly endemial : that the inhabitants likewise of Melun were very subject to it ; and that it would be tedious to enumerate singly all the patients, whom he had seen thus affected.

We are informed by the same author, Carolus Piso, that he had visited two convents ; one in the year 1596 ; the other, seven years after that time ; and

that, in both houses, he had found the monks most miserably affected, some with colic pains; others with palsy of their arms, which hung useless from their shoulders; others frequently harassed with convulsions; others in a lethargic state. He does indeed mention (probably to save his theory) that they had some degree of fever; but that, to use his own words, was *valde mediocris*. His notion was, that the disease, which he found so common in those monasteries, was apt sometimes to succeed the declension of tertian fevers; and that, at other times, it was complicated with tertian fevers. But in the pre-

ceding paragraph, he seems to have approached much nearer to the true cause; when he mentions the free manner of living, which he observed among the seniors of the convent, who are said to have been the only persons in it, who suffered by this disease; for the junior monks, who were kept under restraint, and to whom very little or no wine was allowed, enjoyed perfect health, free both from fever and colic.

To the testimony of several other writers, which tend to prove no more, than those testimonies, which have already been examined, the author adds

the result of his own experience. And he here asserts, that the bilious fever, which, in the year 1727, raged at Amsterdam, being suppressed by the use of the peruvian bark, given while the putrid bile was turgid, violently affected the mesentery, and membranes of the intestines; and that the presence of the colic of Poitou was a proof that the bilious fever had preceded; the remains of which fever, having continued several years, had made that species of colic familiar to the physicians of Amsterdam. If we turn to another part of this work, we find a very different reason given, why this

disease was common at Amsterdam. It is there referred to rain-water impregnated with the lead of the roofs of the houses. "Et hæc est ratio, quare "insolitus olim, colicus dolor "grassetur nunc Amsteloda-"mi."

Ettmuller, in the twenty-sixth case of his *collegium consultatorium*, relates the following history. A person, who laboured under a double quartan fever, had, by the advice of his physicians, taken the powder of the peruvian bark, by which the paroxysms had several times been prevented; but still the fever had afterwards returned.

Ettmuller, having found other medicines ineffectual, gave his patient, on the days when he expected the paroxysm, eighteen grains of sugar of lead, in two doses ; by which medicine repeated several times, the fever was at length subdued. Hereupon followed an obstinate constipation of the bowels, together with a convulsive colic. Some medicines, which the physician administered, relieved these disorders ; but nevertheless, for some time afterwards, at the usual hour of the paroxysm, he suffered returns of a periodical colic. The author accounts for this effect, by supposing that the febrile fer-

ment had been prematurely fixed and concentrated by the sugar of lead. Had the circumstance of the administration of sugar of lead been omitted in this history, how plausibly might it have been urged in support of a theory, which experience has not hitherto established!

Poisons are the second of the supposed causes of this disease.

That the poison of lead is capable of producing the colic of Poitou, is an obvious truth, which can admit of no controversy. But let us see, whether

or not there be any reason for a commonly received opinion, that other metals have a similar power. Our author supports such an opinion; and appeals to the authority of Joh. Jac. Scheuchzerus, in order to prove that the same effects may be produced by copper. Scheuchzerus, in his *itinerarium alpinum, it. i. an.* 1702, *p.* 17, speaks of a monastery, the inhabitants of which were almost universally seized with a spasmodic colic, which terminated in palsy. The water of this monastery is said to have been pure; and the wine not to have been adulterated with litharge, or any other poison. But it ap-

peared, that the culinary vessels, used for the purpose either of preparing or of keeping the victuals, were all made of copper ; and that the tin, with which they had been lined, was worn off. And hence it was concluded, that copper had been the cause of this malady.

It is certain that copper is soluble by all acids ; by alkalies both fixed and volatile ; by the neutral saline liquors ; and by oils ; and that even common water, suffered to stand long in vessels of copper extracts so much of it, as to gain a taste of the metal. But the

constant effect of any small quantity of verdigrise, or vitriol of copper, taken into the stomach, is immediate on the stomach itself, and on the intestines. Neuumann knew a person, who, having accidentally swallowed a sleeve-button of brass, was seized with violent disorders in the first passages, and died in agonies. Vehement vomitings, and even convulsions, have been excited in children by the *unguentum ægyptiacum*, the *basis* of which is verdigrise, applied to ulcers of the mouth; some of the ointment having been accidentally swallowed. Small doses of the blue vitriol have frequently

been administered, as a remedy in intermitting fevers, and in epilepsies. Several cases are mentioned, which have thus been successfully treated; the medicine having acted as a powerful emetic. But I do not hear of any experiments, which tend to prove, that the preparations of copper are productive of the colic of Poitou. It is therefore most reasonable to conclude, that that metal was unjustly suspected by Scheuchzerus.

Antimony has likewise been condemned, as productive of this species of colic; and our author adds to an history, cited

from Mercurialis, a case, which fell under his own observation, tending to shew, that antimony had really been the cause of this colic. A sea-surgeon, who had for several weeks, taken some grains of crude antimony, every day, was seized with a colic, which ended in a paralytic affection of his hands and feet. It has been the fate of this substance very frequently to incur the suspicion of being poisonous. It was proscribed by a decree of the faculty of physic at Paris, followed by an *arrêt du parlement*, in the year 1556. Paulmier de Caen, physician at Paris, was degraded in 1609, for having given anti-

mony; which, however, in 1637, was by the faculty classed among remedies, in a book published under their authority. At length, in 1666, the decree and arrêt were revoked. But here we find antimony again arraigned, after having long had the character of an innocent ineffective medicine. Probably the truth was, either that the sea-surgeon, whose case is mentioned, had taken the native mineral, which having not been purified, might contain some particles of lead ore; (for this is said to be the case of the English antimony in general) or, what is a more likely supposi-

tion, that the disease owed its origin to another unsuspected accident.

Nor is there any foundation for us to imagine, that this disease was ever occasioned, as has been supposed, by the *effluvia* of antimony in the mines. We are informed that the ordinary effects of antimonial *effluvia* are suffocation, apoplexy, vomiting, *diarrhœa*, loosening of the teeth, and salivation:—very different effects from those to which persons are subject, who inspire the exhalations of lead. Salivation, mentioned by Siemens in his dissertation *de metallurgia morbifica*, as hav-

ing been often raised by the fumes of antimony, has been generally regarded as the specific operation of mercury only. But Dr. James lately informed me, that for sixteen years last past, his fever powder has contained no mercury; and yet that, within that space of time, he has known at least six instances of a salivation raised by his medicine. He added, that the patients, who were thus salivated, had neither their teeth loosened, nor their breath made offensive; as happens in a mercurial ptyalism.

It has been likewise supposed, that the fumes of mercury

are productive of this colic. Having made a particular enquiry, concerning this fact among the gilders on copper and silver, I find, that they, who stand over the fire, while the mercury evaporates, are, in general, pale and cachetic; that they are much affected with tremors and debility, particularly in their hands; and that, when the disease is confirmed, like patients labouring under the *chorea sancti Viti*, they have no command over the muscles, which naturally obey the will. It is denied, that, in general, these artists are subject to colic or costiveness. But if they sometimes suffer pains

in their bowels; nay if it even can be proved, that a gilder, on copper or silver, has now and then been affected with the colic of Poitou; may not such an effect very reasonably be imputed to the poison of lead, with which mercury is known to be frequently adulterated?

Those, who work in the mines of quicksilver, ordinarily suffer diseases, similar to what we observe in gilders on copper and silver. Fallopius, in his treatise on metals and fossils, informs us, that these miners hardly ever live three years; and Ettmuller, in his *mineralogia*, testifies, that they

fall into tremors of their limbs; and that they are affected with asthma, and vertigo, and palsy. Islemann, in his dissertation *de colica saturnina*, insists, that, unless we use the term *mercury* in the sense in which it was used by Paracelsus, and understand by it every thing which arises in form of smoke from mineral substances, there can be no reason to attribute the colic of Poitou to mercury. "It cannot," says he, "be sus-
"pected of being the cause of it
"among our miners: it being
"well known, that quicksilver
"is not, in Germany, found in
"the mines of other metals.
"But the effects of the vapour

" of quicksilver differ widely
" from this disease. Adficiuntur
" hydrargyri effluvia qui hause-
" runt, lipothymia, sudore fri-
" gido, convulsionibus, ἀναισθη-
" σία, apoplexia, epilepsia, et
" præsertim artuum tremore,
" paralysi, ptyalismo, et den-
" tium vacillatione. Respon-
" dere quidem nonnulla horum,
" quæ enarravimus, symptoma-
" tum morbi nostri indoli pri-
" mo intuitu videbuntur; ast
" curatius rem si perpenderi-
" mus, differentia eorum haud
" difficile adparebit. Quæ enim
" ab hausto mercurio oriri so-
" lent convulsiones, paralyses,
" sudores frigidi, lipothymiæ,
" ex idiopathia, absque præ-

" gressis gravioribus malis,
" ægros infestant ; cum e con-
" tra eadem morbum nostrum
" symptomatice, precedentibus
" nimirum ventriculi et intesti-
" norum doloribus, a mercurii
" vapore minime oriri solitis,
" subsequantur."

We cannot wonder at Dioscorides, who in his earlier time, asserted, ὑδράργυρον ποθεῖσαν τὰ αὐτα ἐπιφέρειν τῇ λιθαργύρῳ· but we could hardly find an excuse for one, who should, in the present age of experiment, content himself with subscribing to such an opinion, without giving himself the trouble of a more particular examination.

M. du Bois, in his *thesis*, intitled *non ergo colicis figulis venæ sectio*, seems to be confirmed in an opinion, that all the metals, and many other fossil substances, are capable of exciting this same species of colic. "Æris, "plumbi, stanni, argenti atque "auri fabris eadem impendet "lucri pœna. Simili causa, "parique modo plectuntur, qui "crystallo, speculis, marmori, "gemmis aut cædendis aut po-"liendis operam navant." To this I shall only reply, that since M. du Bois has ascribed the very same effects to such a multiplicity of causes, contrary to the general observation of others, it should seem not un-

reasonable to conclude, that many of the twelve hundred patients, whom, in the space of twenty three years, this physician attended in the hospital of *la Charité*, with so inconsiderable a loss, were not really affected with the genuine colic of Poitou.

What relates to the third supposed remote cause, namely *the abuse of wine, and of other sour and austere fermented liquors, and of unripe acids*, has been sufficiently considered in *an enquiry concerning the cause of the endemial colic of Devonshire*. Nor does it seem necessary, in this

place, to enter afresh into a discussion of that subject.

The fourth of the remote causes, mentioned in this Latin treatise is the gout and rheumatism.

Perhaps there may be some reason to think, that a disposition to the gout, which seems to be a disease of the spasmodic kind, may be increased by the same cause, on which this species of spasmodic colic depends. However this may be, it is very certain, that pains in the limbs are constant symptoms of the colic of Poitou. These pains

are generally antecedent to the paralytic affection : and, as well as the colic itself, are apt to cease, and to return again at intervals. They sometimes, though rarely, fix for a short time in a particular limb ; there bring on a slight inflammation, and personate the gout. A remarkable connection, or sympathy, subsisting between the bowels and the limbs, has very frequently been observed. A person shall suffer pains in his intestines, in consequence of being wet in his feet. A dysentery, injudiciously treated, shall be changed into a rheumatism. Dr. Akenside saw, in St. Thomas's hospital, so

many instances of a translation of disease from the limbs to the bowels, and *vice versa*, that he is induced to call a species of dysentery, unattended with fever, which he describes in his *commentarius de dysenteria*, a *rheumatism* of the intestines.

But although it be not denied, that the gout and the rheumatism do sometimes quit their proper station, and attack the stomach and intestines; yet experience by no means testifies, that palsy is the ordinary consequence of such an attack. A pain in the bowels, arising from a gouty cause, under proper management, generally

returns to the extremities; which are very apt, for some time afterwards, to be swollen, and weakened. But a paralytic affection is not the usual termination of an arthritic colic. That *paralysis*, to which gouty people are subject, as far as I have observed, attacks them in form of an *hemiplegia*, a disease very unlike that, which is the subject of our present consideration, in many particulars.

Our author gives, under this head, an account of a whole family, consisting of five persons, who were all first seized with arthritic pains, and then with a colic, which was suc-

ceeded by a palsy. Two of this number died. There is a circumstance in this history, which appears extraordinary. A lady is said to have been affected with all the symptoms above-mentioned, by the means of having slept in the same bed with her sick husband. And we are informed, that there have been many instances of this malady's having been communicated from the husband to the wife, and from the wife to the husband; and that, "con-"cubare vetant visa." But surely, it is much more probable, that five people, living under the same roof, were affected by the same poison, con-

veyed in their food and liquor ; than that the gout, palsy, and colic, were propagated through the family by contagion. For what reason can be given, why contagion was to be suppposed to have prevailed in the present case, rather than in the case of the eleven persons, of the same family, mentioned in page 67, whom the author represents as miserably tormented by the colic of Poitou, from one common cause, which he satisfactorily explains ? We are there informed, that all the eleven patients, " mutato tecto, reno- " vata *aqua*, convaluere."

Obstructed perspiration is the

fifth of the remote causes, to which this disease is referred.

Ever since Sanctorius published his statical experiments, the importance of the fluid, secreted from the external surface of the human body, has been by writers most strenuously insisted on; as if health, or its contrary, were the necessary consequence of perspiration properly regulated, or otherwise. The fluid, which nature thus constantly separates from the blood, in greater or in less quantities, has been considered entirely as excrementitious, and necessary to be thrown off; and any obstruction, given to

it, has been regarded as, in effect, the detention of so much poison in the body. Hence there is scarcely a disease known, which, at one time or other, has not been attributed to this cause. Whether the colic of Poitou can justly be referred to it, we shall now examine.

"It has been proved, that "the rheumatism is one of the "causes of this disease. The "rheumatism is frequently oc- "casioned by obstructed per- "spiration. It follows there- "fore that obstructed perspira- "tion is a cause of the colic of "Poitou." The first proposi-

tion not being allowed, the whole force of this reasoning is at once destroyed.

In confirmation of this theory, the case of an healthy man is appealed to, who, having incautiously, and without his usual clothes, exposed himself to the cold of the morning air, was, in consequence thereof, attacked with severe pains in the epigastric region ; and afterwards became paralytic in his hands and feet. The faithful partner of his bed, who had been constant and indefatigable in her attendance on her husband, likewise obstructed her perspiration ; was attacked with the same colic ;

became paralytic; and died in convulsions. Surely a disease, which thus affected two people in the same house, must have been excited by a less general cause, than what is here supposed.

It seems indeed not improbable, that taking cold may prove an accessory, an occasional cause of this disease; where a person is otherwise disposed to it. This was the case of the painter mentioned by M. de Haen in his first history *(ratio medendi, p. x.)* "Noctu, ob ve-
"hemens tonitru, lecto exiliens
"frigori se diu ad fenestram
"exposuit; dein obdormivit

" iterum. Ex somno autem " expergefactus, intolerabilem " percepit, utraque pedis in " planta, ardorem, unaque octa- " vum colicæ suæ paroxys- " mum." And Citois formerly advised his countrymen of Poitou to avoid the cold and damp air of the morning; not that he seemed to regard cold air as the primary cause, but only as accessory, in cases where there was a previous disposition to the disease. A French writer therefore speaks judiciously concerning this subject. " Tout " ce qu'on pourroit accorder, " c'est que dans ceux, qui por- " tèrent le germe de cette ma- " ladie, la transpiration suppri-

" mée pourra le faire develop-
" per plus promptement qu'il
" n'auroit fait, ou bien rendre
" la maladie plus grave, qu'elle
" n'eut été."

Physicians, who have written concerning the diseases of the West-Indies have generally mentioned obstructed perspiration, as one of the principal causes of the dry belly-ach. And the learned author of the Latin treatise, which we are now examining, in this part of his work, seems to be convinced, that the endemial colic of Surinam is to be referred to that cause. But there is a much greater appearance of

probability in the opinion, which this author himself patronized in a former chapter; namely, that the endemial colic of Surinam is occasioned by the wines of Bourdeaux; which, being apt to turn sour in a very hot climate, *iniqua conservatur arte*. And the reason alleged in that chapter, why the negroes are not infested by the colic of Surinam, namely, because they drink no wine, is much more like truth, than that, which is assigned in the present chapter; namely, that the negroes have stronger constitutions than the Europeans. And the author himself adds, that, in colonies, where the

Madeira wines are drunk, instead of the French wines, this colic is not endemial. But, in fact, if it be admitted, that obstructed perspiration is a cause of the colic of Poitou ; no good reason can be given, why that disease is not, in all parts of the world, nearly as common as a catarrh, or a *diarrhœa*.

The sixth supposed cause of this colic is *the scurvy*.

Willis justly remarks, that the scurvy, like a condemned and infamous name, has had the scandal of most mischiefs charged to its account. And it is well observed by Hoffman, that

when physicians are not acquainted with the real cause of a disease, they are very apt to accuse the scorbutic acrimony of the juices, and to hold out this cause, as a cover for their ignorance. Upon this principle, as I conceive, the colic of Poitou has, in common with many other distempers, been supposed to be of scorbutic origin.

The Dutch seem to have corrupted the original word *schorbeck*, which signifies, in the Danish language, a disease of the mouth, into *scheurbuyk*, a word denoting pains in the belly. The former name very

well expresses one of the most essential and pathognomonic signs of the scurvy. The latter does not appear to have been properly applied to it.

For the truth of an observation, that a colic, ending in palsy, is a symptom of the scurvy, our author appeals to the opinion and testimony of Eugalenus; who enumerating no fewer than forty-nine scorbutic symptoms, adds this species of colic to his immense catalogue. But, in order to determine, what degree of deference is due to the authority of Eugalenus, we ought to reflect, that it was the

favourite opinion of that author, on which he frequently pays compliments to his own sagacity, that the scurvy is apt to assume the appearance of almost every known disease, acute as well as chronic. And surely the judgment of a physician is not much to be regarded, who could take a proneness to faint, in lying-in women, for a symptom of the scurvy; and who could determine the mortification in the foot, of a man of seventy years to be scorbutic, from the black and purple spots, which appeared on the mortified part; and from the small, weak, unequal pulse of the patient. *(See Lind's treatise on the scurvy, page 29.)*

Nor is this fact established, although we find the same observation repeated by subsequent writers. For as it has been abundantly shewn by the ingenious Dr. Lind, all succeeding writers, for a considerable time after Eugalenus, follow him religiously and minutely in their description of this disease.

That scorbutic patients may sometimes suffer pains in their bowels, as well as in other parts of the body, is not controverted. Nor do we contend, that even the colic of Poitou is incompatible with the scurvy. But those authors, who have

been most conversant with the scurvy, and who have given the most faithful and accurate description of it, do by no means testify, that a colic, terminating in palsy, is the ordinary effect of that disease, in long voyages.

Dr. Lind instructs us, that the *scorbutica paralysis* generally comes on, without any preceding colic, in the second stage of the disease; and that it arises from a contraction of the flexor tendons of the ham; and is attended with a swelling and pain in the knee. Besides, the loss of motion, to which scorbutic patients are subject, dif-

fers in several particulars, from the palsy, which succeeds the colic of Poitou. This, for the most part, affects the upper extremities; that the lower. Then, it is observable, that scorbutic patients, although they may want strength to walk, or even to stand; yet, when in a recumbent posture, have still a power of moving their limbs. Likewise, the scorbutic palsy is not so constant and permanent; but has its changes and intervals, and is apt to make sudden and momentary attacks; so that a person, who yesterday, could not support the weight of his body, shall to-day with small assis-

tance, be able to walk a little; nay, in the course of a single day, the inability to walk shall come on, and shall cease, several times. This is agreeable to what is said by Willis, in his treatise *de scorbuto.* "Affectus "paralytici, scilicet impoten- "tia aut resolutio unius aut "plurium membrorum, item "stupor et formicatio sensus, "scorbuto ingravescenti crebro "superveniunt: cujusmodi ta- "men symptomata, ut plurimum "non sunt valde fixa et perma- "nentia; verum modo cessant "et remittunt, modo repetunt "et intenduntur:" Nor will there appear to be any weight in an observation, that, "in a

" scorbutic palsy, when arising " from a muriatic cause, the " limbs of a patient will be- " come rigid; when arising " from an acid or alkaline " cause, flaccid and pendu- " lous;" since Sir John Pringle seems very judiciously to have excluded the muriatic, the acid, and the alkaline causes; and properly to have considered the scurvy as one, simple, uniform disease, arising only from putrefaction.

The seventh supposed cause, mentioned in this treatise, is *melancholia*.

The ancients, having given

to the liver the office of sanguification, from a mixture of the four principal humours, supposed the redundance of the yellow bile to be carried into the gall-bladder, and what remained of the black bile to flow through the *vena splenica* into the spleen, as its receptacle. And to this black bile the source of many disorders was referred. In the barbarous and very imperfect state of the ancient physiology, we cannot be surprised that such a doctrine was established among physicians. But it is wonderful to find some of the moderns, at the same time that they cannot but know the foundation of such a theory to

be false, through an ill-placed veneration for antiquity, not only retaining the terms *black bile*, and *atrabiliary humour ;* but vainly torturing their imagination, in order to explain principles, in themselves most inconsistent and incomprehensible ; to reduce into system and method *quæ in se neque consilium neque modum habent ullum.* In no part of his works is Boerhaave at greater pains to reconcile the ancient to the modern physiology ; and in no part of his works does he give his reader less satisfaction.*

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* A few years ago I was consulted by a gentleman who had taken many medicines

The opinion of the several authors, who are here appealed to will not appear to be of importance, if we consider, how little probability there is in the following theory; namely, "that this black bile, being "out of its natural course, and "penetrating the coats of "the intestines, is transferred "to the membranes of the *ab-*"*domen;* and that thus an ob-"stinate colic is excited, which

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with a view to dissolve the *atra bilis*, which was supposed to appear as well in what he vomited, as what he voided by stool. After death, this *atra bilis* was found to be no other than blood from an ulcer at the beginning of the *duodenum*.

" is to be relieved only by " palsy."

As to the instances brought to prove that grief has occasioned this colic, by having generated the black bile, they appear very inconclusive. In the first case, no better reason is given for the supposed undoubted presence of the black bile, than because the patient was affected with *urentes in cute carbunculi;* and was afterwards cured by the liberal use of the spring-juices, and Spa-water. In the next history, in which a lady, who had suffered great anxiety of mind, is said to have been affected with colic

pains, and to have lost the use of her fingers; the only argument here brought to shew, that black bile was the cause, is founded upon an observation that a *diarrhœa*, occasioned by the use of saponaceous medicines, and of the fruits of the summer, was the means of her recovery.

There now only remains, to be examined, the last supposed cause of this colic, namely, *the passions of the mind*.

That violent passions of the mind are capable of exciting various disturbances in the human machine, is a fact, which

can admit of no doubt. We sometimes, however, meet with histories of diseases supposed to be thus occasioned, which histories seem to border on the marvellous, and almost surpass credibility ; so that we cannot help suspecting that the case has been imperfectly stated ; and that some circumstances have been omitted, which, if fairly represented, would set the whole fact in a different light. We have heard of instances of the small-pox having been occasioned, by a fright, when there has been no possibility of contagion ; and the most terrible effects of the bite of a mad animal have been said to

have been excited by the mere passion of anger. If such histories are admitted as authentic, we can have no pretence to doubt, that anger, or sorrow, or a sudden fright, may have been the immediate cause of a disease similar to the colic of Poitou. But still, it will be granted, that these are very extraordinary effects of the passions: such as have not, I believe, been observed by many physicians, even of the most extensive practice.

It is affirmed, that this species of colic often occurs in hysterical women, and sometimes in hypochondriacal men, of an

irritable system of nerves. We may admit this to be a fact; and yet it will not follow, that the hysterical and hypochondriacal disease ought to be otherwise considered, than as the predisposing cause. Persons, of a delicate habit of nerves, may perhaps be particularly susceptible of impressions, made on the body by certain poisons; but it would be highly unphilosophical to infer, that the poisonous influence resides in a disposition of body, favourable to its reception. The painter, mentioned in M. de Haen's first history, after a violent fit of anger, is said to have suffered convul-

sions, which were succeeded by a return of his colic. In this case, the poison, which had a long time been admitted into the constitution, in consequence of his daily employment, was, by the passion of anger, immediately brought into action; but by no means created by the passion of anger. It was formerly observed by Citois, that the inhabitants of the province of Poitou, who had suffered anxiety of mind on account of any misfortune to themselves, or families, were particularly subject to this colic. The general cause of it had been principally attributed to the sour wine of the coun-

try; and the passion of grief may easily be supposed to have rendered the body more susceptible of injuries from the endemial poison.

Sydenham, who, in his epistolary dissertation, addressed to Dr. Cole, is very copious concerning the universal influence of the hysteric disease on every part of the body; and who gives a particular description of the hysterical and hypochondriacal colic; informs us, that jaundice, and not palsy, is the natural termination of that disease. Whenever therefore this species of colic does happen in hysterical habits, may it not

fairly be considered, rather as the effect of a latent cause, taking advantage, as it were, of such a constitution, than as the offspring of an original disease?

Thus have I examined the several supposed causes of the colic of Poitou, with a view to ascertain its real and specific origin. It may be observed, that there are in nature various substances, as well medicinal as poisonous, which have properties peculiar to themselves; and which are distinguished from other substances by the constant and uniform changes, which they, and they only, pro-

duce in the human body. It is the peculiar operation of lead to excite a disease, most remarkably characterized. I do not venture to affirm that there does not exist another cause productive of similar effects; but from what has above been written, it may perhaps appear, that such a supposition is not void of probability; since no other cause has hitherto been shewn to be adequate to the *phænomena*.

V. *An Appendix to an Inquiry concerning the Cause of the Endemial Colic of Devonshire.*

Read at the COLLEGE, August 11, 1767.

SINCE an *Inquiry concerning the cause of the endemial Colic of Devonshire* has been printed, I have received several articles of important intelligence on that subject; which are here subjoined.

Dr. Ingen-housz, not being entirely satisfied with the information, which he received, when he was at Rouen, has inquired of a physician of that

place, by letter, concerning the method of making cyder in Normandy ; and particularly whether there be any disease in that province, which may be supposed to be the effect of the provincial liquor. In answer to his queries, he has received an *analysis* of two dissertations, which were lately read before the academy of Rouen, by M. Chaudelier, a celebrated chemist of that city ; from which *analysis* what immediately follows is extracted.

" Dans Rouen, il n'y a guè-
" res ou point d'années, où il
" n'y ait des coliques, qui atta-
" quent ordinairement les do-

" mestiques par préférence, et
" en plus ou moins grand nom-
" bre dans les mêmes maisons :
" ce qui fait présumer qu'elles
" sont occasionnées par le cidre
" qui est la boisson ordinaire
" des domestiques.

" Aux mois d'Aoust et Sep-
" tembre, 1766, les maîtres de
" plusieurs maisons de considé-
" ration aiant beaucoup de leurs
" domestiques attaquées de co-
" liques, engagerent un chy-
" myste, de nôtre academie de
" Rouen, à examiner et analy-
" ser leurs cidres, pour tacher
" de découvrir la cause de ce
" désordre. Il fit avec zèle
" et desintéressement l'examen

" de ces cidres ; et comme ils
" avoient un gout agréable d'a-
" bord, qui laissoit cependant
" apercevoir ensuite un aigre
" et un acerbe, qui affectoit la
" bouche d'une espèce d'astric-
" tion et secheresse, il com-
" mença par s'assurer de la
" presence de l'acide ; &c.

" Mais soupçonnant, que les
" maladies qu'on lui attribuoit,
" venoient de quelque chaux de
" plomb, et craignant que l'u-
" sage pernicieux de quelques
" marchands de vin ne se fut
" communiqué à quelques mar-
" chands de cidre, il ne negli-
" gea aucun des moiens pro-
" pres à s'assurer de la presence
" du plomb.

" Le foye de soufre arsenical,
" l'évaporation à siccité, et la
" calcination avec des matières
" abondantes en phlogistique,
" furent emploiées ; et malgré
" une attention scrupuleuse, à
" n'enlever les cendres que par
" le moien de lotions, il n'y
" trouva pas le moindre atome
" de metal.

" Il ne conclût pas pour cela,
" que le cidre n'étoit pas la
" cause des coliques regnantes ;
" mais comme le cidre étoit
" doux et aigre, melangé de ci-
" dre vieux et nouveau, ce qu'-
" on appelle ici *cidre coupé*, et
" ce qui est fort en usage, il
" conclût que *le cidre coupé* cau-

" soit des coliques, et étoit d'un
" usage dangereux.

" On attribue donc au cidre
" les coliques qui règnent ici de
" tems en tems ; mais on ne
" voit guères ou point de pa-
" ralysies, qui en soient la
" suite.

" Presque toutes les auges
" circulaires, où l'on écrase les
" pommes, sont de bois, et join-
" tes avec des chevilles, sans
" aucun metal. Il s'en trouve
" cependant quelques unes qui
" sont construites de pierres,
" et sur tout de grais, creusées
" exprès et mises bout à bout,
" dont les jointures sont garnies
" de plomb.

" La faiselle ou plancher du " pressoir, sur lequel le suc des " pommes s'écoule, est par tout " nôtre canton fait de bois, sans " aucune plaque de plomb."

It is fairly then to be inferred from the testimony of M. Chaudelier, that the colic, which, from time to time, infests the inferior class of people in the province of Normandy, is not analogous to the colic of Devonshire ; since " on ne voit " guères ou point de paralysies, " qui en soient les suites."

It may likewise be concluded, that if we even suppose, what however is not proved,

that the Norman colic does now and then end in a paralytic affection, such cases may reasonably be referred to lead, as the cause of that disease: since, although wooden troughs be in general used in Normandy, it is acknowledged by M. Chaudelier, that " il s'en trouve " quelques unes, qui sont con- " struites de pierres, dont les " jointures sont garnies de " plomb."

My opinion therefore, concerning the cause of the colic of Devonshire, seems to be greatly confirmed by the experience of the inhabitants of Normandy.

It was hardly expected, that the practice of lining cyder presses with lead would ever have been defended, as a practice not at all likely to be productive of mischievous consequences. But it has been supposed, that the pernicious qualities of lead cannot possibly be extracted by the liquor as it flows from the press; there not being sufficient time for it thus to receive a metallic impregnation. Such an argument has even zealously been urged, in opposition to the authority of a decisive experiment above mentioned, as well as to the testimony of the learned Dr. Wall. But I have re-

ceived other positive and circumstantial accounts, from parts of England, where this disease is not endemial, which confirm both the validity of the experiment, and of Dr. Wall's observation; and it has been particularly remarked, that, in that part of the county of Dorset, which adjoins to Somerset, the colic of Poitou is a frequent disease; and especially in those parishes, where the custom of lining the cyder presses with lead most generally prevails.

Dr. Nooth, who communicated to me this, as a certain fact, knows a gentleman, resident in the neighbourhood above men-

tioned, who uses no lead in the *apparatus* for making cyder, and whose family has never been affected by the colic of Poitou, although his servants drink largely of that liquor.

Another piece of information, which I have received from a gentleman of the county of Dorset, is really most alarming. "It is," says he, "a common practice among our farmers, to buy, at the apothecaries shops, large quantities of sugar of lead, with which they are known to sweeten their cyder." It is hoped, that such a pernicious practice will be abolished as soon as it is

known, what are its certain and necessary consequences.

I am informed likewise, that in several of the cyder counties, a leaden pipe has sometimes been contrived for the purpose of conveying the new cyder from the press to the cellar: and I could relate more instances than one of the colic's having by such means been occasioned among all the servants and labourers of a farmer, to whom that disease had intirely been unknown, before the introduction of the leaden pipe. But it is presumed, that to endeavour to corroborate what has already been offered, by

farther evidence, would only be *uti in re non dubia testibus non necessariis.*

With respect to the opinion, which has prevailed, that the sour unripe cyder is the cause of this provincial disease, such ground cannot be maintained, unless (what has not hitherto been done) it can be shewn, that there is any where to be found an acid liquor of a similar poisonous quality, whether drunk in its unfermented, or fermented, state, or in the act of fermentation. For what probable reason can be imagined, why the apple juice, of one part of this island only, should be possessed

of such a baneful peculiarity, such an exclusive privilege of being thus pernicious? But, in fact, every step, which I have taken in this inquiry, has tended to confirm and to illustrate my idea, that the malady, in question, owes its origin, partly to a variety of accidents, and partly to fraud; causes, which will easily be obviated, when once men have divested themselves of those prejudices, by the means of which that plain and direct path, which leads to truth, has been darkened and obstructed; and an error, most detrimental to society, has become inveterate.

V*. *Farther Observations on the Poison of Lead.*

Read at the COLLEGE, Dec. 11, 1771.

SINCE the edition of the first volume of *the Medical Transactions*, several observations have occurred to me concerning the poison of lead. I have likewise received from my friends several articles of information on the same subject. These are here thrown together, as serving to illustrate what was offered in my former papers, and to add farther weight to my general opinion.

What immediately follows, is an extract of a letter which I received from Dr. Wall of Worcester, to whom I was formerly obliged for some important remarks, when I first began this enquiry.

"I here transmit to you
"some facts, which may serve
"to confirm your doctrine, that
"*the poison of lead may gain ad-*
"*mittance into the human body,*
"*unobserved and unsuspected.*
"A gentleman of this town
"was the father of a numerous
"offspring, having had one and
"twenty children, of whom
"eight died young, and thir-

" teen survived their parents.
" During their infancy, and in-
" deed until they had quitted
" the place of their usual resi-
" dence, they were all remark-
" ably unhealthy ; being parti-
" cularly subject to disorders
" of the stomach and bowels.
" The father, during many
" years, was paralytic ; the
" mother, for as long a time,
" subject to colics, and bilious
" obstructions. She died at
" last of an obstinate jaundice.
" This disease had been seve-
" ral times removed by the use
" of the Bath-water ; but it al-
" ways came on again soon
" after her return to Worces-

" ter ; and at last eluded every
" method and medicine which
" was tried.

" After the death of the pa-
" rents, the family sold the
" house which they had so
" long inhabited. The pur-
" chaser found it necessary to
" repair the pump. This was
" made of lead : which, upon
" examination, was found to be
" so corroded, that several per-
" forations were observed in
" the cylinder, in which the
" bucket plays ; and the cis-
" tern in the upper part was
" reduced to the thinness of
" common brown paper, and
" was full of holes, like a sieve.

" The waters of this town are
" remarkably hard. They cur-
" dle soap; coagulate milk;
" let fall a large precipitate
" upon the addition of an alkali,
" either fixed or volatile;
" and, in dry seasons, taste
" bitter and aluminose. They
" consequently contain a calca-
" rious earth dissolved by an
" acid which appears to be of
" the vitriolic kind. Though
" such an impregnation may
" not make water a perfect
" menstruum of lead, yet it cer-
" tainly may make it capable of
" corroding that metal; and
" therefore the caution of Ga-
" len and Vitruvius, with res-
" pect to the use of leaden

" pipes, for the purpose of con-
" veying water, as cited by you,
" appears to be well founded,
" for the reason which you
" have assigned, viz. because so
" much lead may thus be me-
" chanically mixed with, and
" suspended in water, as to
" communicate to it noxious
" qualities. The foregoing ac-
" count fully confirms the truth
" of your observations; and
" indeed it is more than proba-
" ble, that the water of this
" pump, thus mixed with lead,
" did occasion the unhealthi-
" ness of the family who drank
" of it. Since I wrote what is
" above, I have been informed
" by the plumber employed by

" that family, that he had seve-
" ral times repaired the pump ;
" and particularly that he had
" done so not more than three
" or four years before the gen-
" tleman's death ; and that he
" then found it nearly in the
" same state as it has been de-
" scribed ; so that the corrosion
" was effected in a short time ;
" and consequently the water
" must have been very strongly
" impregnated with the noxi-
" ous qualities of the metal.

" In a former letter, from
" which you made some ex-
" tracts, I mentioned the case
" of a woman, who was afflic-
" ted with the usual symptoms

" of the colic of Poitou, occa-
" sioned by drinking cyder
" which had been made at a
" press, the bottom of which
" was covered with lead. Since
" that, I have had two more
" patients from the same vil-
" lage, who were affected in
" the same manner, and from
" the same cause. One of these
" was a farmer, in good circum-
" stances, who had had fre-
" quent returns of the dry-
" gripes, which at last left him
" with a tremor in his hands,
" and great weakness in his
" wrists. As he was igno-
" rant of the true cause of
" his complaints, he had
" drunk his cyder at inter-

" vals, during his whole ill-
" ness, until I acquainted him
" of the dangerous tendency of
" it. He then recollected that
" the pains in his bowels had
" constantly used to come on,
" after he had made a more free
" use than ordinary of that li-
" quor. The other was my
" patient in the Worcester In-
" firmary. When he was ad-
" mitted into the house, he had
" great pain and constipation
" in his bowels; his wrists
" were paralytic; and the back
" of his hands much swoln.
" He told me, that, for several
" years, he had usually been
" afflicted with the dry gripes
" in the spring, viz. about the

" time when the cyder, made
" in the preceding autumn,
" began to be tolerably fine,
" and fit for use. That season
" had been remarkably wet;
" so that the apples had not
" ripened well, but the juices
" of them were crude and im-
" mature. The cyder there-
" fore was more austere and
" acescent than common; and
" on that account must have
" acted more powerfully on the
" metal, than it usually had
" done in more seasonable
" years; and for that reason
" the liquor had now had a
" more violent and permanent
" effect on him than formerly."

" I am inclined to think, that " cyder, made in mills or presses, in which lead is used, is " more or less noxious in proportion to its age. It seems " probable, that part of the metal may sink down with the " lees, especially where it is " only corroded or mechanically mixed with the liquor; " and therefore that the cyder, " which is of a considerable " age, and especially such as " has been frequently racked off " from the sediment, may be in " a great measure freed from its " poison. In some parts of " Gloucestershire, especially " where the clothing manufactures are carried on, the

" cyder-presses are usually co-
" vered with lead ; and I have
" been informed by some per-
" sons of undoubted credit, that
" if their workmen drink their
" cyder whilst it is new, before
" it is well cleared, and has
" thrown down its sediment,
" which they are very apt to
" do, most of them are affected
" with pain in their bowels,
" and weakness in their wrists ;
" but that, if they do not drink it
" until it is of proper age, they
" escape better, and seldom ex-
" perience such effects.*

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* Hence probably it happens, that such patients are sometimes found in the Bath hospital, from the county of Gloucester,

" I should sooner have
" transmitted this paper to you,
" but that I have waited to have
" the effects of the saturnine
" applications, so much recom-
" mended by M. Goulard, as-
" certained. Upon very fre-
" quent trials, our surgeons

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and rarely any from that of Hereford or Worcester. " All such paralytics," says Dr. Charleton, " come to our hospital from the " counties of Devon, Somerset, Gloucester, " and Cornwall. It is a very remarkable " fact, that during the thirteen years to " which this enquiry extends, there has been " only one such patient sent us from Here- " fordshire and not one from Worcester- " shire."

See *An enquiry into the efficacy of warm bathing in palsies,* by *R. Charleton, M. D. Physician to the General Hospital at Bath,* page 81.

" have found, that the *acetum li-*
" *thargyrites* or *extrait de sa-*
" *turne*, as M. Goulard calls it,
" does really deserve, in a great
" degree, the character which
" he has given of it. They
" have applied it, with consi-
" derable success, to inflamma-
" tory and indurated tumors,
" even in some cases which
" had resisted every other me-
" thod. It has been particu-
" larly beneficial in the *hernia*
" *humoralis*, and in some putrid
" ulcers ; but in the latter case
" it does not produce its effects
" so certainly ; sometimes do
" ing nothing and sometimes
" seeming to affect the bowels.
" In general, it is found to

" allay inflammations very spe-
" dily. In such instances does
" it not seem to produce its ef-
" fects by destroying the ner-
" vous influence, and so taking
" off the spasm and irritation
" rather than by any resolving
" power, as M. Goulard suppo-
" ses ? In recent strains, contu-
" sions, fractures, &c. M. Gou-
" lard's application, together
" with a small proportion of
" spirit of wine, is found to be
" of excellent use; and to
" abate the swelling, and take
" off the tension, sooner than
" *spiritus Mindereri*, or any
" other of the common external
" applications.

" Worcester, May 30, 1770."

By the favour of Dr. Addington, I have received from Dr. Hemming, of Crookhern, in the county of Somerset, an account of the following fact. "A farmer in the year 1768, "when great quantities of cy-"der were made in these parts, "bought a wooden cistern, "which contained about four-"teen hogsheads, and lined the "inside with sheet-lead, to the "amount of six or seven hun-"dred pounds weight. Into "this vessel, he poured his "newly-made cyder; where it "remained near a month, and "in that time underwent seve-"ral fermentations. The far-"mer, not apprehending that

" any bad consequence would
" attend it, drank of this cyder
" himself, as did his family.
" Several hogsheads of it were
" likewise sold. All, who
" drank this liquor, were sei-
" zed with violent spasms in
" their stomach; bilious vo-
" mitings; a great tension
" about the *abdomen*; and ob-
" stinate costiveness. The far-
" mer, and some others, lost
" the use of their hands.

" Crookhern, Jan. 24, 1770."

I am in possession of various other attestations, serving to prove, that lead, whenever it is suffered to come in contact with cyder, does very speedily

communicate to that liquor a poisonous quality; and likewise that, in several parts of this country, our cyder has actually had all those opportunities of being affected by the poison of lead, which have been particularly pointed out in my former papers on this subject. I selected the testimony of Dr. Hemming from a great number of similar testimonies, because it came from a physician of credit, who speaks of this accident from his own knowledge; who attended several of the persons affected; and who cannot be supposed to have been deceived with respect to the cause of the malady,

or those effects of which he was an eye-witness. Before I quit this subject entirely, let me not forget to mention, that I learn from unquestionable authority, that the practice of suspending a large ball of lead in the weak, sour cyder, (such as usually comes to the share of poor labourers, who are particularly subject to the dry-gripes from the use of cyder) has been much more common than I formerly apprehended.*

There is likewise another very mischievous practice pre-

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* This practice is mentioned by Dr. Charleton, in his treatise referred to above.

vailing in several counties, which ought not to pass unnoticed in this place; I mean that of drinking cyder out of earthen vessels glazed. Dr. Watson, junior, when he was lately at Exmouth, saw several instances of the Devonshire colic, during the time of harvest, apparently from this cause. And a similar instance, not long since, fell under Dr. Charleton's knowledge, of six persons, who became at the same time paralytic, by drinking cyder, brought to them, while at harvest-work, in a new earthen pitcher, the inside of which was glazed. That the glazing was dissolved by the liquor,

appeared not only by the effects, which the drinking of it produced, but likewise from its having given (as these persons informed Dr. Charleton) that astringent sweetish taste to the liquor, by which the solutions of this mineral are peculiarly distinguished.*

An inquiry† concerning the

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* See Charleton's Enquiry, &c. p. 80.

† In an Essay on this subject, *Med. Trans. vol. i. p.* 181, I cited a passage from the preface to a French pamphlet, written by an anonymous author, wherein there is an intimation, seeming, in some measure, to correspond with the idea which had appeared to me to be more than probable. But I added, that it seemed evident from what the same writer said afterwards

true cause of the Devonshire colic, naturally led me to the

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in the same pamphlet, that he was very far from having formed any decisive opinion concerning the cause of the colic of Poitou.

In a note, added to a late edition of this pamphlet, I find the following words: "Voilà donc mes soupçons éclaircis, et "pleinement justifiés par ces observations. "M. Baker a démontré en 1767 le fait que "je n'avois fait que conjecturer en 1757: "ainsi je lui dois des remercimens d'avoir "donné la preuve de ce que j'avois ima- "giné. Mais qu'il ne dispute pas à ma "conjecture le droit de dix ans d'aînesse "qu'elle a sur la sienne! Je serois assez "content, si je pouvois me flatter (ce qui "n'est pas absolument sans fondement) de "l'avoir mis sur la voie, et de lui avoir fait "naître l'idée des récherches qu'il lui a été "très facile de faire. J'espere qu'en faveur "des raisons que j'allégue, il voudra bien "dorenavant me pardonner de n'avoir pas

consideration of a similar disease, which has been endemial

" affirmé positivement un fait dont la démon-
" stration me manquoit, et qu'il m'a
" fournie."

I am desirous to pay all due honour to this learned and acute physician ; but in the present case, I cannot acknowledge the justice of his pretensions. It might easily be proved, that my paper had some time been prepared for the press, before I ever saw the pamphlet in question, or any part of it ; and that what I cited from it was added by interpolation. But the truth of what is here said, will hardly be doubted by those who know, that this very lively piece of criticism, written *by a physician of Paris,* in its first edition, was never allowed to appear openly at Paris. The gentleman, to whom I was obliged for the perusal of it, informed me, that he procured it in that city not without great difficulty, and as a mark of particular favour. In London, it has hitherto been generally unknown, as

in the West-Indies. And, having had frequent opportuni-

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well in public and private libraries, as in the shops of booksellers.

Having again read over this pamphlet, I have found no reason to alter my original sentiment: I must therefore demur to the claim of *prior occupancy;* and I am apt to think, that an unprejudiced reader, who shall have leisure and inclination to consider the general tendency of this author's preface, and to compare it with what follows in the course of the pamphlet, will agree with me in opinion, that what was cited from the former part seems rather to have been thrown out accidentally, and in the heat of disputation, than to have been delivered as a conjecture, which the author himself then thought probable.

Comparing the two editions of this pamphlet, I find a remarkable variation in one passage. In the first edition, p. 46, our author, having rejected five of the eight supposed causes of the colic of Poitou, pro-

ties of bringing this subject to a more strict examination, I

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ceeds thus : " Il ne me reste à parler que de " la méthode curative, qui regarde les trois " premières causes, sçavoir la bile, les ma- " tières minerales venimeuses, et les vins " verds et austères : or ces trois causes (si " tant est qu'il n'en faille pas retrancher " encore la première) *quoique différentes* " *en apparence*, produisent, malgré ce qu'en " peut dire M. Tronchin, des coliques *à* " *peu près* de même espèce, et qui se gué- " rissent par une même méthode, dont on " ne doit s'écarter, que relativement à de " légères circonstances. Voions cepen- " dant quels sont les remèdes, qu'il con- " seille pour ses trois espèces de colique."

In the second edition, p. 38, the latter part of this quotation is thus changed : " Or, de ces trois causes (si tant est qu'il " n'en faille pas retrancher encore la pre- " mière *et la dernière*) il ne resulta jamais, "malgré ce qu'en peut dire M. Tronchin,

am still farther convinced, that the dry belly-ache of those islands is neither to be considered as a disease, which the inhabitants owe to their climate, as some have supposed ;

" que des coliques de même espèce, et qui " se guérissent par une même méthode. " Voions cependant quels sont les remèdes " qu'il conseille pour ses trois *prétendues* es- " pèces de colique."

From hence it manifestly appears, that in the year 1758, this author had really conceived some doubts, whether *the bile* ought or ought not to be regarded as a possible cause of the colic of Poitou. But from hence it does by no means appear, that he had conceived the same doubts, with respect to *sour and austere wines,* until the year 1767. But let me not engage further in a controversy, so entirely uninteresting, and so unimportant !

nor, according to the opinion of others, as a disease produced by the inordinate use of the acid juices of certain vegetables. The truth is that while our colonists in the West-Indies made their punch with newly distilled spirit, and drank it very strong and very sweet, they were perpetually subject to the colic; but that, having now learned to keep their rum to a proper age, and to drink their punch much weaker than formerly, and extremely sour, they in great measure escape that disease. I have heard it observed, that the servants, who drink the new rum by stealth, are particularly subject

to this disease. It is likewise certain, that experience has now taught the West-Indians, that the juice of lemons and limes is so far from being the cause of this colic, that they frequently find in it a most efficacious remedy against its severest attacks. This observation was formerly mentioned; and it is now repeated upon the best authority. My suspicion that lead, which enters the composition of the apparatus for distillation, is the principal cause of this malady in the West-Indies, has already been communicated. But, upon farther enquiry, I discover, in several of those

islands, more traces of that metal, employed in the preparation of rum and sugar, than I was formerly aware of. For first, the juice of the canes, being expressed by a mill, flows into a vessel lined with lead. From thence it is conveyed to the boiling house through leaden gutters. Likewise the skimmings, which are taken off the liquor during its decoction, as well as the melasses, are conveyed to the still-house through leaden gutters.

Much has already been said concerning the metallic mixture, which in general is used

for lining copper vessels, designed for the kitchen, in which composition lead bears the proportion of ten to sixteen of tin. As I have lately been instructed, the danger of this mixture does not arise merely from the probability that the saturnine part of it may be corroded by the acid juices of vegetables. It is very well known, that vessels, thus lined, frequently want repairing. The metallic mixture adheres to the copper by a very loose connexion. Strong fire speedily disunites it; and it falls off in form of powder. And this appears particularly to be dreaded in the preparation of

food *à la braise*, as the French term it, in which process fire is placed upon the cover, as well as applied to the bottom of the vessel.

Let me here take occasion to mention the common wine-measures; which in this country, as well as abroad, are made of a base kind of pewter, wherein there enters a large quantity of lead. M. Roux, author of *Le Journal de Medicine*, when he was lately in this town, favoured me with the following observation on this subject: "Le vin, qui est des-"tiné au peuple de Paris, est "ordinairement verd et foible,

“ et par conséquent très dispo-
“ sé à l'acescence. Cela va au
“ point qu'en été, lorsque le
“ tems est un peu chaud, une
“ demie heure suffit pour le
“ changer en vinaigre, s'il a le
“ contact de l'air. Les mar-
“ chands, qui le vendent, lui
“ connoissants cette qualité, ne
“ le distribuent jamais à ceux,
“ qui vont boir chez eux, que
“ dans des vaisseaux d'étain,
“ dans l'alliage desquels il en-
“ tre une très grande propor-
“ tion de plomb. Il est bien
“ évident, que le plomb ne
“ peut empêcher ce vin de
“ s'aigrir, que parce que l'acide,
“ à mesure qu'il se developpe,
“ l'attaque, se neutralise, et par

" là est mis hors d'état de re-
" agir sur le vin, et d'en accé-
" lérer la décomposition ; ce
" qui arrive en effet, lorsqu'on
" le tient dans des vaisseaux
" de terre, de verre, ou de bois,
" s'ils ne sont pas bien bou-
" chés."

The celebrated M. Rousseau* attributes the frequency of the colic of Poitou, among the common people of Paris, to the use of poor sour wines, which have been suffered to flow over a surface of lead. The follow-

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* Emile, ou de l'Education, par Jean Jacques Rousseau, tome premier, seconde partie, page 34.

ing is the passage alluded to: "Les vins, qu'on vend en dé- "tail chez les marchands de "vin de Paris, quoiqu'ils ne "sont pas tous lithargirés, sont "rarement exempt de plomb; "parce que les comptoirs de "ces marchands sont garnis de "ce métal, et que le vin, qui "se repand dans la mesure, en "passant et séjournant sur ce "plomb, en dissout toujours "quelque partie.*" M. Roux

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* This practice is mentioned by an anonymous French writer; but he is of opinion, that the colic is but very rarely produced by it, because very small quantities of lead can be dissolved by such means. "Les égouttures du vin, que débitent nos "cabarétiers, reçues dans leur contoir, qui

confirmed this observation, informing me, that the table called *the counter*, on which the wine is measured at Paris, is covered with lead; that this table receives the liquor which is spilt in measuring, having for

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" est une esèpce de cuvette garnie de " plomb, s'aigrissent assez facilement, sur- " tout en été, mais dissolvent si peu de ce " métal, que très rarement elles donnent la " colique." *Examen d'un livre qui a pour titre T. Tronchin de colica Pictonum, par un Médecin de Paris*, p. 27. I shall here only observe, what is confirmed by experience, that, if any part of the metal be dissolved in sour wine, the noxious effects of such liquor cannot be absolutely ascertained. They will be relative to the peculiar constitution of those who shall happen to drink it. In some they will be greater; in some less; and perhaps in others, none at all.

that purpose an hole in it, through which the liquor is conducted into a vessel placed underneath. The fact therefore being as M. Rousseau has stated it, the justice of his animadversion cannot reasonably be doubted; and since it appears that the colic of Poitou is much more frequent at Paris* than at London, its greater frequency there ought perhaps to be referred to this, as one of the principal causes of it. M. Dubois, who was more than twenty years physician to an

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* It is computed by M. Gardane, that at Paris between five and six hundred persons have this disease every year.

hospital at Paris, called *la Charité*, and had therefore great opportunities of investigating and ascertaining the true cause of this species of colic, speaks of it vaguely, and without any precision; for, according to his notion, the same morbid effects may be produced by every noxious mineral and metal, almost without exception.

M. Gardane,* in his *recherches sur la colique métallique*, published at Paris, in the year

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* Censeur Royal, Docteur Regent de la Faculté de Medecine de Paris, Medecin de Montpellier, de la Société Royale des Sciences de cette même ville, et de celle de Nancy.

1768, has by the means of the same hospital thrown a very different light on the subject. Beginning from the year 1755, inclusive, he has published an extract from the register of that hospital, down to the end of July, 1767. Here we find, regularly noted, the trade and employment of each patient, who was admitted within the period above-mentioned. The number is large ; and it is observable, that painters, plumbers, and potters, make up a very great proportion of it. On a nearer examination of the other trades there mentioned, we generally discover, that lead, in some shape or other,

has been more or less concerned. And the remainder of such patients, as seem to have had no dealing with lead in their daily employments, may, as it is observed by M. Gardane, be reasonably supposed to have contracted the disease by the use of wine, poisoned by a solution of lead.

When I was considering the various unsuspected means by which this poison gains admittance into the human body, a very common, but dangerous practice, ought not to have been passed over without notice: I mean that of painting toys made for the amusement of children.

It is well known, that children are apt to put every thing, especially what gives them pleasure, into their mouths ; and it therefore can hardly be doubted but that the disorders of the stomach and bowels, to which they are particularly subject, are multiplied by this practice ; a practice, which lies the more open to censure, as it is of no real utility.

Much has already been urged against the use of the preparations of lead, as internal medicines ; and cases have been related, tending to shew the danger of small doses even of the *tinctura saturnina*, a tincture

in which there can be only a very small portion of that metal. The particulars of the following case have fallen under my own observation. A young man, who had a gleet in consequence of venereal contagion, had been advised to take, twice every day, fifteen drops of *tinctura saturnina*, and to use an *injection*, in which was a solution of *saccharum saturni*. By these means the disorder was cured; but it was immediately succeeded by a dejection of spirits, restlessness, flying pains in the breast and arms, and a very uneasy sensation round the margins of the feet. Then followed costiveness, colic,

jaundice, and strangury. *Cremor tartari*, the common remedy in this case among the miners in Derbyshire, was tried, and with success. Of this medicine he generally took ten drachms every day; and after six weeks, was entirely freed from his complaints. Having an opportunity of examining the phial, from whence the *tinctura saturnina*, which had been given to this patient, had been taken, I found in it a very large quantity of precipitated matter; so that it should seem that a part of the metal had been deposited; and that it could only be an extremely

small quantity of it that had occasioned so much mischief. This history abundantly confirms the truth of what was before observed of the unsafe application of saturnine preparations to the purposes of internal medicine; since, in certain constitutions, very inconsiderable quantities of them are capable of acting as poisons; and since physicians have no lights by which they can come at the knowledge, in what constitutions (if such there are) they may be administered with security; and where their power of doing harm is particularly formidable. How far the solu-

tion of *saccharum saturni*,* used in the *injection*, as before-mentioned, ought to be considered as having contributed to the mischief, I must leave undetermined. But I cannot help observing in this place, that it is greatly to be wished, that all the *injections*, commonly ordered for disorders of the *urethra*, were gone into disuse; since almost every day's experience testifies that such injudicious applications are, in the event,

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* Dr. Charleton, in the treatise above referred to, mentions an instance of a palsy of both legs and arms, occasioned, in the opinion of a surgeon of great eminence, by an attempt to destroy venereal *verrucæ* by rubbing them with *saccharum saturni*.

frequently the parent of obstinate and incurable obstructions of that passage. These indeed are not immediate effects of this compendious method of cure; and it is on that account that they are the less regarded; but they are too apt to appear towards the latter end of life, and to become a cruel aggravation to the miseries incidental to old age.

Since an English translation of M. Goulard's treatise has been published, a certain preparation of lead, strongly recommended by that author, has been brought into general use. This, in skilful hands, has

proved an efficacious medicine, particularly in those cases, which are above specified by Dr. Wall. But, as it is now received into private families, and is used as a domestic remedy by unexperienced persons (whose confidence in every new-fashioned medicine generally keeps pace with their ignorance) there seems to be abundant reason to fear, that the too much celebrated *extract of saturn* does frequent mischief through misapplication. It is admitted, that it powerfully abates inflammation. But, can every external inflammation be abated with security? It checks cutaneous discharges. But are

not some such discharges salutary? The truth of this reasoning has unfortunately been proved by facts. The gout, thus repelled, has been converted into a paralytic affection; and an humour on the skin, thus unseasonably suppressed, has been followed by various mischief. These indeed are objections to the external use of lead, in common with all other cold and astringent applications. I am, however, convinced, that this metal, even outwardly applied, has, in some instances, produced its specific morbid effects; and Dr. Hawley has favoured me with an account of the following curious

fact, which seems to establish the truth of this observation.

" A gentleman, who had for " many years had a fontanel in " his thigh, finding that the " pea was not sufficiently de- " pressed by the usual bandage, " for two or three years past, " applied occasionally a piece " of the thinnest* lead over the " oil-skin, which covered the " pea. This apparently an- " swering the purpose, the oil- " skin was by degrees omit- " ted ; so that the lead was ge-

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* Taken from an Indian tea-chest: in size the piece was not equal to an inch-square.

" nerally in immediate contact
" with the pea and the orifice
" of the fontanel. This was
" the case about the end of
" June 1771; when an unea-
" siness and oppression were
" felt at the *præcordia* and dia-
" phragm, with anxiety and
" difficulty on making a deep
" inspiration. (This complaint,
" it is supposed, much resem-
" bled that which is not uncom-
" monly called by hospital pa-
" tients, *a pain at the heart.)*
" The disorder, daily increas-
" ing, became, towards the
" end of July, so grievous as to
" require the serious attention
" of the person afflicted. On
" recollection, he began to sus-

" pect that his complaints
" might be owing to the nox-
" ious quality of the lead,
" which covered the fontanel.
" He therefore immediately
" threw it off; and from that
" time, without the use of any
" medicines, the disorder very
" soon abated, and in about
" one month was entirely re-
" moved; nor has it in any
" degree returned."

That lead, either when dissolved by fire, or corroded by an acid, emits poisonous *effluvia* is sufficiently shewn by the diseases incidental to plumbers, and painters; nay even by the same effects, which not unfre-

quently happen to those who inhabit houses newly painted. But that a degree of heat, much less than that which is required for melting lead, is capable of detaching such *effluvia* from this metal, is a fact which has not generally been noticed. It was before mentioned, that printers, who imprudently use their *types* while they are hot, are subject to palsy and contraction of the fingers. Upon enquiry, I find the truth of this observation abundantly confirmed. The *types*, after having been used, are washed; and, in order to dry them, they are placed near the fire. An intelligent printer informs me,

that, while they are in this state, an offensive smell, like that of melted lead, arises from them; and that the workmen in general well know the danger of touching them, till they become cold. I have heard of some instances of the colic of Poitou seemingly produced by this cause; and it is observable, that, in M. Gardane's hospital-list, above mentioned, we find many printers.

We have another similar instance of the bad effects of the *effluvia* of lead, in the case of persons employed in *scolloping* glass. Having examined a large manufactory of this kind,

I have received the information which follows. The last polish, given to glass, is done by the means of calcined lead. But there is one part of the process of cutting glass into surfaces of various shapes and angles, which is performed by the attrition of the glass against a thick circular plate of lead, turned with great velocity, from whence a smoke is emitted, which is extremely poisonous. The machine, used in this manufacture, is a complicated one, consisting of many wheels of iron, of wood, of several sorts of stone, and one only of lead. It was remarkable, that the man who sat working at the leaden

wheel, was a poor, pale emaciated, paralytic creature; whilst all around him seemed to be in good health. It is observed, that many, who are thus employed, become consumptive; some lose their senses; but the generality of them are subject to a colic, which usually terminates in a palsy of the hands.*

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* The glass-grinders, or those whose business it is to polish mirrors, &c. perform that process by the attrition of heavy weights, cased in wood, and moved by a wooden handle. Although this case be sometimes filled with lead, yet no part of it is acted upon by the glass, or by the hands of the workmen. The common medium of attrition, during the most laborious part of the work, is sand, emery, and rotten-stone. But here likewise the last polish is given to

Dr. Charleton has mentioned the effects of the leaden wheel from the papers of the late Dr. Oliver; and adds, that there issues from it a blue flame, which smells sulphureous.*

Thus have I attempted to point out some of the most remarkable ways, in which this poison has opportunities of exerting its virulence on the human body. Doubtless, more observations of the same kind

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the glass by a *putty* made of calcined lead. Hence it is, that so many of these poor people are found in our hospitals, tortured with the colic of Poitou.

* Charleton's Enquiry, page 93.

might be added; but enough has been said to shew, how much it is to be lamented, that a metal of such singular convenience, and so easily applicable to various purposes in human life, is not more innocent in its effects on the health of mankind.

The best preservative of those poor people, who are obliged to expose themselves to the action of this poison, is greasy, unctuous food. This is well known to those who work in lead-mines; and it is a common practice of the most prudent among the painters, to take some fat broth, butter, or oil,

every morning before they begin their daily work. Dr, Cremor, physician at Osterhoüt, a small town near Breda, communicated to me, in the year 1766, the following curious observation: " Osterhoüt is " the place of residence of a " great number of potters, who " are constantly employed in " glazing earthen vessels. Hav- " ing practised physic here fif- " teen years, I never observed " among these men one instance " of the colic of Poitou; indeed " very rarely any affection of " thebowels. Their exemption " from this malady seems to be " entirely owing to the large " quantities of cheese, butter,

" and fat bacon, which is their " common food. It is, however " observable, that, though these " poisonous *effluvia* are enerva- " ted with respect to the *primæ* " *viæ*, yet very few of these men " are free from disorders of the " breast; but are subject to " coughs, hoarseness, *asthma*, " and sometimes spitting of " blood."

This prophylactic method having been shewn by experience to have been generally successful in preventing the colic, the indication of cure, during the paroxysm, has been, in the opinion of some physicians, to sooth and quiet the

nerves; to inviscate the offending matter; and to expel it by gentle and gradual means. Opium therefore, and oil, and the mildest laxatives, are the principal instruments, which they have employed. This method has been strongly opposed by others, particularly some of the French physicians, who contend, that these are not only *levioris armaturæ præsidia*, and insufficient, but even that they are doubly unsafe; for that first, repeated emollients weaken the intestines, already too weak; secondly, that, though they were entirely innocent, the use of them would take up some precious time, the right,

or the wrong application of which decides the fate of the patient.

The following is the process of cure which is established in the hospital, called *la Charité* at Paris.

Immediately on the admission of the patient, the following clyster is administered.

R. Infusi foliorum senæ uncias duodecim,
*Electuarii diaphœnici unciam unam,

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* Electuarium diaphœnicum Pharmacopœæ Parisiensis.

R. Pulpæ dactylorum mundatorum, in hydromelite coctorum, per cribrum trajectæ,

Vini emetici turbidi uncias quatuor.
Misce; fiat enema.

A few hours after this medicine has produced its effect, a

Penidiorum recentium, ana semilibram,
Amygdalarum dulcium excorticatarum uncias tres et semis:
Contusis et permixtis omnibus adde mellis despumati libras duas.
Coquantur paulatim; dein insperge
Pulverum, Zingiberis
Piperis,
Macis,
Cinnamomi
Foliorum rutæ siccorum,
Seminum dauci cretici,
Fæniculi dulcis ana drachmas duas,
Turpethi, tenuissime triti, uncias quatuor,
Diagrydii unciam unam et semis.
Misce: fiat electuarium secundum artem.

second clister is injected according to this *formula*.

R. Olei nucum,
Vini rubri, singulorum partes æquales.
Misce; fiat enema, quocum, pro renata, decoquantur capita papaveris albi quatuor.

On the following day an emetic is given him, in this form and manner. Five grains of *tartarum stibiatum* are dissolved in one pint of warm water. This solution is divided into three equal parts; one of which is to be taken every quarter of an hour. If, however, the two first doses have produced a sufficient operation, the third is omitted. To facilitate the

effect of this medicine, the patient is ordered to drink plentifully of warm water. At night half a drachm of *theriaca* is prescribed, and a decoction of the sudorific woods, of which he is to drink freely, in order to promote sweating.

On the next day no medicines are given; but on the subsequent morning, this purgative is prescribed.

R. Infusi foliorum senæ, uncias sex,
Electuarii diaphœnici,
Syrupi e spina cervina, singulorum unciam dimidiam.
Pulveris radicis jalapii, grana quindecim.
Misce; fiat potio.

This purgative is repeated once or twice more, always at the interval of some days. The theriaca is always given at night, after the purgative. It is said that it is seldom necessary to repeat the emetic. I am assured by several gentlemen, who have attended this hospital, that the same method is constantly pursued, and almost always with success: and it is confidently affirmed, that those persons, who, at the time of their beginning this process, are not become paralytic or epileptic, are generally secured by it both from palsy and from epilepsy.

Although a less severe treatment than that which has here been described, has sometimes been equally successful; yet those who are the most conversant with the colic of Poitou, agree, that it requires quick and active purgatives. These are the remedies which are principally employed in our London hospitals. In some cases, however, emetics are given in the beginning with good effects; sometimes the cure is facilitated by the warm bath, and laxative clysters: sometimes the violence of the pain induces the physician to join opium with purgatives; but all these are applied only as

occasional assistance ; and are not considered as being always necessary and indispensable. I have several times seen the balsam of Peru, which Sydenham recommends as sufficient in itself to the cure of this species of colic, tried both in an hospital and in private practice ; but its effect has not seemed to answer the character given of it by that author.*

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* In the year 1756, I visited two plumbers, who at that time, suffered a most violent attack of this colic. It was, in both cases, remarkable, that large doses of opium (such as two grains of the thebaic extract taken every six hours, for the space of two days) did not appear to give them the least degree of ease: but on the contrary,

Palsy is seldom observed to appear in consequence of the first paroxysm of colic, where the colic has been properly treated. The cure of it is generally attempted by stimulating medicines, both internally and externally applied. When these have been found ineffec-

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brought on an intolerable thirst. Various purgatives, in form of pills, were tried, but without success. At last the disease, in both instances, yielded to repeated doses of a solution of *sal catharticus amarus* in simple pepper-mint-water; which, although at first it was rejected by the stomach, very soon were less disagreeable to it: and at once freed the intestines from constipation and pain. They both were paralytic; but one of them became likewise delirious and blind, and remained so for some time.

tual, the use of Bath-water has frequently succeeded. Whatever method is followed, a peculiar attention must be paid to the state of the bowels.

There is hardly a disease more formidable than the colic of Poitou in a chronic state. Thus far concerning it, I have learned from experience, that little benefit is to be expected from mere medicines, unless they are assisted by an accurate regimen and diet. At a time when all the muscles of the body are weakened and wasting; and when those organs, which are subservient to the digestion and assimilation of

the aliment, are in a particular state of debility, that food only is proper, which is easily convertible into nourishment. Wine and spices, which the patient is apt to desire, and which may seem to be rationally opposed to such extreme languor, give indeed a temporary comfort ; but, in fact, are injurious ; tending only to harden the food, to promote indigestion, and therefore to impede nutrition. Singular benefit has sometimes been received, in this case from a steady perseverance in a milk diet, together with the long-continued use of the Bath-water.

Here certainly there cannot be room for controversy, whether or not strong evacuants are required. I once in this case saw convulsions immediately follow a mild emetic by ipecacuanha. However, as the bowels are almost always inclined to costiveness, even in the intervals of the paroxysms, it will be necessary to correct this disposition occasionally by some mild, but efficacious laxative; for otherwise the returns of colic will be apt to be more frequent as well as more severe. The *oleum ricini*, when it does not disagree with the stomach, perfectly answers this intention. During the severity of pain

opium will often be necessary ; which here does not act as a mere palliative, affording only a momentary relief ; but is likewise singularly beneficial as an antispasmodic, assisting the operation of purgatives, and facilitating their passage through the intestinal tube. When it is not in our power to remove the cause of a disease, it is a valuable attainment to be able thus to counteract its effects, and to shorten its paroxysms. For, in truth, when this disease has affected the habit for some time, I have never been so fortunate as to find any method of cure so far successful, as to restore the patient to a better,

than to a tender, infirm, valetudinary condition.

Perhaps the principal cause, why physicians are in general so unsuccessful in their treatment of this disease, is, that they are frequently ignorant by what means the poison is taken into the body. From what has been said on the subject, it may easily be supposed that it may happen, that the cause of the mischief continually accumulated in some imperceptible manner, may render the best remedies ineffectual. Dr. Heberden had a patient, who became paralytic, in consequence of frequent attacks of colic.

How the disease had been excited, it did not immediately appear; but an inquiry being made into all this gentleman's habits, it was discovered that it had long been his custom every day to drink a pint of Lisbon wine. Dr. Heberden, having before had reason to suspect Lisbon wine of being sometimes corrected by lead, desired him to drink no more of that liquor. His advice was complied with; after which the patient was very soon freed from the disorder, of which he has had no return.

The opening morbid bodies after death, if it does not always

assist a physician in his future practice, has its singular use, in as much as it frequently exhibits the genuine effect of a fatal disease. One opportunity only has occurred to me of observing the effects of the colic of Poitou, in its chronic state, on a dead body.

A gentleman, who had long been tormented with this disease, and by degrees had become almost universally paralytic, fell suddenly into convulsions, and died apoplectic. Two days after his death the body was examined. And it was here observed, that the stomach had no morbid appear-

ance. The whole tract of the intestines likewise was sound. They were neither wasted in their coats, nor in any part contracted. The liver was less than common ; and there were a few small concretions in the gall-bladder. The substance of the brain was much softer than ordinary ; and about half an ounce of extravasated blood was found on the anterior lobe of the left side of the *cerebrum*. The muscles, in general, instead of their usual fleshy appearance, were become white, and were wasted in a most remarkable manner.

VI. *Additional Observations concerning the Colic of* Poitou.

Read at the COLLEGE, August 6, 1785.

Much has already been written, and many arguments have been urged in support of an opinion, that the solutions and *calces* of lead, as they unquestionably are sufficient to the production of the colic of Poitou, so they possess that power solely and exclusively of all other causes, the existence of which has been imagined:— that this disease, whether it be

called the Painter's colic; the dry belly-ach of the West-Indies; the hutten-katze of the Germans, entrapado of the Spaniards; the bellain of Derbyshire; or the *morbus colicus Damnoniorum*, is the specific operation of one and the same poison; and that though, in particular cases, it may not be easy to trace the passage of this poison to the stomach, yet from the uniformity observed in nature, it is not unphilosophical to suppose, that effects so similar are not excited by different causes. This opinion must still await the judgment of future observation and enquiry. On the one hand, from the

nature of the subject, it is not reducible to the certainty of demonstration. On the other hand, it does not appear, that its probability has hitherto been lessened either by reasoning or by experiment.

There may be observed, in this disease, certain accidental varieties, resembling those of plants sprung from the same seeds. The different manner, in which different persons are attacked by it, is one of these varieties. Its beginning is sometimes sudden, unsuspected, and at once violent. Sometimes the approach of it is announced by signs of indisposi-

tion gradually advancing, namely by a leucophlegmatic and yellowish complection; hebetude of the eyes; restlessness of mind and body; loss of sleep and of appetite; frequent eructation from the stomach; a slight degree of *nausea;* sometimes a *diarrhœa,* but more frequently a costive state of the bowels, allowing no *fæces* to pass through them, except in form of small, globular, and hard lumps. These leading symptoms are soon followed by a sense of weight and fulness in the epigastric region, and, successively, by all that train of evils, of which the second volume of Medical Transactions,

page 68, contains a copious and just description.

There is another variety, observable in this species of colic, respecting the external condition of the *abdomen;* which, in some cases, is so distended and hard, as if it were likely to burst; and so tender, as to be impatient of the softest covering, or the most gentle touch; and is, in other cases, drawn back to the spine, nearly deprived of motion, and not only bearing almost any degree of pressure, but even benefitted by it. One of the plumbers (mentioned in the second volume of Medical Transactions, p. 463.)

whom neither purgative medicines, nor opium, nor the warm bath, had at all relieved, enjoyed a considerable alleviation of his torment, whilst, at his request, a very corpulent neighbour was sitting on his belly. This retraction of the *abdomen*, and particularly of the navel, to the spine, has by some physicians been regarded as an essential and pathognomonic symptom of the colic of Poitou ;* and it has been said, that, only by applying a

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* Those authors, who have divided this disease into *the metallic* and *the vegetable* colic of Poitou, have contended, that *the sudden invasion of pain*, and *the retraction*

hand to the part affected, one may fully determine the nature of the disease. Experience, however, testifies, that both the state of the *abdomen*, just described, and its contrary state, are incidental to the colic of Poitou ; but, that neither the one nor the other can justly be called pathognomonic. What the particular circumstances are, respecting either the disease, or the patient, on which this difference depends, it is not easy to ascertain, and it would be nugatory to conjecture. In

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of the belly, are two of the symptoms, by which the former may be distinguished from the latter.

cases of the greatest severity, I believe, the belly will most commonly be found to be drawn back. And sometimes the bowels may be perceived to be contracted in some parts, and dilated in others.

It may likewise be observed, that the symptoms of this malady do not always follow each other in a regular and stated order of succession. Muscular pains, in various parts of the body, have tormented the patient some time previously to the attack on the stomach and bowels. It has likewise happened, that the disease has made its first appearance in a paralytic affection

of the wrists. Convulsions have generally come on, when the pain has ceased; but they sometimes begin during the violence of it, and sometimes after the appearance of palsy. There likewise have been cases, where the first seizure has been an* epileptic fit. This disease sometimes begins with a temporary *mania*, as may be observed particularly in the manufacturers of cerusse. In many cases, but not universally, when the palsy has commenced, a small tumor is observable on the back of one or both

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* See Med. Trans. vol. ii. p 86.

hands, at the extremity of the metacarpal bone of the middle finger, next to the *carpus*, of the size of a small nut, without pain or change of colour, in some moveable, in others fixed. This tumour sometimes disappears gradually, and sometimes continues. Experience has not shewn, either that this tumour is to be considered as critical (which has been suspected), or that it contains a malignant humour, which, if suddenly reabsorbed, is capable of producing a fresh attack of the colic. Certain it is, that no disease is more liable to a relapse, whether this tumour does, or does not, appear.

In some patients the legs have been paralytic for a night; and some, but not very many cases, have been remarked, in which the palsy of the legs has been lasting. In some, the palsy has been attended with a temporary loss of voice; the patient being unable to speak otherwise than in a whisper.

A temporary *gutta serena*, and a comatose affection, or a quiet kind of *delirium*, are not very uncommon effects of this disease.

This palsy invariably grows worse after every paroxysm of pain. By it the parts are de-

prived only of motion, the sense of feeling being even quicker and more acute than in a state of health; and the paralytic parts often suffering great pain. It may be distinguished from the common apoplectic palsy, by this circumstance particularly, that the debility, induced by it, comes on gradually; and that the limbs, affected by it, are hardly ever entirely deprived of all motion. This palsy sometimes continues through life; and sometimes, when the parts have suddenly been restored to motion, a fit of colic has been the immediate consequence, allowing but short intervals of ease, until it again

ends in palsy. There is nothing in this case more remarkable, than the atrophy of muscular flesh, with which it is attended, particularly of that which constitutes the ball of the thumb. According to my observation, a patient ought never to think himself secure against a return of the colic whilst this singular effect of it continues.

In treating the colic of Poitou (as was formerly* observed) we ought principally to rely on the operation of the more active cathartics, steadily insis-

* Med. Trans. vol. ii. p. 462.

ted on, until the bowels have been thoroughly cleared. But a physician will not probably succeed so soon, or so certainly, in relieving his patient from pain, by any means, as by joining opium with a purgative medicine. In cases, likewise, where such a disposition to vomiting prevails, that nothing is retained in the stomach, opium will be thus administered with a peculiar advantage. It may also be useful to give opium after the operation of a purge, in order to quiet spasms, and to procure sleep. But when it has been given in large doses, before that the bowels have been emptied, instead of allay-

ing the violence of the symptoms, it has, in some cases only added to the distress of the patient. I believe, however, that the opinion of Baglivi, that opium given in this disease, accelerates palsy, is not founded in experience. It must here be remembered, that *the art of physic rarely admits of any perpetual precepts;* and that the best medicine may do harm, if not adapted to the patient, as well as to the disease. The *dura ilia* of men accustomed to hard labour, may bear, and even require, such a method of cure as would be ill suited to the sensibility of an hysterical

woman, or to the tender fibres of an enfeebled West-Indian.

A blister to the *abdomen* has often afforded quick relief in this colic; and it has been observed, that, very soon after this application, purgative medicines have acted with more certain power.

An effectual emetic given in the beginning of this disease, as it unloads the stomach from its foul contents, is advisable, and even necessary. But a frequent repetition of strong antimonial vomits, given with an intention to evacuate the *cor-*

rupted bile, would only harass, the patient most unprofitably. Those, who, on this principle, have recommended such a practice, have mistaken the effect for the cause. One might, with equal soundness of argument, maintain, that sea-sickness is excited by bile; a cough by a copious expectoration of *mucus;* or an *opthalmia* by the water that distils from an inflamed eye.

A temporary relief may sometimes be procured by the warm bath: and I am informed by a physician of credit, that, in a case, in which the frequent use of the warm bath had not

given the shortest interval of ease, he made trial of a cold bath with almost immediate success. This is mentioned here, only as a single fortunate experiment. But* Citois informs us that this was his constant practice, even in the midst of winter: and he calls all his fellow citizens to witness, that most of his patients, thus treated, had been restored to health.†

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* F. Citesii opuscula medica, p. 215.

† The late professor Gaubius mentioned to an English physician a method of treating this colic, which he had found successful in himself, and several others. Three drachms of *oculi cancrorum*, and one drachm of powdered rhubarb, were divided into eight equal parts, one of which was

This colic is very apt to return; but particularly after that the palsy has taken place, on occasion of the least error in diet. Even the smell of paint has been sufficient to excite a fit of it. It was an observation of Dr. Reynolds, when he attended St. Thomas's hospital,

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given every third hour, together with a draught of an infusion of some emollient herbs. This medicine, together with a clyster, administered occasionally, and a blister to the *abdomen*, is said to have completed the cure.

In Derbyshire the popular medicine is *cremor tartari*. One drachm of this is taken every hour, or every two hours, until a stool be procured. Afterwards the same dose of it is given once in four hours, until the disease be subdued.

that the colic, of all the workers in lead, frequently returned under any management whatever, whilst the poor people were allowed to wear the clothes in which they had been used to labour. And on this account, such clothes were never suffered to lie on the patient's bed.

In the palsy, consequential to this colic, beneficial effects have, in vain, been expected, as well from the external application of stimulants to the parts affected, as from the electric influence, howsoever modified, or directed.

Van Swieten affirms, that he sometimes cured it by the means of friction, and aromatic plasters, applied to the *abdomen* only, on this principle, that the disease, having originated in the abdominal nerves, ought to be attacked at its source. But this practice does not appear to have been established by the experience of others.

In this paralytic state, the French physicians first purge; then give a sudorific decoction of the woods; and afterwards send the patient to their sulphureous mineral waters. M. de Senac trusted principally to the warm bath. Whatever

tends to recover the stomach and intestines from the ill effects of the colic, and to prevent the return of it, is here pointed out. Under a course, therefore, of aromatic and bitter infusions (a due regard being at the same time had to the state of the bowels) some have been restored to their muscular power. Our Bath-waters, from their friendly effects on debilitated stomachs, have frequently been beneficial in this case: and it is observable, that there is this singular advantage in the use of these waters, that when other means of removing costiveness have failed, they have produced the effect so pe-

culiarly necessary to the patient. In cases where the organic fabric of the muscles seems to be destroyed, a speedy restoration of it is not to be expected; yet I have known more than a single instance where the Bath-waters, used several years successively, have reanimated the palsied parts, and restored them to their natural habit. Great benefit, in this case, has been derived from a course of warm-bathing, even in London.

When I was formerly treating this subject, I mentioned several means, by which the saturnine poison may find ad-

mission into the human stomach, unobserved and unsuspected. Farther enquiry has now enabled me to take notice of more instances of the same kind.

The sore nipples of women's breasts, washed with *extractum saturni*, have, in many instances, occasioned convulsions in children. Twelve infants died at Dartmouth, in convulsions, occasioned by an ointment, which had litharge in its composition, applied to the nipples of their nurses. This ointment was sold by a woman, famous for her skill in treating this complaint. More children

would probably have shared the same fate, had not the cause been accidentally discovered. A person, employed in *drawing the breast* of a woman, the nipple of which had been thus anointed, was affected with great sickness and pain in the stomach; on which occasion the composition of the ointment was examined, and ascertained.

It was formerly observed, that the colic of Poitou appears to be a more frequent disease in France, than in this country. One cause, why it is so frequent in France, is that the French laws, though they are said to be severe on this sub-

ject, have not suppressed the adulteration of wine by means of litharge. In the year 1769, Sir John Pringle was informed by M. de Senac, that, since he had been employed at court, a wine-merchant, at Versailles, had been the occasion of the death of eighty or ninety persons, by selling litharged wine. The merchant confessed, that he had dressed his wine with litharge; but declared his ignorance of its pernicious effects. M. de Senac added, that he had at that time, near one hundred patients, ill of this disease, in the hospital of Versailles, a large proportion of whom were servants to the king.

In the second volume of a French book, intitled *la Maison rustique*, there is a particular direction, that, in order to prevent the wines of Burgundy from turning sour, a ball of lead be suspended in each cask.* And what other reason can be suspected, why the Europeans in Surinam, and not the natives, are subject to this species of colic, than because the French wines, used by the former, contain a saturnine solution?

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* Il faut mettre dans chaque tonneau une bille de plomb pesant trois ou quatre livres, qui puisse passer par le bondon, et la suspendre au milieu du tonneau avec une ficelle. It is hoped, that a similar method of treating cyder does no longer prevail in the county of Devon.

There can be very little reason to doubt, but that physicians themselves have frequently laid the foundation of this disease. Sugar of lead was Paracelsus's specific in a *mania*. Sir Theodore de Mayerne entertained a great partiality in its favour, and reckoned it among the sweeteners and correctors of the blood. Accordingly, he prescribed large doses of it for various purposes. Particularly, he affirms, that he could cure a *gonorrhœa* in three days, by the repeated use of a bolus, containing one scruple of sugar of lead. The very powerful effects of this salt were remarkably exhibited in a case,

which I shall relate, on the authority of Mr. Knight, surgeon to the Coldstream regiment of foot-guards. A soldier, having contracted a *gonorrhœa virulenta*, took a drachm of sugar of lead in milk. In about five hours after that he had taken it, he was seized with great pain in his bowels and back, and with a violent and excruciating distention above and below the navel. Not suspecting what was the true cause of his present sufferings, he repeated the same dose. Within an hour afterwards his complaints increased; he became delirious; lost his power of speech; sweated profusely; and dis-

charged by vomiting much green bilious fluid. In the mean time, his pulse was remarkably soft and slow, not exceeding forty strokes in a minute. His stomach having been well drenched with warm water and oil; and his bowels having been at length cleared by a frequent repetition of clysters, and purgatives taken by the mouth, his colic ceased, and his senses, and power of speech returned. The *gonorrhœa*, which had been very severe, was entirely cured in two days: and, what is still more extraordinary, some old venereal ulcers, which had withstood a long course of mercury, appear-

ed as suddenly to have put on an appearance of healing.

The preparation of the *oxymelita*, according to the *pharmacopœia* of London, *in vase fictili vitreato*, lies open to criticism. Indeed it has already been observed, with respect to these medicines by Lewis,* "that vinegar, by a boiling heat, may corrode so "much of the vitrified lead, "as to receive from it noxious qualities." And it is well known, that vinegar, boiled for some time, in glazed earthen vessels, will yield, on

* New Dispensatory, p. 352.

being inspissated, a true sugar of lead.

Our College has ordered the *tinctura rosarum* to be prepared *in vase vitreo, vel fictili vitreato.* But the College of Edinburgh, apprehensive that the vitriolic acid may be apt to corrode the glazing, has ordered the infusion to be made in a vessel of stone-ware. I mixed a scruple of the strong spirit of vitriol with two pints and half of boiling water in a common glazed earthen vessel. To a portion of this water, as soon as it was cold, I applied the common *liquor probatorius;* but there appeared no mark of a satur-

nine solution.* The vitriolic acid, indeed, readily unites with the *calces* of lead ; but that solution immediately is followed by a precipitation ; and the compound is indissoluble. Accordingly, I am informed, that both in Scotland, and at Birmingham, leaden, instead of glass vessels, are now used in the manufacture of oil of vitriol ; that, in the first use of them,

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* To a saturated solution of sugar of lead, in distilled water, oil of vitriol was added, in small quantities, at a time, as long as it occasioned any precipitation. The precipitated powder being left to settle at the bottom, and the water being poured off clear, the test was added, but made no discovery of lead.

the acid dissolves a certain portion of the metal, leaving it on the surface of the vessel like a crust ; and that, after this, no more lead is dissolved.

I am informed by an apothecary of great experience, that he has frequently observed a considerable quantity of sugar of lead generated around the sides of the coarse glazed earthen vessels, used for the composition of *the lenitive electuary*. It is evident, that this must be the consequence, whenever the acid vegetable juices are suffered to stand for some time in such vessels. The stone-ware, the glazing of

which is a superficial vitrifaction of the clay itself, by means of the fumes of common salt, would more properly be used for this purpose, as being, if not quite proof against acids, incapable of communicating to them any thing noxious.

Wherever any of the vegetable acids are used in pharmacy, pewter-vessels ought to be carefully avoided by the apothecary; for a solution of lead may thus be administered in a case where it is not intended. This caution will hold good particularly, when it is applied to the small pewter-funnels, which, as I am informed, are

generally made of pewter of an inferior quality. If a funnel, of this description, after that a vegetable acid has passed through it, be left to stand, without being cleaned, (which may happen) a crystallization of sugar of lead will be seen in the pipe; and the next medicine, which has the fortune to be poured through it, whatever it be, will, probably, not be improved in virtue. In the course of the last winter, I saw a person who had the true colic of Poitou, which continued five days. On enquiry from whence this disease could owe its origin, I discovered, that the patient had long been in the

habit of drinking cyder, warmed in a pewter-pot. Being recovered, he determined to change his common drink; and, in consequence, has had no return of the disease.

The College of Edinburgh has properly ordered, that the distillation of vinegar shall be performed in glass vessels; and this rule ought to be universally followed. In one of my former papers I mentioned, that a saturnine taint is frequently found in distilled vinegar. Lewis* had probably made the same observation. Cer-

* New Dispensatory, p. 482.

tainly a mode, in which distilled vinegar may easily be impregnated with lead, had not escaped the notice of that ingenious chemist. "The distilled "spirit," says he, "must be "rectified by a second distilla-"tion, in a retort or a glass-"alembic; for though the "head and receiver be of glass "or stone-ware, the acid will "contract a metallic taint from "the pewter worm."

Should it be made an objection to these remarks, that only a very small portion of lead can be admitted into the compositions, which have here been mentioned; and that, therefore,

little danger can reasonably be apprehended from it; the obvious reply would be, "*abundans cautela non nocet.*" In all these instances, even the suspicion of danger ought to be avoided; for here danger is not necessarily incurred. Secondly, it is not possible to ascertain the exact quantity of the poison, in question, which shall be, universally, either innocent, or hurtful; since, like the other nervous poisons, it acts with peculiar severity on some habits, whilst others seem insensible of its power. It is affirmed by Zeller, in his *docimasia, signa, causæ, et noxia vini, lithargyrio mangonisati, variis ex-*

perimentis illustrata, that, whilst some were suffering the most grievous torments, occasioned by the litharged wine of Wirtenberg, many others were not hurt by the same wine, though they had drunk it even to intoxication. And Ilsemann, in his treatise *de colicâ saturninâ*, testifies, that among the workmen, constantly employed in the separating furnace, there were many who never had the least symptom of the colic, and some who were very slightly affected by it, though all were equally exposed to the same *effluvia*.*

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* Both the treatises, here referred to

It is universally agreed on, that lead is an efficacious instrument in surgery. But that, externally applied, it is, in some constitutions, and under certain circumstances, capable of exciting its pernicious effects, is an opinion which has not much prevailed. It is experience only, which can confirm this opinion, or refute it. With a view to refer the matter to that test, I have subjoined the two following well authenticated histories.

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have great merit. They are preserved by Haller in his third volume of *disputationes ad morborum historiam et curationem pertinentes.*

CASE I.

A young man had an eruption of small pustules on his arms, which after two or three weeks, appeared also upon his trunk, and extended down his thighs. On some parts of the right thigh the pustules were confluent, and raised the cuticle entirely, leaving the part, as if it had been scalded; from which there was a considerable dischage of thin matter. The diseased parts itched much, and suffered great pain. He was advised to take small doses of calomel, and to apply an ointment, composed of one part of

the *unguentum saturninum*, and three of hog's lard. By the use of this ointment, the pain and itching were greatly relieved; and, the disease afterwards increasing, and spreading all over the trunk of the body, and the extremities, insomuch that there was a loss of the cuticle in every part, and even of a portion of the nails of the fingers and toes, the ointment was liberally applied to all the parts affected. When he had thus used the ointment ten days, he was seized with severe pain in his belly; and his navel was drawn towards the spine. He had no stool from the time when the pain commenced, till a pur-

gative medicine had been given, which was more than 24 hours. The purgative used was *the bitter purging salt*, two drachms for a dose, which were repeated every hour, till they had operated. After the operation, the pain was much less violent; but as it was not entirely removed; and as there still remained a disposition to costiveness, small doses of rhubarb were ordered. The symptoms not yielding to the rhubarb, *the bitter purging salt* was repeated, which operated more powerfully than before, and removed all pain. It returned, however, for several days afterwards; but was always relieved

by an opening medicine. It should be remarked, that, after the attack of the colic, he used no more of the *unguentum saturninum*.

CASE II.

A gentleman, who had, in general, been healthy, though of a tender and irritable state of nerves, strained the *tendo Achillis* of the right leg; and, for a considerable time, either applied Goulard's *vegeto-mineral water* to the part affected, or wore a compress of linen soaked in that liquor, and fastened by a bandage. Though the complaint was not removed by this

means, the patient, by degrees, paid less and less attention to it, and, at last, left off all applications to the part affected. Some months afterwards, he strained the same tendon more violently; and, after a few days, by favouring the part injured, he suffered the same accident on the *tendo Achillis* of the left leg. In this situation, he had recourse, by advice, to a bath of the *vegeto-mineral water*, prepared of the usual strength, and kept in an earthen vessel, of sufficient capacity, to admit of his putting into it both his legs up to the calf. This bath he used, for five or six minutes each time, every morning and

evening, and sometimes also at noon, for about a week or ten days; when he found himself obliged to desist, by what appeared to him to be a violent cold, attended by a stiff neck. The malady, however, increased rapidly. He had a continual and obstinate costiveness, attended with a seeming contraction of the belly, and at the same time with a painful tension at the *præcordia*. The stiffness of the neck increased. The spine, and all the muscles, in general, became weak. The head was drawn to the left shoulder; and the arm, thigh, and leg, on that side, were

languid and inactive. Whilst he was without motion, he felt little or no pain or uneasiness; but the least motion was painful, and particularly if at any time he stooped, coughed, sneezed, or even extended the chest by a full inspiration.

First, gentle aperient medicines, and, particularly, *oleum ricini*, were given; then sudorifics; and a suitable embrocation was applied to the parts, which were the principal seat of the disorder. By these means the symptoms gradually abated in three or four weeks; but a lameness of the left hip

and thigh still remained, and always grew worse in cold weather.

He afterwards went to Bath, where the use of the waters entirely removed the internal disorder; diminished the lameness; and gradually restored the limbs which had been most affected.

For some time afterwards, he was very subject to a considerable degree of lameness in the left thigh and hip; and particularly on a change of weather from mild to cold.

The effects of the strain had

been removed by the bath of saturnine water.

With respect to the first of these cases, it seems reasonable to conclude, that the disease, described, was the genuine effect of the external saturnine application. The only conjecture, which could tend, in any degree, to invalidate this conclusion, is, that some part of the ointment might possibly have found its way into the patient's stomach. But, surely, there is more than an equal degree of probability in a supposition, that a man, so circumstanced, would not only not voluntarily convey to his mouth a com-

pound so nauseous, but would even guard himself against the accidental admission of it by every possible precaution.

Nor does it seem less evident that *the vegeto-mineral water* excited the various spasmodic and paralytic symptoms in the latter case; since we have no experience which would justify an opinion, that cold water, alone, applied to the lower extremities, could be a cause adequate to such extraordinary effects.

Before that I take leave of this subject, let it be understood that it is far from my intention

to reprobate the external use of lead in all cases and constitutions. That would be an attempt to destroy one of the main pillars of surgery. All that I would insist on, is, that it ought not to be trusted to the hands of the unexperienced; and that whenever it is to be applied to a large surface of the body, and continued for a considerable length of time, caution and circumspection are particularly necessary.

P. S. Since the conclusion of this paper, I have received what follows, in a letter from Dr. Douglas. It contains the genuine observations of a phy-

sician in his own case; which, therefore, seem to claim a more than common attention.

"Some years ago I received "an accidental blow a little "below the inner ancle; and, "being then obliged to remain "in a wheel-carriage for many "hours, I found the part affec- "ted, at the end of my journey, "stiff and uneasy, with some "swelling and inflammation. "Business prevented my atten- "tion to it: and on the third "day, the redness extended as "high as the knee, accompa- "nied with great pain. A "poultice, made of crumb of "bread, and a diluted solution

" of the extract of saturn, was
" applied at bed-time. My
" sleep was soon interrupted by
" a most violent cramp in the
" calf of my leg. I endeavour-
" ed to remove the spasm, by
" changing the position of the
" limb, but without success;
" and the pain was at length so
" excessive, that I could not
" continue in bed. The poul-
" tice being now taken off, and
" my legs immersed in warm
" water, the cramp ceased.
" Being relieved from pain, I
" renewed the poultice, and
" returned to bed, where I had
" scarcely reposed myself a
" half an hour, when the cramp
" again seized me with more

" violence than before; and
" I again had recourse to
" warm water, and with the
" same good effect. Having
" now some suspicion of the
" lead, I did not repeat the
" poultice; and I passed the
" remainder of the night free
" from pain. My friends not
" being convinced that my sus-
" picion was just, I tried the
" same application on the fol-
" lowing night: and suffered
" as before, until the poultice
" was removed. Still farther
" to satisfy myself and my
" friends, I gave the lead ano-
" ther trial; and the result was
" exactly the same.

"I have no desire to tarnish "the reputation of so celebra- "ted a medicine as the extract "of saturn: but, if it be capa- "ble of producing such an ef- "fect as I have here related, it "should certainly be used with "some caution and reserve."

THE following remarkable instance of the power of an external saturnine application, in producing muscular debility, had not been received, when the former part of this paper was read at the College.

Dr. Reynolds knew a gentleman, who brought on a tempo-

rary palsy of the *sphincter ani*, and, in consequence, an inability to retain his excrement, by freely using a strong solution of Goulard's extract of saturn, with a view to cure the piles. These were external, and some of them had bled, the rest were tumid and painful. Linen pledgets, dipped in this solution (made stronger than the *vegeto-mineral water)* were applied five or six times a day for about a week; at the expiration of which time, he found the effect above mentioned, without any previous colic. This being perceived, he discontinued the use of the solution; and, in a few days reco-

vered the contractility of his *sphincter*. Three or four months afterwards, the piles being very troublesome, he had again recourse to a somewhat weaker solution of the extract of saturn ; which he had not used more than three days, when he perceived the same want of power in the *sphincter*, which he had before experienced ; and, though he immediately desisted from the use of the solution, yet that muscle did not recover its action so soon as it had done after the former experiment.

VII. Flos Cardamines *recommended to the Trial of Physicians, as an anti-spasmodic Remedy.*

Read at the COLLEGE, August 11, 1767.

APPREHENDING it to be a principal object of the present institution of the College, to give those, who are employed in the cure of diseases, an easy opportunity of throwing out to the public whatever practical knowledge they may, from time to time, have derived from observation and experience; I am encouraged to mention to you a medicine, not often heard of in common practice, which,

if I have not been deceived, has, in several instances, been used with success. I say, *if I have not been deceived;* being persuaded, that we ought not to speak with greater confidence of the success of a medicine, on the authority of a few experiments. I must likewise premise, that, in two or three epileptic cases, in which I have given this medicine, no benefit has been received from its use. Indeed, it is not to be expected, that a disease, produced by such a multiplicity of causes, should always yield to the specific powers of any single remedy. In such a disease, a medicine would be a valuable accession

to our stock, which should now and then succeed even though it should oftener be unsuccessful; "quod cum multo sæpius "fefellerit, aliquando tamen "etiam respondeat."

The medicine, which I am about to recommend to your trial, is the flowers of our common *Lady's smock, Cardamine pratensis, Lin. sp. plant. page* 915. *no.* 13. This plant grows in moist places: and flowers early in the spring. Its flower is either white, or of a light purple colour. To the taste, it is bitter and pungent. Taken into the stomach, it does not seem to have any sensible operation.

Cardamine is the σισύμβριον ἕτερον of Dioscorides. That author has given a good description of it. He says, that it is like *cardamum ;* and that, it is warm and diuretic ; that some used it externally as a cosmetic ; and that its leaves were eaten raw.

Galen says, that it is like the water-cress, in taste and virtues.

Brunfelsius gives a figure of it ; calls it *herba veteribus ignota ;* and adds, that the Germans killed lice with it.

Tragus ascribes to it the vir-

tues of water-cress: "Urinam "ciet, ventrem turbat."

Fuchsius says, it is hot in the fourth degree: and talks of its having been used as a remedy against the *sciatica* and rheumatism, on the authority of Pliny.

Ray says, it has the taste of the water-cress; but nothing of its virtues.

Linnæus seems to have designed to have said something of it in his *materia medica:* for its name is in the *index*, but not in the book.

Having consulted many au-

thors, I can find the flower of this plant no where mentioned as an antispasmodic remedy, except only in the *pharmacologia* of Dale. And all that is said of it in that book, is,— "flos in convulsionibus lauda- "tur ex MS. Tancred Robin- "son, M. D."

In the month of January, 1763, I was consulted in the case of a young woman, who about two months before that time, being then in her seventeenth year, had suddenly been seized with an hysteric affection in consequence of an interruption in the menstrual discharge. Until that seizure, she

had, in general, enjoyed health of body, and cheerfulness of mind. I found her pale, emaciated, and in a state of extreme dejection of spirits. Her disorder, after having tormented her in various ways, had now put on the appearance of a spasmodic *asthma*, of which she frequently suffered twenty paroxysms, or more, every day. If the returns of her *asthma* were, at any time, less frequent than ordinary, she paid dearly for such a respite, by suffering violent cramps on the muscles of the *abdomen*.

I tried, in succession, almost all the medicines, usually tried

in such cases ; but without benefit to the patient. A blistering plaster, applied between her shoulders, at a time, when she seemed almost in a state of suffocation, did her evident mischief. As soon as it began to take effect, her disorder was manifestly aggravated.

During this distress, one of her friends recommended a scruple of *flores cardamines*, to be taken every morning and evening. I saw her after she had taken this medicine, in the dose above mentioned, six days ; and was then informed, that, during the first three days, she had not received any re-

markable relief; but that, from that time, she had each day suffered only three slight fits. I encouraged her, therefore, to persevere in the use of her remedy, and to increase the dose of it to half a drachm. After a month, when I visited her again, I was informed, that during that time, she had undergone no more than ten fits of *asthma*; and that they had returned, gradually, less and less violent, without having been succeeded by spasms of the *abdomen*. I was likewise informed, that she had lately been relieved in a natural way. She was desired to continue the use of the medicine, for a month lon-

ger. This she complied with; and became free from her complaint. I have not heard, that she has had a relapse.

Encouraged by the happy event of this case, I soon afterwards gave the same powder to two patients, a boy, and a girl, both of them a little under the age of puberty, who had, for several months, been affected with the *chorea sancti Viti*; although they had taken chalybeate medicines, and the fetid gums, in great abundance; and had likewise used the cold bath. In a very short time, after they had begun to take half a drachm of this medicine, every morn-

ing and evening, they appeared to be relieved; and, in less than a month, their disorder entirely ceased.

The history, which I am going to subjoin, seems farther to shew, that these flowers are possessed of an antispasmodic virtue.

An unmarried woman of a delicate and valetudinary habit, was, when in her thirty-fifth year, or thereabouts, thrown into convulsions by a sudden fright, at the time of the *menses*. These convulsions terminated in a very difficult deglutition, supposed to arise from a para-

lytic cause. This affection continued thirteen or fourteen years; and various medicines, which had been tried, had produced no sensible amendment. In the year 1765, she was seized with an *hemiplegia;* which after a few hours, was succeeded by convulsions, and at once was removed. These convulsions attacked the palsied side. From that time, she seldom failed, once every month, to have a return first of the palsy, and afterwards of convulsions; and she performed the act of deglutition with greater and greater difficulty, after every paroxysm. In January, 1767, I ordered half a drachm of the powder of

flores cardamines, to be taken by her twice a day. This medicine she has continued to take, from that time to the present. It is remarkable, that since she began the use of this powder, she has suffered only one slight return of her disorder. When I lately saw her she appeared greatly improved in her general health. Her appetite to food was increased, as was likewise the power of satisfying that appetite. Indeed, in every case in which I have used this medicine, I have observed, that it has agreed well with the stomach; and that it has seemed to strengthen the digestive powers.

Although the last case, which I shall mention, ended less happily, yet it seems not less worthy to be communicated to the College, as well on account of the almost immediate change, which followed the use of *flores cardamines*, as of the very uncommon appearances in the body after death.

A woman, who, before that time, had in general been healthy, when about the age of twenty-four years, was affected with an obstinate *diarrhœa*. Other medicines having failed of success, this disease was stopped by the means of clysters, in which it is supposed that sugar

of lead was an ingredient. The *diarrhœa* having thus ceased, there followed very frequent colic pains, and a constipation of the bowels. By degrees, she perceived her lower limbs to become weaker and weaker; and, at the end of twelve years, they had a very small power of motion remaining. During this time, her health, in other respects, did not appear to be injured; and, within the period mentioned, she had been the mother of several children. About four years before her death, after having used the tepid bath, she perceived the first beginnings of a symptom

which was afterwards most painful and obstinate. From that time, her lower limbs were affected with almost constant spasms, and various distortions; so that she was now not only deprived of all the use of the muscles of the lower extremities, but was farther distressed by having no power to control their irregular and involuntary motions. During the continuance of these grievous disorders, the faculties of her mind were not impaired; but she very frequently complained of imperfect and indistinct vision, particularly after having amused herself with

reading for a short time; and her eyes had an unnatural, glassy appearance.

Various medicines, of the antispasmodic character, were opposed to this complicated disorder. But it was soon observed, that the fetid gums, the root of the wild valerian, volatile salts, musk, and camphor, all which had been tried both separately, and combined with one another, had not only no good effect, but that the disease was even aggravated by the use of them. Opiate medicines produced uncertain effects. Sometimes a small dose of *confectio Damocratis* was suf-

ficient to procure for her a quiet night. At other times, she required forty or fifty drops of *tinctura thebaïca ;* which quantity, at other times, seemed only to disturb and to irritate the whole system of nerves and to add violence to the spasms.

Under these circumstances, one drachm of the powder of *flores cardamines* was ordered to be taken by her every morning and evening. This dose was afterwards increased to a drachm and half, thrice a day. Before she had taken this medicine a week, it was evident, that her spasms were less violent ; her

spirits calmer; and that her sleep was less disturbed.

She persevered in the use of this medicine two months; and, during that time, appeared every day to have received some benefit; except only at the time of the *menses*, when the medicine was not taken. At that time, she always appeared more than commonly irritable; and her spasms were more violent and painful. But while we were entertaining some hope of her life being rendered less miserable than it had lately been, she was seized with a fever, and died in a few days.

About twenty-four hours after her death, we were permitted to examine the body. The *cranium* being opened, it was observed, that the *dura mater* was much looser on the brain than what is common; and that it appeared, as if the brain was lessened and contracted, and had shrunk from under its covering. Both that membrane, and the *pia mater* were sound. The cortical substance of the brain was in a natural state, as was likewise the external part of the medullary substance, especially that which formed part of the convolutions. But all the internal part of the medullary substance, which is

called *centrum ovale*, containing the *corpus callosum*, *corpora striata*, *thalami nervorum opticorum*, &c. and more especially the most central part of each hemisphere, was of a much firmer consistence than natural. The lateral ventricles contained about the quantity of a large spoonful of bloody *serum* between them. The *glandula pinealis* contained a small bit of a gritty substance. The *cerebellum* was affected in a similar manner with the brain ; that is, the cortical substance was without any morbid appearance, whilst the medullary substance was sensibly firmer and tougher than usual, but not to such a degree as that of the *cerebrum*.

The *medulla oblongata* was smaller than natural, and of the same kind of tough and firm consistence with the *centrum ovale*, and in the same degree.

The *medulla spinalis*, in its whole length, was in the same condition with the *medulla oblongata ;* that is, remarkable for its smallness, and for the firmness and toughness of its texture, having entirely lost its pulpy consistence. Indeed it was so tough, as to allow of being twisted like a rope.

The nerves derived from the *medulla spinalis* had nothing uncommon in their appearance. But the dissector imagined, that

all those nerves, which went off from the brain, the third pair excepted, were smaller than natural. But of this fact he could not be sure, except only with regard to the optic nerves, which were contracted to half their natural size. They were hardly larger than the third pair of nerves.

It was observed, that this firmness and toughness of the medullary substance of the brain, of the *medulla oblongata,* and of the *medulla spinalis*, was different from that firmness, which had been found in the brain of several maniacal subjects, which had been lately dissected. In the

latter a firmness only or hardness, without toughness, appeared, corresponding with the description of the brain of several persons, who died under a *mania*, recorded by Morgagni, in his book *de causis et sedibus morborum per anatomen indagatis*.

In the *thorax*, the lungs adhered to the right side: but nothing else was found diseased in that cavity.

In the *abdomen*, the omentum adhered to the liver. The liver bore marks of some old inflammation; for its coat from the *peritonæum*, was thickened, and was harder than common. The

spleen was of a large size; and had also marks of an old inflammation. The *ovaria* contained little sacs of coagulated blood. This person having died soon after the menstrual period, the vessels of the internal surface of the *uterus* were found still turgid. All the parts not mentioned, were in a natural state.

Here then it seemed sufficiently manifest, why this woman's disorder had been so intractable. At the same time it was satisfactory to reflect, that in a body, so diseased in the most important part of it, some small relief had appeared

to have been derived from medicine.

P. S. *Since the first edition of this volume, I have seen several instances of the good effect of* flores cardamines *in convulsive disorders.*

VIII. *The Case of Mr.* Thomas Wood, *a miller, of* Billericay, *in the County of* Essex.

Read at the COLLEGE, Sep. 9, 1771.

The practice of physic was anciently distributed into three branches; the first of which was confined to chirurgery; the second to the administration of internal remedies; the last, to a due regulation of diet. The two former have in no age, received more useful cultivation, and real improvement, than in the present. But it is greatly to be doubted, whether or not

an attention has been paid to the latter, in proportion to the dignity and importance of it. Nothing is more certain, than that, in many cases method and management are the principal instruments of cure; and that mere medicines, unconnected with an appropriated regimen, are almost sure of losing their efficacy and their credit. How beneficial an alteration in the human body may be affected by a strict course of abstemiousness is remarkably exemplified in the history which I have now before me. It is presented to the College, as being, perhaps, more singular and extraordinary, than any case of the same

kind, which has hitherto been recorded; whether we consider the great severity of the regimen, the perseverance with which it has been continued, or the success with which it has been attended.

The first notice, which I received of this case, was communicated to me in a letter from my friend Dr. Pugh of Chelmsford. Mr. Wood himself, at my request, afterwards transmitted to me a more full and particular detail both of his complaints, and his method of cure. From these two letters, and from several conversations, which I have had with Mr.

Wood, the following account was adjusted.

Thomas Wood, born on the 30th of November, 1719, of parents, who were apt to be intemperate in their manner of living, was subject to various disorders, particularly the rheumatism, until he attained the age of thirteen years. He then had the small-pox in a favourable way; and from that time became healthy, and continued to have no complaints, to the age of about forty-three years. From his attaining the state of manhood to this period, but especially during the latter part of the time, he indulged him-

self, even to excess, in fat meat, of which he used to eat voraciously three times a day, together with large quantities of butter and cheese. Nor was he more cautious with respect to strong ale, which was his common drink. About his fortieth year he began to grow very fat; but finding that he had a good appetite, and digested his food without difficulty; and that his sleep was undisturbed, he made no alteration in his diet. It was in his forty-fourth year when he first began to be disturbed in his sleep, and to complain of the heart-burn, of frequent sickness at his stomach, pains in his

bowels, head ache, and vertigo. He was now sometimes costive, at other times in the opposite extreme; had almost a constant thirst, a great lowness of spirits, violent rheumatism, and frequent attacks of the gout. He had likewise two epileptic fits. But the symptom, which appeared to him to be the most formidable, was a sense of suffocation, which often came on him, particularly after his meals. Under such a complication of diseases, every day increasing, he continued till the month of August, 1764. At this time the Rev. Mr. Powley, a worthy clergyman in the neighbourhood, observing his very ill

state of health, and the extreme corpulence of his person, recommended to him an exact regimen; and pointed out the *Life of Cornaro*, as a book likely to suggest to him a salutary course of living. This book convinced him, that intemperance was the principal cause of all his complaints; and he therefore determined to try, whether, the cause being removed, the effects might not cease. However, he thought it prudent, not to make a total change in his diet suddenly and at once; accordingly he at first confined himself to one pint only of his ale every day; and used animal food sparingly.

This method he soon found to answer to his satisfaction; for he felt easier and lighter, and his spirits became less oppressed. These good effects encouraged him to proceed in his experiment; and therefore, after he had pursued the regimen, before mentioned, during two months, he deducted from his allowance half the former quantity of ale, and was still more sparing of gross animal food. In this course he continued till the 4th of Jan. 1765, since which time he has entirely left off all malt liquor; and in the following month, he began to drink only water, and to eat none except the lighter meats.

Under this degree of abstinence, although some of his complaints were relieved, yet some of them remained in full force. The rheumatism tormented him; and still he had, now and then, slight fits of the gout. On the 4th of June following, he began the use of the cold-bath; and continued it twice or thrice a week, until the 29th of October, 1767. About the same time he began the exercise of *the dumb-bell*; in which he perseveres to this day. Water was his only drink from the beginning of January, 1765, to the 25th of the following October. From this day he drank no more, until the 9th of

May, 1766, when he drank two glasses and an half of water; since which he has drunk no more of any liquor whatever, except only what he has taken in the form of medicine. He has avoided cheese, ever since the 30th day of June, 1767. He began to abstain from butter some time sooner. The 31st of July, in the same year, was the last time of his eating any animal flesh. Since that date, his diet has been principally confined to pudding made of sea-biscuit. He allows himself very little sleep, generally going to bed at eight o'clock in the evening, sometimes even earlier, and generally rising

about one o'clock in the morning, but being very rarely in bed after two o'clock.

Under this strict course of abstinence he still continues to live; and he expresses, in the highest terms, the great pleasure and tranquillity of mind which he enjoys in consequence of it. The poor diet, to which he has accustomed himself, is now as agreeable to his palate as his former food used to be; and he has the additional satisfaction to find his health established; his spirits lively; his sleep no longer disturbed by frightful dreams; and his strength of muscles so

far improved, that he can carry a quarter of a ton-weight, which weight he in vain attempted to carry, when he was about the age of thirty years. His voice, which was entirely lost for several years, is now become clear and strong. In short, to use his own expression, he is metamorphosed from a monster to a person of a moderate size: from the condition of an unhealthy, decrepit, old man, to perfect health, and to the vigour and activity of youth. His flesh is now firm; his complection well-coloured; and, what is very remarkable, the integuments of his belly, which I expected to have

found loose and pendulous, are contracted nearly in proportion to his diminished bulk.

Prejudiced by a commonly prevailing superstition, Mr. Wood never suffered himself to be weighed, either during the state of his extreme corpulence, or since his reduction: but it is conjectured, that he has lost ten or perhaps eleven stone weight.

On being asked why he submitted to such very strict rules of diet, he answered that, as he was ten years older than Cornaro was, when he began his regimen, he thought that, on

that account, a more severe and abstemious course was necessary for him; and that he was greatly influenced by Dr. Cheyne's opinion, "that Cor-"naro would probably have "lived longer had his regi-"men been more strict."

To the question, "what first "induced him to abstain from "all drink?" he answered, that it happened one day that the servant had forgotten to bring his water at dinner, as usual; that, being then full of business, he did not think of calling for any; and that, having found himself easier and less oppressed by that meal than

common, he determined to try whether a total omission of all liquids might not be an improvement to his diet; and that he soon found the experiment to answer. He added, that he was farther encouraged to abstain from liquids by an observation that he had made in feeding hogs. He never allows these animals to drink; and to this he attributes the excellence of his pork; it being greatly valued on account of the whiteness and firmness of the flesh.

His business obliges him to use a great deal of excercise, particularly that of riding. Be-

sides this, he uses *the dumb bell*, as was before mentioned; and digs in his garden, whenever he has leisure. But let his exercise be ever so laborious, or ever so long continued, he has very little or no sensible perspiration.

I have thrice had an opportunity of examining his pulse, about ten o'clock in the morning, after his having walked six hours. The first time, I counted 45 pulsations in a minute; the next time, 47; the last, only 44.

He makes every day, about a pint and half of urine, which is

of a full amber colour. It has scarce varied, either in quantity or appearance, ever since he left off drinking.

He has seldom more than one stool in two days, or two, in three days. If it happens at any time, that his body is in a less costive state, he finds himself languid and faint, and less able to go through business.

Although he wears thinner clothes, than he used to wear, when in his state of corpulence, he finds himself much less sensible of the external cold. He is likewise much less liable to catarrhs, than he formerly was.

Nay, he exposes himself to all weathers; and yet scarce ever perceives the least degree of that indisposition.

From the time when he first entered upon the pudding-diet, he has been much less subject to flatulence; and still much less so than ever, since he left off drinking.

It is to be added to the advantages, which he has gained by his regimen, that he is now entirely free from gravel, a disorder to which he was formerly very subject.

Mr. Wood is a great enemy

to all fermented liquors; to butter; and to salt. Nay, he even doubts of the wholesomeness of common bread, meaning bread which has undergone the process of fermentation. Nor does he seem to build this opinion on mere speculation: for he asserts, that, when his pudding has, at any time, been made of common bread instead of sea-biscuit, he has constantly found the effects of it to be thirst, unquiet sleep, and disagreeable dreams.

The pudding, which was his sole support during two years, was made as follows. Three pints of skimmed milk,

boiling, were poured on one pound of the best sea-biscuit, broken into pieces. This was done over night; and these ingredients were left to stand together until the following morning, when two eggs were added. This compound, being boiled in a cloth about the space of an hour, became a pudding of sufficient consistence to be cut with a knife. Of this his quantity used to be one pound and an half, at four or five o'clock in the morning, as his breakfast, and the same at noon, as his dinner; after which he abstained from food until the next day. But, having grown fatter under the use

of this diet, he judged it necessary to quit it, as being too nutritious; and during three months he lived on the following composition; *videlicet*, one pound of coarse flour, and one pint of water, boiled together. This he was at first much pleased with; but afterwards found it disagreeable to his stomach, and not easily digestible. The pudding, which he now uses, is composed of one pound of the flour, of which the best kind of sea-biscuit is made, boiled with a pint and half of skimmed milk, without any other addition.

I have only to add, that Mr.

Wood has the character of a man of veracity; and that he is desirous to communicate his history to the public, as I really believe, not from a motive of vanity, but of benevolence to mankind.

"January 30, 1770, We, "whose names are underwrit- "ten, do certify, that Mr. Tho- "mas Wood, of Billericay, [an "hamlet of Great Burstead] "about five or six years ago, "was very corpulent, and in a "very bad state of health; and "that now he is reduced to the "condition of a middle-sized "man, and is become healthy "and active. These effects he

" attributes to a certain regi-
" men and diet. This we be-
" lieve to be true, esteeming
" Mr. Wood to be a person of
" undoubted credit, and incapa-
" ble of imposing a falsehood
" on us.

" P. D'Aranda, Vicar of
" Great Burstead, Essex.
" Smith Turner, Church-
" warden of the same pa-
" rish.
" John Powley, Rector of St.
" Laurence and Neven-
" don, Essex.
" Benjamin Pugh, Physician
" at Chelmsford.
" Robert Chaplyn, apotheca-
" ry to Mr. Wood."

P. S. Aug. 22, 1771, Mr. Wood informs me, that he still pursues the same general method, and still enjoys the beneficial effects of it. He says, that he sometimes uses a coarser kind of flour than what is mentioned above, in order to prevent costiveness. He continues lively, active, and in full strength.

IX. *A Sequel to the Case of Mr.* Thomas Wood, *of* Billericay, *in the County of* Essex.

Read at the COLLEGE, March 16, 1785.

In the second volume of the Medical Transactions, page 259, the College published an account of the very extraordinary course of abstemiousness, which Mr. Thomas Wood had for some time pursued, and of the beneficial effects of it to his health. He died of an inflammation in his bowels, on the 21st of May, 1783, in the sixty-fourth year of his age. He had continued in good health to the

ninth of that month ; when he is supposed to have taken cold, by riding in the rain, with his clothes unbuttoned, in his usual way. His indisposition is said to have been slight, until about twelve or fifteen hours before his death. His mother and brother had been carried off by the same disease.

My friend, to whose favour I owe this information, had visited him a few days previous to his last illness. He then was in health and spirits. On the preceding day, he had travelled, on horseback, more than sixty miles, without any sense of fatigue.

Having heard it positively asserted, that, notwithstanding his boasted temperance, Mr. Wood was, in reality, much addicted to spirituous liquors, I judged it to be particularly incumbent on me, as his historian, to inquire whether or not there might be any good foundation for such a charge against him; in order that, in case of my having been deceived, I might no longer give any degree of authority to a misrepresentation. But several creditable persons concur in assuring me, that they believe the report to have been utterly groundless, and probably raised by some of Mr. Wood's neigh-

bours ; among whom he had made himself unpopular by the severity of his deportment, and by his lectures on the luxury of temperance, which were not at all times relished.

His constant and minute attention to parochial œconomy, had likewise made the poor of his neighbourhood, in general, his enemies ; for he used to argue, from his own experience, that the common allowance, for the maintenance of a poor man, was superfluous, and tended only to add disease to poverty.

His son and daughter, who

lived with him, and his servants, declare uniformly, that he adhered to the regimen, which he professed to follow, except that, in the summer, he sometimes indulged himself a little in the fruits of the season; but that he generally paid dear for this indulgence by a pain in the bowels, which was apt to be the consequence of it, and to which he was subject through his whole life. They add, that, on those occasions, he had been accustomed, now and then, to pour over his pudding half a wine glass of gin or brandy; which, however, seldom proved successful in alleviating his pain; but that he had left

off that practice for two or three years before his last illness. This appears to be the only foundation, on which a report was founded so unfavourable to the reputation of Mr. Wood.

I have been entertained by the perusal of a large collection of letters,* in manuscript, written by Mr. Wood to his correspondents, on the preservation

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* A collection of letters from various parts of the world to Thomas Wood, of Billericay-mills, in Essex, on the subject of temperance, together with his answers; to which are prefixed some remarks on the case of Mr. Wood, as communicated to the College of Physicians, and published in the Medical Transactions.

of health ; on which subject he was much consulted, and by some persons of considerable rank. These letters, together with those of his patients to him, he left prepared for publication. The letters of Mr. Wood have all the appearance of having been dictated by a spirit of sincere religion and benevolence ; and if, amidst such sentiments, as are here to be found, a little vanity may now and then be discovered, it has a just title to our candour and indulgence. No other relaxation, with respect to regimen, appears in any of the letters, except that he sometimes allows to himself, and his correspon-

dents, the use of boiled vegetables, but without the addition of butter, salt, or spice of any kind. His abhorrence of fermented and spirituous liquors is frequently expressed in these letters ; and even the necessity of abstaining entirely from all drink is strongly recommended. "Nay," says he, "it is not "enough, for the perfect "establishment of health, total-"ly to abstain from drinking ; "but likewise we ought to be "cautious not to eat too much "of moist vegetables, such as "turnips cabbage, &c. For by "certain experience I know "that the drier my food is the "less quantity will suffice, and

" the better I am. The perni-
" cious custom of taking in too
" much moisture, is, perhaps,
" as great a provocative to eat-
" ing, as salted meats and high
" sauces are to drinking; and
" consequently should, with
" equal care, be avoided."

I take leave to extract from one of these letters Mr. Wood's illustration of his doctrine of the cause and cure of most chronic diseases. " If you fill a
" large vessel with pure water,
" and every day draw off half a
" pint, and instead of it pour in
" half a pint of ink, you will
" soon find the liquor foul and
" thick; and, by continuing

" this method, you will in time
" make it so black and turbid
" as to be good for nothing.
" On the contrary, if you re-
" verse this practice, that is, if,
" instead of ink, you pour in,
" each day, half a pint of pure
" water, it will soon become
" less foul and thinner, and in
" time will be as pure and clear
" as it was originally."

Prefixed to these letters, are Mr. Wood's remarks on his case, as published by the College of Physicians.

" When I mentioned, that I
" do not suffer my hogs to
" drink, my only meaning was,

" to shew that my living with-
" out drink is not so wonderful
" as it may at first appear. I
" would, however, by no means
" have it understood, that I
" think, that any animal can
" live without moisture. My
" hogs are not, as is common,
" fed on dry pease, but on flour
" made properly moist with
" water. With respect to my-
" self, my pudding is made of
" coarse flour, and such a quan-
" tity of water as is necessary
" to make its parts to disunite
" easily. This makes a ten-
" der pudding, which will put
" nature to little or no expense
" to digest, and consequently
" needs no liquid to be drank

" after it: so that, in fact, it is
" much the same thing, as if I
" were to eat the quantity of
" dry flour, of which my pud-
" ding is made, and drink af-
" terwards the quantity of water
" which it contains. Those,
" who would live without
" drinking, ought to be very
" careful in the choice of pro-
" per food, and to abstain
" from all provocatives to
" thirst, such as dry bread,
" cheese, butter, hard puddings
" composed of fine flower,
" milk, and eggs, and salted
" meats of all kinds; and, in-
" deed, every thing commonly
" called *relishing;* for they I
" think, are snares most dan-

" gerous of any to the human
" species, with respect to health,
" and the prolongation of life.
" But I have often wished, that
" my abstinence from drink had
" been entirely omitted in this
" account; because it carries
" with it such an appearance
" of incredibility as does hurt
" to the main cause, viz. that of
" temperance.

" As to perspiration, I think
" that I was misunderstood in
" that matter likewise; for I
" seldom or never continue
" long at hard labour; that be-
" ing as pernicious to nature as
" high feeding.

"There is a capital mistake
"with respect to my pudding's
"being composed of the flour,
"of which the *best* kind of sea-
"biscuit is made. It should
"have been said, ordinary or
"*coarse* kind of sea-biscuit."

X. *Observations on the modern Method of Inoculating the Small-pox.*

Read at the COLLEGE, Sep. 19, 1771.

So much has already been written concerning the modern method of inoculating the small-pox, and the peculiarities of it, in its several steps and stages, that it seems at this time unnecessary to enter into a particular detail of a practice, which is now not only distinctly known by physicians, but is almost become a matter of public notoriety.

The process has been generally this.

I. The subjects have been prepared by a very abstemious diet, and by a mercurial purgative given and repeated, previously to the infection, and in the interval between the infection and the beginning of the variolus fever.

II. The infection has been communicated by means of a *slight* elevation of the cuticle raised by a lancet infected with *crude* matter, in a *fluid* state.

III. Powerful purgatives have been occasionally given

during the fever, previous to the eruption ; during the period of eruption ; and even after its completion.

IV. The free use of fresh air and a very cool regimen, has been strenuously recommended.

About the time when the great success of this method began to be the subject of popular conversation, a report was likewise propagated of as uncommon a failure of inoculation, among the inhabitants of a considerable town in the county of Dorset. Having esteemed a particular enquiry into the

truth of these representations well deserving my attention, I found that in the counties of Essex, Norfolk, and Suffolk, many thousands of people, of all ages and constitutions, and some of them under every apparent disadvantage, had been inoculated, with general good success; whereas at Blandford, out of 384 persons who were inoculated, 13 actually died, and many others narrowly escaped with their lives, from the confluent small-pox. These facts having been ascertained, I was of course led farther to enquire into the probable causes and occasions of events so very different. And having exami-

ned how the patients had been respectively treated, I could not hesitate in determining, that the good success on one side, and the misfortunes on the other were to be referred to no other cause than to proper and improper management. Fresh air, cold water, acid liquors, and purgative medicines, had been uniformly insisted on by those, whose practice had been warranted by successful experience; whereas it appeared, that the inoculated at Blandford had been confined in their beds under a warm regimen; and that the whole process of their cure had evidently tended only to aggravate their disease. "I do

" not believe," says M. Gatti, speaking of these two facts, " that there is to be found, in " the history of inoculation, " another instance of so great " a difference in the success of " that practice.*" And his conclusion is, " that so considera- " ble a difference in the success " cannot have been the effect of " accident ; and that the cause " of it cannot possibly have " been other, than the differ- " ence of the method."

Under the influence of the

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* Nouvelles reflexions sur la pratique de l'inoculation, par M. Gatti, médicin-Consultant du Roi, et Professeur en Médecine dans l'Université de Pise, p. 12.

same opinion, I published the result of my enquiries, as far as they had then been carried. My view was, to excite the attention of others to a course of proceeding, from which, as I imagined, considerable benefit might be reasonably expected to accrue to society. And that very important benefits have accordingly been derived from it, will readily be acknowledged, when it is known that inoculation, which was heretofore in a manner confined to people of superior ranks, is now practised even in the meanest cottages, and is almost universally received in every corner of this kingdom. It cannot therefore

be doubted, but that many valuable lives have hence been saved to the community. On the other hand, it would argue an unjustifiable partiality in favour of our modern inoculators, were we to dissemble, that their practice has not in all respects been free from error; and that unfortunate events have not in particular instances, brought it into discredit. My intention therefore, in this paper, is in some measure, to supply, from farther observation and experience, what was defective in my former publication; and to point out what parts of this method are evidently liable to

objections, and what parts deserve to be considered as real improvements, and worthy to be adopted.

I. Let it then be the first object of this enquiry, to examine how far a general plan of preparation, indiscriminately, or at least, with very little variation, applied to persons of all ages and constitutions, and in every season of the year, may be justifiable by experience. And here it will appear, upon the authority of certain facts, that such a general preparative method, although it has been attended with more success than could reasonably

have been expected, has not always been practised with impunity. Several histories of cases, which I have collected, both from my own observation and that of others, abundantly shew, that the preparation itself has sometimes produced unkindly effects; that persons of tender habits have suffered greatly from the repeated use of strong purgative medicines added to a severe course of abstinence; and that, in a few instances of children, convulsions and even death itself, have been the consequence of this treatment. Such indeed are the effects, likely to be produced in this practice, whenever

the disease is prescribed to, and not the patient. It may be as necessary to support the strength of some constitutions, as to lessen that of others. The same method and medicines cannot rationally be opposed to firmness and to relaxation; to superfluity and to defect; to a man of strong, elastic fibres, and dense blood; and to a weak hysterical, cachectic woman. But this argument needs no illustration. Experience has sufficiently shewn the truth of it in the subject now before us.

It is no new opinion, that mercury has certain specific

powers, capable of counteracting the variolous poison, and of lessening its malignity. Physicians, who attend hospitals, have frequently observed the small-pox to be particularly mild in those patients, who have happened to receive the infection soon after a mercurial ptyalism: and inoculation is said to have been a much more successful practice in some of our American colonies, since the use of calomel has been there introduced into the preparative regimen. The result of my observations on this subject is, that in cases, where there is no particular objection against the use of calomel, it

may be considered as an useful evacuant ; and that a few grains of it may be properly given with a view to cleanse foul bowels. Boerhaave's idea on this subject seems to have been little more than speculation and conjecture ; nor indeed, if the fact be really true, (which however is disputed) that the small pox, ensuing upon a mercurial ptyalism, is generally a slight disease, does it follow, that such an effect is to be ascribed to any particular qualities of mercury ; since it may be referred, perhaps with an equal degree of probability, to the mere evacuation only. This idea is consonant with Dr. Mead's opinion, who observes, that this

disease is generally mild, whenever it is contracted soon after some great evacuation, natural or artificial. The instances, which he mentions, are, persons in general after any acute disease; women after lying in; and salivated patients in an hospital. These he speaks of as cases quite parallel; nor, in the latter, does he attribute any antivariolous efficacy to mercury. His inference is simply this:—*indicium certe satis manifestum, quamcunque materiæ diminutionem, fomitem igni subtraendo, huic morbo apprime convenire.** In a word, comparative trials have been made with

* Mead, de Variolis, cap. iv. p. 71.

sufficient accuracy: mercury has been used, and has been omitted, in an equal number of patients, nearly of the same age and under similar circumstances, previously to inoculation: and the result of these trials has by no means been decisive in favour of mercury.

It is the opinion of M. Gatti, that a person, in a good state of health, needs no preparative for inoculation. This proposition, although supported by that author with his usual ingenuity, should seem to be too general. For according to an old observation, consummate health is very apt to border on its contrary; and it is often

seen, that men of the strongest habit of fibres, and the most plethoric health, are the greatest sufferers under the attack of an acute disease. We cannot perhaps define, with a philosophic precision, on what circumstance a disposition to a mild kind of small-pox depends. But, are we to make no use of the knowledge, which we derive from observation, because it is a limited knowledge? If we appeal to the authority of those, who were the first writers on this disease, we find them very solicitous to prepare their patients against it, whenever it was epidemic.* With this in-

* They advised, that young persons

tention therefore they prescribed a cooling diet, and lenient purgatives, forbidding every thing, which might seem likely to quicken the motion of the blood and increase heat. From the time of the Arabian writers down to that of the introduction of inoculation into this country, we find very little said concerning preparation. It did not, however, escape the sagacity of our countryman Sydenham, that great advantages

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should be always kept prepared during the spring and winter. They had an idea, that by their management, if timely applied, they had a power even to extinguish the disease, and prevent any eruption; or at least to ensure the pustules being *debiles et paucæ*.

might be obtained by it; for he testifies in express terms, that a purgative medicine, twice or thrice repeated before the accession of the variolous fever, had, in his opinion, frequenly contributed to render the subsequent disease mild. It will indeed readily be granted, that, since the æra of inoculation, too much has often been done in this particular; that practitioners have been led into error by their abundant caution; and that dangers have been multiplied by the very means calculated to prevent them. But it will be remembered, that objections against the abuse of a practice will not avail against

the proper use of it; and that the success of every method of cure depends on the discreet, just, and seasonable application of it.

Since then we have two opinions, concerning a point of medical practice, so opposite and contradictory to each other, a prudent physician will guard himself against an hasty attachment to either party. The greatest security will probably be found between the two extremes. For, on one hand, there are many persons, who, previously to inoculation, have undergone great evacuations, and a strict course of abstemi-

ousness, not only with impunity, but apparent advantage. On the contrary, the same method has produced in other persons very different effects. It has only added to their natural weakness, and rendered them less fit subjects for the small-pox. The practice of physic rarely admits of any perpetual precepts; and he will be very apt to err, who will not, as he may find occasion, deviate from authorities, and follow the dictates of his own judgment and discretion, as they arise from the case before him.

II. With respect to the

mode of communicating the disorder, here our modern inoculators have introduced, or revived rather, what must be acknowledged to be a very considerable improvement. How it happened, that the original and most simple use of the needle did not take place with us from the very first, I cannot say: certain it is that inoculation never received the smallest advantage from any of the refinements of art; nay, the formidable apparatus of ointments, and plasters, and bandages, did in all cases add to the inconveniences of the disease, and in some, aggravate its symptoms. It is a well known fact, that

even slight incisions in the skin, when thus treated according to art, have degenerated into troublesome sores of long continuance, and of difficult cure. It is likewise observable that the erysipelatous rash, which beginning at the arms, used frequently to spread itself over the whole surface of the body, and which was apt to return from time to time in successive crops, is now seldom or never seen under the modern management; nor are inflamed eyes, or suppurations of the lymphatic glands, in any degree so frequent as formerly. Let me add, what appears to be an advantage of no trivial

importance, that we cannot now be at a loss to determine with certainty, whether or not the patient be secured from future infection. This was far otherwise, while plasters were applied to the incisions. Some skins being impatient of all such applications, an inflammation and a consequent discharge were not uncommonly produced, even where no infection had been communicated; and on the authority of this deceitful appearance, persons were pronounced free from all danger, who afterwards fell victims to the disease. Whether or not there be any real and essential difference between the

effects of the crude and the ripe matter, it is not easy to determine. There does not, however, appear to be any reasonable objection to the use of the crude matter; nor is it an improbable supposition, that some advantages may arise from it.

That the matter more certainly takes effect, when it is applied in a fluid state, seems generally to be allowed. And this apparent novelty may be supported by the authority of antient usage; for we are informed by the earliest writers, on this subject, that the Grecian woman, who practised

inoculation at Constantinople, was attended by a servant, who brought the matter fluid in her bosom. Mr. Holwell likewise testifies, that the same method prevails among the Bramins in India. And we are also informed, that the people of Tripoli, who are destined to inoculation, are carried to the houses of those, who have the small pox, in order that they may immediately receive the fluid matter, fresh from the pustules.

But the present method is likewise attended with another practical improvement; for, by a daily and attentive observation of the parts, to which the

poison has been applied, the experienced practitioner is enabled not only to view the natural progress of the infection, but likewise to conjecture, with some degree of certainty, concerning the quantity of the future disease. During the time when ointments, and plasters, and bandages were in fashion, every appearance on those parts was uncertain and uninstructive; every possible prognostic, which could be founded on it, was precarious.

III. With respect to the general treatment of the small-pox, from the commencement of the fever to the maturation of

the pustules, here likewise our modern inoculators have opened a large field for medical improvement. For not contented with being inactive spectators of the progress of the disease, they have ventured to administer purgatives, even of a powerful nature, and to repeat them more or less often, as the occasion may have seemed to require. Whether or not they ought to be considered as the original authors of this method, it is not material. The same certainly was some years since recommended by a physician in a *treatise on the small-pox;* but he had not sufficient reputation in the medical world, to

give authority to novelties in practice. Be this as it may, it is now sufficiently evident, that this method of purging in this stage, under particular circumstances, may be followed beneficially to the patient. What a contrast then does there appear between this method of treating the small-pox, and that which had generally prevailed, established by the practice of the most able physicians! Was it not usual with them even to promote a costive state of the bowels through the whole disease? And has it not been made a matter of doubt, whether or not even a clyster might be administered with impu-

nity? It is to be suspected, therefore, that the old doctrine, "nature cures diseases,"— "nature is the surest guide," &c. may in this as well as in some other instances, have led practitioners into a dangerous error. As it appeared to be the design of this much celebrated intelligent power within us, to expel a load of mischief from the centre to the circumference of the body, it was held to be the duty of the physician to co-operate with that design. Upon this principle, medicines were applied under the title of diaphoretic and alexipharmac, some of which fortunately are mere inactive substances,

others, as experience has shewn, are too capable of doing mischief. Because a copious perspiration had frequently been observed to precede a mild and distinct kind of small-pox, a conclusion was too hastily made from hence, that, in order to ensure safety, no more was required than to promote a *diaphoresis*. But this proved to be a fallacy; and an imitation of nature, under a misapprehension of her motions, was attempted by means which tended to counteract and embarrass them. That natural and unsolicited perspiration which is regarded as a prognostic sign of a mild and distinct

small-pox, may be observed not to break out, until the fever has in some measure subsided. Hot medicines, therefore, applied before this crisis, must accelerate the blood's motion; and so may serve only to prevent perspiration; or if being continually taken, they do succeed in forcing out sweats, such sweats are found at least to be unprofitable. In either case, the eruption is likely to be precipitated; and the patient to be in a worse condition than if he had not had the assistance of art. The true way then of following the dictates of nature, in this case, is to endeavour to assist her in moderating the

fever ; and a beneficial perspiration will, in general, be best attempted by antiphlogistic medicines, and a cool regimen.

If it be objected to what is here written, that there are, in this country, several successful inoculators, who confine their patients, sweating, in bed, during the whole eruptive fever ; I answer, that it is the good fortune of inoculation very often to prosper even in the most unskilful hands, and under the worst management ; but no accidental success can, in this instance, be properly urged as an argument in justification of a practice, opposed

to reason and general experience.

The eruption being completed, particularly when the pustules are numerous, anodynes are usually given. And here let me take occasion to observe, that Sydenham seems to have shewn too great a partiality in favour of this *liquid laudanum ;* and that there is reason to suspect, that his doctrine has, in this particular, been sometimes too implicitly followed. For, if experience has shewn that important advantages have arisen from the belly's being kept in a soluble state, it must follow, that a medicine, the ordi-

nary effect of which is to occasion costiveness, must have its inconvenience. Besides, it is often seen in certain constitutions and subjects, that opium, whether given in a small or a large dose, does not cause sleep, but on the contrary, even increases anxiety and restlessness; and, if it should stupify the nerves, so as to render them less sensible of pain, such a temporary relief is sometimes dearly bought by the patient, whose head is confused, whose respiration becomes more difficult, whose spitting is checked. I would not be understood to mean, that these are constant effects of opium, given in the

small-pox ; and I am very far from subscribing to the opinion of the ingenious M. Tissot, who, in his epistle to Mr. V. Haller, *de variolis, apoplexia, et hydrope*, condemns the use of opium in this disease universally and without exception. For we sometimes, at least in this country, meet with tender and irritable habits, which require the assistance of such a medicine, and are relieved by it. In such cases, if some of the inconveniences, above mentioned, do happen, the advantages, gained by a precious interval of ease, will sometimes be found to be more than an equivalent.

But I would speak something further of the use of purgatives, not only in respect of the disorder before us, but more generally. Should it not seem then that the beneficial effects of them, in this and other eruptive diseases, result chiefly from that peculiar relation, which is observable between the affections of the skin and the intestines? The perspirable matter, checked suddenly, and thrown back upon the constitution, is in all cases very apt to affect the bowels; and *vice versa*, I have more than once known a *diarrhœa*, which has resisted other remedies, yield entirely to the use of a

warm bath. If, upon this principle, purgatives, under certain restrictions, were more generally given, physicians perhaps would be more successful in their treatment of some other fevers, attended with eruptions on the skin. I am convinced by experience, that the prudent application of this practice to the miliary fever has been of singular advantage; and it is worthy of observation in this place, that the symptoms of the measles are often rendered less formidable, when, during this disease, the patient has every day two or three evacuations by stool. Nature herself frequently points out in what

manner she ought to be relieved, by raising a spontaneous *diarrhœa;* and experience has shewn, that the discharge is salutary and cannot be restrained with security. I have even reason to think, that the dangerous peripneumony, consequential to the measles, is by no means so effectually to be prevented, as by the method of cure which is here suggested.

But as every powerful remedy is by the abuse of it, convertible into a powerful poison, this method of purging in the small-pox has, in many instances, been productive of mischief, which has surely arisen

from the want of judgment and discrimination in some of our inoculators. I have collected many histories of cases on this subject; from whence it appears, that various are the ill effects, which have been produced by the indiscreet use of purgatives given with a view to suppress and repel the eruption. The most common, as well as the most fatal of these ill effects, is a consumption of the lungs. The late Dr. Blanshard informed me, that out of ninety persons, who had been inoculated in one village ten died consumptive, soon after their recovery from the smallpox; three only of which

number had shewn any disposition to diseased lungs before their inoculation. Upon enquiry, he learned, that all these people had taken strong purgative medicines, as well through their preparative course, as through every stage of the disease. The same gentleman shewed me two instances of a *gutta serena*, most probably from the same cause. This ill-judged treatment has likewise not unfrequently been the cause of various disorders of the hysterical and spasmodic kind; of dropsies; and of the most obstinate pains in the limbs. To this account may be added various eruptions on

the skin, particularly pustules resembling those of the small-pox: and abscesses in various parts of the body; all seeming to indicate, that the constitution, forced from the ordinary manner of relieving itself, makes every irregular struggle to shake off its oppression, and to dislodge the enemy by any means and at whatever expense and hazard. Several cases have occurred to myself, which have seemed to justify such a reflection; and from many parts of this kingdom, in which I have had an opportunity of enquiring, I have received accounts corresponding entirely with what has been here

represented ; and yet certain it is notwithstanding, that the misfortunes, which have attended this modern mode of inoculation, have been greatly over-balanced by its general success.

It appears then, from what has been premised, that the use of purgatives, regulated by discretion, is capable, under certain circumstances, of lessening the violence, and averting the danger of the small-pox. It appears likewise, that the same medicines, given injudiciously with respect to time or quantity, and without due attention to the strength and habit of the

patient, have produced very ill effects. In so critical a situation, by what rule shall the physician determine his conduct? By none, which can easily be described. Here therefore especially, is the use and importance of a man of skill, deliberation, and judgment. Such an one will make it the first object of his consideration, how far it may be necessary or expedient to do any thing, which may possibly interrupt the progress of the disease; and whether the whole business may not more safely be committed to nature. Should he find reason for attempting to lessen and retard

the eruption, he will not have recourse to any prescribed form of medicine; but will endeavour to accommodate his remedies to the age, sex, constitution, and other peculiar circumstances of the patient. In a disease, which is subject to such a variety of *phænomena*, to be confined to any established method of cure, would be as irrational, as to be guided by no rule, no method at all.

IV. The great benefits, which persons under the process of inoculation, derive from the free use of fresh air, were the principal object of my pamphlet formerly published.

And here it would argue the utmost want of candour in us, not to acknowledge that physic is greatly indebted to our modern inoculators. If it be objected to them, that, in this respect they have introduced nothing of novelty; for that Rhazes and the other Arabian physicians, whose writings are come down to us, both taught and practised the cold regimen, according to the most extensive signification of the words; and that our own countryman Sydenham, having, as he himself testifies, found the medical world divided between patrons of the hot and of the cold method, zealously attached him-

self to the latter opinion; yet let it be remembered, first, that as to what regards the Arabians, reasons, apparently plausible, were objected to the imitation of their practice: namely, that it was well adapted to the warm countries in which they lived, but would be very injudiciously followed in our northern climate: and, with respect to Sydenham, it is manifest, even from his own words, that in his general practice, he fell short of his principles and persuasion, and was restrained by the obloquy of his contemporaries from openly pursuing a plan, which, in his private judgment, he

heartily approved. And it is as certain, that from the time of Sydenham, down to that of the introduction of the modern improvements, the antiphlogistic method of treating the small-pox was in reality, and in submission to the prejudices and tenderness of women and friends, more talked of by physicians than prescribed; more praised than practised.

It is, however, to be lamented, that the liberty of using fresh air has been exercised in too free and unlimited a manner, sometimes for the patients themselves, but generally for the neighbourhood and commu-

nity. The contagion has thus been propagated: the unsuspecting and the unwary have been surprised with the disorder, and have suffered; and a practice, so beneficial to individuals, has, in many instances, become detrimental to society. This evil, and that other, of country practitioners, who have opened houses of reception in or near large towns, I shall content myself with having mentioned. I fear it cannot be remedied, unless by the interposition of the legislature.

From this free, and, I hope, fair examination of the merits of our modern inoculators, we

may draw the following conclusions.

First, when we consider to how full a diet (consisting principally of gross, heavy, unctuous, animal food) the people of this country are accustomed, we cannot doubt of the general utility of a short course of abstemiousness, as a preparative for the small-pox. And upon the same principle, we may conclude, that the several purgatives, given at this time have contributed their part to the general success of the practice. If this method of preparation has sometimes seemed not to have been attended with good

effects, our censure ought to fall, not on the method itself, but on the misapplication of it in particular instances.

Secondly, these operators have derived singular advantages from the manner of communicating the infection, which they have practised.

Thirdly, they have introduced the use of purgative medicines, with a view to abate the fever, and lessen the eruption. And although the indiscriminate application of the same method has, as might have been expected, in some cases, done mischief; yet physicians, in

this respect, may even from the errors of these men, derive useful instruction to themselves.

Fourthly, they have experimentally shewn, that fresh air, if it be not an antidote to the variolous poison, is the great preservative against the dangers, which frequently attend the small-pox.

Fifthly, they have proved, that the idea of the possibility of accumulating the infection of the small-pox (an idea which prevailed long, and which appears to have been strenuously maintained by Mead) is wholly without foundation: and that,

when the poison has once affected the skin, the patient is secured from any farther degree of contagion. This they have satisfactorily proved by their custom of admitting, without the least scruple, and with impunity, persons, who come to their houses, in order to be inoculated, into the company of the variolous patients, sometimes several hours before the matter is inserted. From the same custom we may likewise deduce the following very curious truth, *viz.* that the small-pox, by inoculation, out-runs and anticipates accidental infection. This truth is still more confirmed by a remark-

able case which once happened within my own knowledge; and again, lately, in the practice of Dr. Watson, with little or no variation of circumstances. A poor woman who had an infant at her breast was seized with the small-pox, which proved confluent. On the fourth or fifth day after the eruption, the child was inoculated, and, at the usual time, had the disease, and passed through it without danger or difficulty. The mother, in both cases, died.

Before I finish this paper, I beg leave to add a few words concerning the inoculation of

pregnant women, and of infants at the breast. The small-pox has ever been found to be so hazardous a disease to women during pregnancy, that one would scarce have imagined, that in such a state, inoculation could ever have been thought of, except only under circumstances of extreme necessity. And yet even in this situation it has been advised, nay sometimes practised with safety. But, it should seem, that nothing less than a multiplicity of successful experiments can justify this practice. And as it does not appear, that a sufficient number of such successful experiments have as yet

been made, we may at present be allowed to reason on the subject. Is it not then generally observable, in the case of pregnant women, that the pulse is quicker and fuller than natural; and that they are liable to be hot, thirsty, costive, nay, to become feverish on the slightest occasions? Does not the blood, when drawn from their veins, exhibit those appearances (whatever may be the cause of them,) which are usually found to attend inflammation? Is not the general irritability of the habit considerably increased, during pregnancy? And lastly, is not the natural small-pox, when it hap-

pens to a pregnant woman, found by experience to be more than ordinarily formidable? These are considerations, which render the expediency of inoculation, under such circumstances, greatly questionable; and it should seem to be an act of temerity to recommend it, with any view, except only to prevent a greater evil, which might otherwise probably be immediate and unavoidable. Several unfortunate cases have been reported to me which shew this practice to have been attended with extraordinary danger, more especially to the *fœtus*. I set down the following, because the event fell un-

der my own observation. An healthy young woman was inoculated in the sixth month of her pregnancy. The pustules appeared at the usual time, and in moderate numbers: and nothing untoward happened, until the evening of the fourth day from the eruption. She was then seized with symptoms of a premature labour; and a sudden and violent hæmorrhage following, she very soon died convulsed.

Dr. Mead speaking of pregnant women having the small-pox, ventures to assert, that "if "there be no miscarriage, the "child will be free from the "disease during his whole

" life, unless he happen to be " born before the pustules are " come to maturity."* This assertion is not confirmed by later experience; nay, the reverse of it is proved to be true by the following indubitable fact. Two pregnant women, having been inoculated, had the small-pox in a very favourable manner; and afterwards brought forth their children, perfectly healthy, at the usual time. Both these children, when they had attained the age of about three years, were inoculated with effect, and had a moderate eruption.

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* Mead, de Variolis, cap. iv. p. 66.

This general position of Dr. Mead being thus shewn to have no foundation, it would be of importance in the practice of inoculation, if we could go farther, and ascertain whether or not a child in the womb be liable to the small-pox. Dr. Mead* has taken the affirmative side of this question; and has even asserted, that the *fœtus* may be infected, though the mother be free from the disease; and in confirmation of this opinion, he relates the following history. "A woman, "who had formerly had the "small-pox, and was now near

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* Mead, de Variolis, cap. iv. p. 66.

" her reckoning, attended her " husband in that distemper. " At her full time, she was de- " livered of a dead child, whose " body was entirely covered " with pustules; a manifest " sign, that it died of the small- " pox, before it was brought " into the world." With respect to this case, which, it is to be observed, the author relates from memory, there is great reason to suspect, that the pustules were not variolous, there being frequently seen on the skin of children, who have some time been dead in the womb, vesicular appearances,*

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* Dr. Clerke informs me, that the fol-

which may be easily mistaken for the small-pox, especially by one who examines it under the influence of a preconceived opinion. What is here said of this case is likewise applicable to that recorded by Mauriceau.*

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lowing case fell under his own observation. "A woman towards the end of her pregnancy, had the small-pox, from which she narrowly escaped. Five weeks after the crisis, she was delivered of an healthy female child, who, having numerous marks on her skin, was judged by all, who saw her, to have undergone the same distemper before her birth. However, at the end of twelve months, she had the true small-pox in a very severe manner. Both the mother and the child are now living at Epsom."

† Mauriceau, sur la grossesse et l'accouchement des femmes, observation 600.

While I am upon this subject, let me take notice of another assertion in the same chapter of Dr. Mead's book *de variolis*, the truth of which is not proved, and which indeed appears to be founded on an oversight and misconstruction. His words are what follow: "Illud tamen auctarii loco adjiciam, fieri interdum posse, "ut infans etiam in utero ab "hac ægritudine incolumem "se expediat, evanescentibus "ante partum morbi indiciis." In order to establish this opinion, he refers the reader to a case related by Mauriceau, in his book *sur la grossesse et l'accouchement des femmes, observa-*

tion 576; which *observation* contains only the following history: "A woman was deli-
"vered of a male child at the
"ordinary term, herself as well
"as the infant being in good
"health, notwithstanding that,
"in the fifth month of her
"pregnancy, she had the small-
"pox in a severe manner; of
"which disease, however,
"there did not appear on the
"body of the child any mark,
"which could testify, that he
"had been infected in the
"womb." It is evident from hence, that Dr. Mead entirely misunderstood Mauriceau; and that he drew a conclusion from this history, directly contradic-

tory to the whole tenour of it, and to the author's meaning.*

With respect to the propriety of inoculating infants at the breast, there are two opposite opinions; and specious arguments are used in support of each opinion. To avoid a repetition of what has been urged

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* The words of Mauriceau are, "—dont "il ne paroissoit aucune marque sur le "corps de l'enfant, qui pust témoigner "qu'il en eust été aussi lui-même infecté "dans le ventre de la mere." —Dr. Mead's construction of these words conveys a very different idea: *Evanuerant ante partum morbi indicia.* According to the author, *no marks of the small-pox appeared*; according to the translator, *the marks of the small-pox had disappeared.*

on both sides, I leave this question to be determined wholly by experience. And, if I have not been misinformed, the decision will not be in favour of an early inoculation of children; for, having been diligent in my enquiries on this subject, I learn, that much the greatest proportion of deaths, which have happened here in London in consequence of inoculation, have happened to children under the age of two years. Of these some have died in convulsions, previous to any eruption; but the majority of them have sunk, oppressed by an insuperable load of disease, at

an advanced period of the small-pox. And yet, notwithstanding the force of this practical objection, an infant may easily be supposed so circumstanced, as not to be likely to escape accidental infection. In such a case, the apprehension of the greater danger ought, it should seem, to over-rule that of the less; and even doubtful means of safety should be hazarded.

While I have been engaged upon this subject, some points have occurred to me upon which, as I have not been able to satisfy myself clearly, I submit

them, as matter of enquiry to more general consideration.

Queries.

I. Since it has not been supposed, that the small-pox of the Arabians, differed either in its nature or effects from the disease so called, with which we are conversant; how are we to account for the silence of Rhazes, and other Arabian writers, with respect to its two remarkable peculiarities, namely its being communicated by contagion, and being once only incidental to the same person ?*

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* They speak of this disease, as arising

II. Since no mode of preparation has hitherto been found effectual for reducing the natural small-pox to that degree of security, which generally attends the practice of inoculation; and since in numberless instances, inoculation has been successful, even without the assistance of any preparative regimen; to what circumstance ought we to attribute such different effects of the same poi-

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from the ebullition of the blood, and particularly incident to the age between childhood and youth. Nay, it is asserted by Aaron, that it is liable to return to the same person twice or thrice, *præcipue cum sanguis sit acutus.*

son? Is it to be supposed, that there is a greater degree of activity and virulence in those contagious particles, which are received in the form of *effluvia*? or should it seem, that, in the natural small-pox, the poison is applied immediately to a vital, most intimate, and very sensible organ; whereas, in the case of inoculation, it is applied to a distant extremity, and of less importance in the animal œconomy? In a word, does the difference lie in the quality of the poison itself, or in the part first poisoned?

III. Before the variolous poison, when inserted, takes ef-

fect, an inflammation ever arises on the place of its insertion. Where no such inflammation appears, no small-pox ensues in consequence of inoculation. The same thing is observable of another animal poison, generated, like this, by disease, namely, that which is infused into a wound made by the bite of a mad dog. Although this wound sometimes readily heals up, yet it constantly breaks out afresh and inflames, before any of the terrible symptoms appear. May it not then be supposed, that these poisons are for some time confined in the part to which they were applied, and do not enter into the

habit, till, by a topical inflammation, they have shewn their powers and energy for further mischief? If such a supposition be probable, does it not, in the case of the bite of a mad dog, confirm the propriety of an obvious experiment, whether the cutting out or burning the part wounded might not prevent the effect? This has been proposed; if ineffectual, perhaps a sufficient quantity of flesh has not been destroyed; and it is natural to suppose, that such an operation may have been performed in too much haste, under the influence of a presumption that it must be useless, if not immedi-

ate ; or possibly with too great tenderness for the unhappy sufferer. But if the poison be only confined in the wounded part, may not the operation be expected to be successful at any interval, provided only it be before the inflammation and other bad symptoms begin to appear ? One can hardly suppose a case, in which such an experiment would be tried in the inoculation of the small-pox. But, in support of this reasoning, I am informed, that the cutting out the parts surrounding, and at the bottom of, a recent venereal ulcer, so that none of it be left, has entirely prevented any farther symptom

of the disease ; the wound having healed like a common wound, without any use of mercury.

XI. *An Account of a singular Disease, which prevailed among some poor Children, maintained by the Parish of* St. James, *in* Westminster.

Read at the COLLEGE, August 11, 1784.

On the 24th day of September, 1782, seventy-three children, viz. forty-six girls, and twenty-seven boys, of different ages, from that of seven to fourteen years, were removed from Wimbledon, where they had been maintained at the expense of St. James's parish, to a large house in King-street, near Gol-

den-square, which the officers of the parish had lately purchased, with an intention to keep the children separate from the other people who live in the common poor house. To this house all these children came in good health, and continued so till the 8th day of October following. On that day, a girl, of the age of thirteen years, was suddenly seized with an excruciating pain in the region of the stomach, and in the back, which was soon followed by violent head-ach, *delirium*, and convulsions. Assistance being called, she received a temporary relief. After a few days, another and another girl were

attacked exactly in the same manner; and, towards the end of the month, this disease had so prevailed, as very much to alarm all to whom the care of these children had been committed. Therefore, on the 29th day of October, my advice was desired by a committee of the parish-officers. I found nine of these poor girls, and a female servant, in the same room, suffering the various effects of a most dreadful malady. Five were in the agonies of extreme pain; three were most cruelly convulsed; and the other two were raving in a fit of *delirium*. At the same time, another female servant, who had con-

stantly slept in the room with the patients, was tormented by a severe colic; but she escaped the other symptoms; was well in two days; and had no relapse. I was informed, that, since the first appearance of this disorder, some of these patients had had several attacks, and had several times been relieved, principally by means of purgative medicines; but that within the two last days, the attacks had been more violent; that the intervals of ease had been shorter; and that the *delirium* had scarcely ever ceased intirely. It had, likewise, been observed, that sickness at the stomach had usually been

the leading symptom ; that the bowels, in general, had been in a costive state ; but that, in three instances, a spontaneous discharge, by vomit and stool, had given an immediate relief, and had stopped the farther progress of the disease. I was informed, likewise, that their costiveness was not of a very obstinate kind ; but that it was occasionally removed without much difficulty. During the remission of the disease, they used to lie quiet, sometimes during an hour, or even two hours ; and then suddenly to start up as before, screaming under the most afflictive torture. When they were able to

give a consistent account of their own sufferings, they all agreed, that, the fit approaching, their first sensation of pain was in the stomach; which, after some minutes, having abated, the head, particularly the back part of it, was attacked in like manner; and it appeared that a total perversion of the understanding very soon followed. None of them had any degree of fever; and during the most violent paroxysms of pain, the stomach and bowels seemed, to the touch, soft and natural. It was likewise observable, that their paroxysms were always most severe immediately after sleep.

Having made a diligent inquiry into the state of health of the other inhabitants of this house, I found, that during the month of October, four or five other girls, had now and then complained of pain in the stomach and bowels; which, however, had ceased without medical help; but that (those cases excepted which have been here described) the family had been in general healthy.

I likewise made a minute inquiry into the diet of this family; and examined all the vessels used in the preparation of their food. But here I dis-

covered nothing which might not with equal reason be objected to the generality of houses in this town; nor, indeed, was it very likely, that the origin of this extraordinary disease could be ascertained by such an examination; since the same simple food, prepared in the same manner, had been indiscriminately served to the whole house; and since the disease affected only females, and was confined to those who had slept together in a certain room on the second floor.

It appeared, that this house, being almost entirely wainscotted, had been painted at least a

month before the reception of the children; and that the paint had been judged to be sufficiently dry. The peculiar smell of paint was, indeed, perceptible to me, when I made my first visit; but not more so than what is common in private houses; nor was it, to me, more offensive in the chamber of the sick, than in the other parts of the house. It was then obvious to examine in what circumstances that chamber differed from the other apartments. The height of it is a little more than eight feet; the length twenty; the breadth sixteen feet. It contained ten beds, in which it was intended

that eighteen girls, two in each bed, and a female servant, singly, should sleep. But I discovered, that this, being a favourite room, on account of its warmth, was generally crowded, at night, by a much greater number than its just complement. That as much space as possible might be made for beds, the chimney had been stopped up with bricks; and, it had been the constant custom of the servant, at night, to keep the door shut, and to close the window shutters, that as little fresh air as possible might have access. Mr. Rennel, apothecary to the parish-poor, informs me, that, when he has been called to this chamber at

midnight, (which frequently happened) he has found the smell of paint very disagreeable to him, although he had hardly perceived it during the day. The attendants, in general, being asked, what number of lights had been used in the chamber of the sick ; and whether or not those lights had any uncommon appearance, agreed in the following testimony ; that, from the time of the commencement of the illness, three candles, and a lamp of oil, had been used during the night ; but that they were hardly of any service, giving a glimmering light, and frequently almost extinguished.

It was, likewise, remarkable, that, in a chamber adjoining, of the same dimensions, painted at the same time, in which eighteen girls slept, in nine beds (which chamber differed from the other only in having an open chimney, and not being so closely shut up during the night) none of the children had a symptom of the disease. Another striking fact was, that a female servant, who had passed one night only in attendance on the children in the chamber of the sick, was, on the following morning, attacked by the same pain, *delirium*, and convulsions, under which she suffered most severely. It is

likewise worthy of notice, that the disease was confined to the nine elder girls: and that the nine younger girls, who had slept in the same room from the beginning of the illness were not affected by it. The sufferers were all above the age of thirteen years. It would be difficult to account for this distinction upon any supposition whatever: but it should seem most probable, that the whole number would have been included in the same calamity, if the same causes had been suffered to continue.

In medical books we meet with several instances on re-

cord, where the accidental sight of a patient, suffering an epileptic attack, has immediately occasioned a similar attack on the spectator: so that the epilepsy has been supposed to be sometimes communicable from one person to another, nearly in the same manner as has been observed of the action ofyawning; and, agreeably to a notion alluded to by the poet—

Dum spectant oculi læsos, læduntur et ipsi.

Abraham Kauu Boerhaave, in a book, intituled, *Impetum faciens dictum Hippocrati per corpus consentiens*, (page 355) gives, on the authority of his uncle, the celebrated professor of that

name, an history which bears some resemblance to the subject of this paper. But, whatever similitude there may seem to be betwixt the two cases, at first sight, it will be less apparent on a closer examination. In both cases indeed, the sufferers were young persons maintained by charity in a poor-house. In both, the disease first exerted its influence on a single patient, and was afterwards communicated to a considerable number in succession. But the difference is very observable. The children, treated by Boerhaave, were supposed to have been thrown into convulsions by a certain effect

on the imagination,* not explicable by any known laws of

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* The commissioners, charged, by the French King, with the examination of *animal magnetism*, have proved, by the most decisive experiments, that the imagination alone is capable of producing all those convulsive effects, which have been falsely attributed to the power of the magnet. They relate an history, which has a strong resemblance to that recorded by Kauu Boerhaave. " Le jour de la cérémonie de la première communion fait en la paroisse de Saint Roch, il y a quelques années (1780), après l'office du soir, on fit, ainsi qu'il est d'usage la procession en dehors. A peine les enfans furent-ils rentrés à l'église, et rendus à leurs places, qu'une jeune fille se trouva mal, et eut des convulsions. Cette affection se propagea avec une telle rapidité, que, dans l'espace d'une demie-heure, 50 ou 60 jeunes filles, de 12 à 19 ans, tombèrent dans les mêmes convulsions; c'est-à-dire,

the animal œconomy. It does not appear, that they had any

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serrement à la gorge, gonflement à l'estomac, l'étouffement, le hoquer, et les convulsions plus ou moins fortes. Ces accidens reparurent à quelques-unes dans le courant de la semaine ; mais le dimanche suivant, étant assemblées chez les Dames de Sainte Anne, dont l'institution est d'enseigner les jeunes filles, douze retombèrent dans les mêmes convulsions, et il en seroit tombé d'avantage, si on n'eût eu la précaution de renvoyer, sur le champ, chaque enfant chez ses parens. On fut obligé de multiplier les écoles. En séparant ainsi les enfans, et ne les tenant assemblés qu'en petit nombre, trois semaines suffirent pour dissiper entièrement cette affection convulsive épidémique."

Rapport des Commissaires chargés par le Roi, de l'examen du magnétisme animal, p. 54.

The propagation of these convulsive effects, is, in the *rapport* above cited, refer-

bodily pain or disorder, either antecedent, or subsequent, to their convulsions. But, in the case of our patients, each paroxysm was preceded by the most painful irritation, of which it was evidently the immediate effect. Add to this the consequent *delirium*, and other circumstances, which either have been already, or will hereafter be, enumerated. Hence it may fairly be inferred, that this illness was not propagated by any supposable means of transition from one

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red *à cette imitation machinale qui nous porte malgré nous à répéter ce qui frappe nos sens. Rapport, &c. p.* 62.

person to another; but that some common external cause prevailed, by which the nerves of the stomach were affected primarily; and in consequence, the general nervous system.

But to return to our narrative —It was recommended to the officers of the parish to evacuate the chamber of the sick without delay; to separate the healthy from the diseased; to open the chimney; and to remove whatever tended to exclude fresh air. These directions were complied with: and the patients, having been removed to a large apartment

(where proper care was taken that fresh air might be admitted) passed a quiet night, entirely free from every symptom of the disease. However, the next morning, immediately on their awaking, they were all seized in the usual manner; but it was very soon observable, that the paroxysms returned less often, and with less violence, and sometimes without convulsions; and that during the intervals, the *delirium* appeared gradually to abate. Thus, from the third to the sixth of November, we had every reason to hope, that this malady was about to cease intirely. But in the night of the

sixth of November, it returned. In the morning of the seventh, I found them all, after having passed many hours in pain and convulsion, in a most outrageous state of insanity, which continued the whole day. From that time, the disorder made no general attack; and, although each of these patients had separately several returns of the pain in the stomach and bowels, those returns were less and less violent; and but seldom were followed by convulsions. At length the lower bowels only were affected; and it was matter of general complaint, that the stools were attended by a painful irritation

at the *rectum;* and that there was great difficulty in discharging the urine. During the whole course of the disorder, whilst there was a remission of colic and convulsion, all these patients were affected by pains in the breast, legs, and arms.

One of the earliest sufferers appeared for some days to be so sunk and overpowered by attacks of this disease continually repeated, that she seemed not likely to survive; but she as well as the rest, speedily recovered both strength and spirits; nor have any of them suffered a relapse.

The only one who appears (20 Feb. 1783) to retain any effects of this disease, is the maid servant above mentioned; she, since her illness, has been subject to frequent and severe head-ach, and giddiness; and, after any extraordinary exertion of strength, has been observed to have a wildness in her countenance, which, however, has not been followed by any degree of convulsion.

It is worthy of observation, that the disease made no farther progress from the time when the chamber of the sick was evacuated; although, during the preceding night, no less

than three persons had their first seizure.

The pain of the stomach, in all these cases, was so severe, that it required the assistance of opium; and it was, occasionally, given in liberal doses; but it was often suspected of having aggravated the head-ach, and added force both to the *delirium* and convulsions. Some of the other medicines, called antispasmodic, were tried, but proved useless. Blisters, particularly when applied to the region of the stomach, were certainly beneficial. Emetics were several times repeated, and always with good effects.

It was observed, that not one of these patients could bear sena. Though opium* were added to it, as often as it was

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* Les narcotiques ne font qu'irriter. See Recherches sur la maladie convulsive épidémique, &c. par M. Saillant. *Histoire et Mémoires de la Société Royale de Médécine vol. I. p.* 303. The author of the mémoire, here cited, in treating this subject, mentions, that an epidemic convulsive disease raged in London, and in all other parts of England, in the year 1661. For this assertion he appeals to the authority of Willis. But M. Saillant seems not to have observed, that Willis, in the place referred to (viz. *de morbis convulsivis, cap. viii.*) does not give an history of an epidemic convulsive disease, as an original malady: but, that he professedly describes an epidemic fever, particularly injurious to the nerves and brain, and sometimes attended with convulsions, as a symptom.

given, it increased their torture and sometimes even seemed to hasten on the convulsion. *Oleum ricini* at first passed through their bowels, and seemed to be sufficiently powerful: but it was afterwards necessary to give purgative medicines of greater efficacy.

If it be asked, why the quality of the air, in the chamber of the sick, was not examined; since such an examination would have been easy; and since the propriety of it was obvious; I answer, that having observed the respiration of these patients not to be at all

injured, except only during the convulsions, I did not immediately (nor, indeed, until I had conversed on this subject with Dr. Heberden) suspect such disturbance in the animal œconomy to have wholly arisen from vitiated air: that several persons having had their first attack in the course of the preceding night, the first object of my attention, upon my being called, was to prevent the farther progress of the disease; and that, perhaps, it would hardly have been deemed justifiable, even among philosophers, to have exposed a number of children, another night

to such evident danger, for the sake of an experiment, although very important.

However, the offensive smell of the room, at midnight, mentioned above, together with the manner, in which the candles and lamp had been observed to burn, are certain indications of vitiated air: and the following case *in point*, related on the authority of Dr. Heberden, makes it more than probable, from what source this extraordinary disease originated.

A young man was in the morning shut up in a close room, with burning charcoal,

till two small birds fell down dead in their cages, and till he was so ill, as to be obliged to go into the air; which he had no sooner done, than he fell down senseless. When he came to himself, he complained of giddiness, sickness, a pain of his stomach and loins, and of a stupor: all which continued the whole day. The next day, he thought himself better; but about seven in the evening, he was seized with a very violent pain of his stomach and loins: he vomited; threw himself down upon the ground; fell into convulsions; and could hardly fetch his breath. Soon after that he had a little reco-

vered himself, he had a second fit of the same sort. About an hour afterwards he became delirious, and the assistants could not without great difficulty, keep him in his bed during the whole night. In the morning he came to himself; and had some quiet sleep: but the pain was not quite gone: and the patient continued to complain of giddiness, and of strange sights before his eyes, for some little time longer.

Dr. Priestley has very fully proved (Phil. Trans. vol. lxvi. p. 226) that one great and indispensable use of respiration is to carry off, or lessen, a cer-

tain quality in the blood, which is now known by the name of *phlogiston*. This can only be done by pure air; for after that the air has been much vitiated by the fumes of paint, and of lighted charcoal; by having been breathed; and various other means, which all have the same effect; it then, being already saturated, can no longer imbibe any of this matter from the blood; but, unless this be done, the animal expires almost instantly.

Many fatal accidents have long ago taught mankind this effect of very impure air; but no great notice has been taken

of the peculiar disorders occasioned in the animal functions by breathing air so much injured, as to be incapable of sufficiently freeing the blood from this noxious part; though not so totally spoiled, as immediately and irrecoverably to extinguish life.

In the case here related, by Dr. Heberden, it is remarkable, that the breathing of half-vitiated air, for a very little time, made such a lasting impression, as to occasion returns of the above mentioned symptoms after intervals of the persons being apparently well.

Respiration itself does not appear to have been particularly affected by this impure air; for, though the patient once complained of not being able to fetch his breath, yet this seemed to arise from the general convulsions, rather than from the lungs themselves.

The symptoms, above described, resemble those of an epileptic fit; and it would be happy, if our knowledge of the cause of them, in this case, could lead us to a more clear knowledge of the cause and cure of that obstinate distemper. Dr. Priestley, in the same paper, mentions a test, by the help of

which we may judge when the blood is not disposed to part with this noxious quality so readily as it naturally ought to do. If this should be found to be a cause of epileptic, or of any other diseases, they would be much relieved, or perhaps, as he suggests, removed, if the patients were to breathe an air, either by nature or art, extraordinarily pure.

Apuleius,* in his *apologia*

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* Incensus gagates lapis (ut apud physicos lego) pulchre et facile hunc morbum explorat: cujus odore etiam in venalitiis vulgo sanitatem aut morbum venalium experiuntur. *Lucii Apuleii pro se apologia. Ed. in us. Delph. p.* 479. This property of

pro se ipso, informs us, that before the ancients purchased a

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the *lapis gagates* is confirmed by the testimony of various authors. Dioscorides, in his chapter concerning it, testifies—Ἐστὶ δὲ καὶ ἐπιληπτικῶν ἔλεγχος ὑποθυμιαθεὶς—*Dioscoridis l.* 5. *c.* 146. Dioscorides is followed by Pliny, who says—Deprehendit sonticum morbum suffitus. *C. Plinii Natur. Histor. l.* 36. *c.* 34. The same notion is adopted by Aretæus—Ἄλλοίε δὲ ὄσφρησις βαρεῶν ὀσμῶν καὶ ἔβαλεν, ὥσπερ γαγάτε λίθε. *Aretæi de causis et signis acutorum morborum, l.* 1. *c.* 5. Cælius Aurelianus, among the causes, which excite the epilepsy, mentions odores nimium bonos vel malos, ut storacis incensi, aut thuris, aut bdellii, aut gagatis lapidis, vel bituminis, aut cervini cornu. *Cœlii Aureliani morborum chronicorum, l.* 1. *c.* 4. To these authorities Aëtius adds his testimony —Ἐλέγχει δὲ καὶ τὰς ἐπιληψίας—*Aëtii Amedeni, l.* 2. .. 28. *Ed. Aldi.*

Whoever was the author of the Greek poem περὶ λίθων, which some have ascribed to

slave, they were very solicitous to have as satisfactory

Orpheus, he has well described this effect of the *lapis gagates*, when burning.

Καρφαλέῃ δ' ἴκελος πεύκῃ φλόγα δῖαν ὀρίνει·
Ἀλλ' ὀλοὸν πολὶ ῥῖνας ἄγει μένος· ἠδ' ὅγε φῶτας
Λήσειαι, ὧν κ' ἐθέλοις ἱερὴν ἀπὸ νοῦσον ἐλεγξαι.
Γνάμψει γὰρ σφέας αἶψα χαμαὶ προπρηνέας ἕλκων.
Ὁ δ' ἄρ' ἀπὸ σφετέρῃ πεπαλαγμένοι ἀφρισμοῖο
Στρωφῶντ' ἔνθα καὶ ἔνθα, κυλινδόμενοι καλὰ γαῖαν.
Τοῖσι δὲ χωομένη φρένα τέρπεαι, ὁππότ' ἴδῃσι
Πήμαλα πάσχοντας κεραὴ πόδας ὠκέα Μήνη.

Tædæ aridæ similis flammam divinam corripit:
Sed ad nares exitiosum virus agit; neque hic homines
Latebit a quibus sacrum morbum deprehendere volucris.
Confestim enim eos incurvabit, præcipites humi trahens.
Hi vero, suâ spumâ inquinati,
Versant se hinc et inde volutantes in terra.

a proof, as possible, of his being free from this disorder; and that, for this purpose, they used to burn the *lapis gagates* under the nostrils of slaves exposed to sale, in order that they might inspire an air loaded with the fumes of that bituminous substance, upon a persuasion that this test would excite an epilepsy in every one predisposed to it. Now, beside the probability of this opinion, de-

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His autem irata animo, delectatur, quando videt
Mala patientes, cornuta, pedibus celeris Luna.

Vide poema *de lapidibus*, Orpheo a quibusdam adscriptum, *edit. Tyrwhitt. p.* 63.

rived from the continuance of the custom, it is at present well known, that air, charged with the fumes of burning bituminous substances, is exactly the same with that in which charcoal has burned ; and is equally incapable of making the blood discharge that noxious part, which, being retained, naturally tends to bring on epileptic symptoms.

In confirmation of what has been here offered to the consideration of physicians, Dr. Garthshore (who is an accurate observer of those diseases which fall particularly under his notice) informs me, that

towards the end of a tedious and difficult labour, when a close and unventilated chamber has, for a long time, been crowded with attendants and friends, he has seen frequent instances of most dangerous convulsions, which have suddenly seized the patient. These convulsions, after the most exact enquiry, and strictest attention to all circumstances, he has not been able to ascribe to any other cause, than to the long continued inspiration of air saturated with animal and other septic exhalations. The increased irritability of the female habit, during the time of parturition, and the known power of

animal *miasmata*, in exciting morbid irritability, give us reason to believe that the cause, here assigned, is, under such circumstances, adequate to the effect produced.

Do not these facts and observations suggest to us a probable reason, why those, who inhabit houses, where, for the sake of warmth, every art has been employed to exclude the outward air; and who spend much of their time in air tainted with the steams of animals and candles, are subject to nervous disorders; and why this habit of life is particularly hurtful to the tender and valetudinary?

For languor, head-ach, and *vertigo*, are often the manifest, sometimes the immediate effects of air thus contaminated. And would it be deemed a conjecture, exceeding the bounds of all probability, to suspect, that some of the numerous palsies, which of late years have increased in so alarming a manner, have originated from the same source? How far such a suspicion can be supported by general experience; or to what cause, or combination of causes, the frequency of this disease may more justly be referred, would be a fit object of our investigation.

XII. *Observations on the late intermittent Fevers; to which is added a short History of the Peruvian Bark.*

Read at the COLLEGE, Jan. 10, 1785.

THE predominancy of certain diseases, observable in some years; and the total, or partial, disappearance of the same in other years, constitute a subject worthy of our contemplation. It stands recommended to us by the father of physic. Extraordinary pains and diligence were used, in this matter, by our countryman, Sydenham: and there is, in a neighbouring

kingdom, a society of recent establishment, whose institution has, for its primary object, to enquire into the state of epidemic diseases throughout the provinces; and to record the rise, progress, and declension of them, together with the *phænomena* peculiar to each, and the methods of cure approved by experience. These are examples, which may usefully be followed. For although, whilst our knowledge of nature is so limited, we may not arrive at such principles, as may enable us to ascertain the specific causes, why this, or that, morbid influence should reign at present; and why some other,

which lately reigned, should now have lost its dominion; yet it cannot be doubted, but that by a diligent attention to this subject we shall enlarge our stock of experience; and by recording our observations, serve posterity.

It appears, that intermittent fevers, previously to their having been particularly noticed in the capital, namely, in the spring and autumn of the year 1780, infested various parts of this island. These fevers, in general, were no other than the common ague, of which no description is necessary; but particularly in the more inland

counties of England, they were often attended with peculiarities extraordinary and alarming. For the cold fit was accompanied by spasm and stiffness of the whole body; the jaws being fixed, the eyes staring, and the pulse very small and weak. On the succession of the hot fit, the spasm generally began to abate, and at length ceased intirely, under a profusion of sweat. But, in many cases, *delirium* was added to spasm; under both which symptoms the patient laboured quite to the end of the paroxysm. And, though the senses returned, when the fever subsided, yet a convulsive twitching of the

extremities continued, even in the intermissions, to such a degree, that it was not possible to distinguish the motion of the artery at the wrist. This fever had every kind of variety; and whether at its first accession, it were a quotidian, a tertian, or a quartan; it was very apt to change from one type to another. Sometimes it returned two days successively, and missed the third day; and sometimes it became continual. I am not informed, that any died of this fever, whilst it intermitted. It is, however, certain, that many country people, whose illness had, at its beginning, put on the appearance of

intermission, becoming delirious, sunk under it in four or five days. It is a remarkable fact, and very well attested, that, in many places, whilst the inhabitants of the high grounds were harassed by this fever, in its worst form, those of the subjacent valleys were not affected by it. The people of Boston, and of the neighbouring villages, in the midst of the fens, were in general healthy, at a time when this fever was epidemic in the more elevated situations of Lincolnshire. It is likewise singular, and worthy of notice, that in many families, the female servants were nearly exempted from a disease,

which very few male servants, especially the labourers in the open air, escaped.

I am informed, from all parts, wherever I have had opportunities of making an inquiry, that the same constitution continued through the years 1781 and 1782; and that, since that time, though it sensibly abated, yet agues have been much more prevalent than usual, and have even been frequent in places, where, before that period, they were very uncommon.

I did not learn, either from my own observation, or that of others, that the constitution,

above described, was extended to the city and suburbs of London, previously to the spring of 1781. At that time fevers, for the most part tertian, and some quotidian, began to attack persons of all ages and constitutions. I saw no quartans which had originated in London; but several persons, principally servants, came hither, in the months of March and April, with quartans, which had commenced in the preceding autumn, and had not even been palliated by any method or medicine which had been used. Dr. Reynolds made a similar observation with respect to the type of the fever then reigning.

He saw no quartans in this town during the whole year, until the close of the autumn; when a few poor labourers, after the harvest, were brought from Essex to the hospital, affected with that disease. But I am not informed, that any of those formidable symptoms occurred in London, which are above mentioned as having been incidental to the fevers in some parts of the country. In the cases which fell under my observation, the intermissions were remarkably periodical and complete; and the returns of the paroxysms; nearly at the same point of time; the *horror*, the heat, and the perspiration

keeping their respective stages with exactness more than common. But the distinguishing characteristic of this fever was its obstinate resistance to the Peruvian bark: nor indeed was the prevalence of the disease more observable than the inefficacy of the remedy. Though the quantities of the bark, usually given, were far exceeded, the fit was apt to return, rarely altered either with respect to the time of invasion, or the intenseness of the symptoms; and just as if no means had been used to prevent it. A drachm of the bark, in powder, was frequently given every second hour, without averting

the fit. This, however, was observed, that the repeated shocks of fever seemed to do less injury to the constitution of the patient, during so liberal an use of this medicine, than might have been expected; though it was inadequate to the cure of the disease.

It is a common practice to give emetics as preparatory to the use of the bark; and I recollect several instances of intermittent fevers completely cured by them, even unassisted by that medicine. But here, whether emetic tartar, or ipecacuanha, or a compound of both were administered, it did not

appear to me, that any impediment to a cure was removed, or the patient's recovery facilitated by the operation. And as to the *nausea*, frequently a troublesome symptom at the access of the fit, I did not observe, that it was less troublesome in the fit, which immediately followed the use of an emetic, than in that which preceded it immediately. More evident were the good effects of small doses of calomel (according to my experience) taken two or three evenings successively, and then followed by a purgative of moderate strength. This method, particularly in old and stubborn

cases, and where a yellowish hue of the skin gave reason to suspect visceral obstruction, seemed to render the disease a more easy conquest to the bark, which before had made no impression on it. I ought, however, to add, that others experienced less advantage from this use of calomel, and spoke less favourably of its effects. An extraordinary operation of mercury fell accidentally under my notice. A servant came to London, at the same time ill of a quartan fever, and in a very advanced stage of the venereal disease. It being judged necessary to put an immediate stop to the progress of the greater of the

two evils, a mercurial preparation was ordered to be taken every night; but without any intention to raise a salivation. In a few days, the salival glands were much affected; and it was remarkable, that the patient had not a single return of the fever after the commencement of the salivation. This case brought to my recollection the following cure of a quartan, mentioned by Willis, in his sixth chapter *de febribus*. " Virgini cuidam per-
" illustri curationem subitam,
" quovis licet modo perficien-
" dam, exigenti proposui, ut, si
" a pharmaco minerali per ali-
" quot dies oris fluorem patere-
" tur, inde morbum brevi pro-

" fligatum iri speraret. Cum
" huic facile assensit, pharma-
" cumei mitius, et omnino tu-
" tum exhibui, a quo sputatio
" tantum levior, eademque in-
" tra duodecim dies finita, cieba-
" tur. A quo salivatio ince-
" pit, paroxysmis statim caruit
" ægrota."*—

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* This must be allowed to have been a very severe remedy: and we find the case particularly alluded to by Gideon Harvey, who insists, that the prescription was not authorized by experience; and that Willis *exhibited to the young gentlewoman such a proportion of mercurius dulcis as raised a salivation so plentifully, that it had almost embarked her in Charon's Boat.* This author treats Willis with much acrimony, accusing him *of having given himself up to physic tales, and inventions of cases that*

But whatever precaution or preparation was used, it too often happened, that the obstinacy of the disease, for a long time, eluded all attempts to subdue it. And, as the common mode of exhibiting the bark, and the ordinary doses of it, had often failed, some trials were made with one ounce of the powder, taken at several doses, within five hours of the time of the expected fit. In one case out of three, this method succeeded. But even a

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never happened, producing them in evidence to maintain his false positions. See the Conclave of Physicians, by Gideon Harvey, M. D. Physician to his Majesty, p. 192.

greater proportion of successful experiments would hardly justify the recommendation of a practice which cannot be endured but by a stomach and bowels of uncommon strength. To one patient, who had been long persecuted by the continual returns of a tertian fever, two drachms of the bark, in powder, were given agreeably to the *schedula romana, frigore febrili incipiente*. This dose, though not rejected, was very oppressive to the stomach: the ensuing fit was more than ordinarily severe: and a relapse was not prevented.

So general a disappointment

in the use of a medicine, which had long maintained the character of a specific, almost infallible, obviously caused a suspicion, that the failure of it could arise only from its inferior quality. On this subject, therefore, no opportunity of inquiry, or examination, was neglected. But it was the general opinion, that the bark, then in common use, was not worse than usual; and the specimens, which I saw, exhibited all the criteria of goodness, with respect to the colour, taste, smell, &c. Experiments having been instituted on that used in Saint Thomas's hospital, it was found to yield the usual quantity of

extract by decoction, and of resin by tincture. And that the bark of the hospital was not, at that time, deficient in some of those properties for which it has been celebrated, Dr. Reynolds had a certain proof in several instances of gangrenes, which were stopped by the quantities of it usually given on such occasions. In other instances, likewise, where he gave it as a tonic, it produced its usual effects; when, at the same time being opposed to an intermittent fever, it was either totally inefficient, or acted with diminished power; sometimes only protracting the interval for a few hours;

now and then abating the violence of the fit; and, in very few instances, suppressing the fever for one or two periods. On the other hand, a person, very conversant with all subjects of the *Materia Medica*,* speaks unfavourably of the general state of the bark, which was used whilst the fever was most epidemic. In the month

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* The same person gives me authority to say that, in one hundred pounds of the bark there are not ordinarily found more than twenty pounds of such bark as a curious man would choose to make use of. He adds, that his own method has long been to select, out of a large parcel of this drug, that of the best quality, and to allow an advanced price for it.

of December, 1778, Mr. Ortega, professor of botany at Madrid, by the order of the Spanish ministry, sent hither two varieties of quinquina, very different in appearance from that with which we had been acquainted; it was, however, certified that they were species of quinquina; and they were said to have been brought from the kingdom of Santa Fé. Our Royal Society being consulted, appointed a committee to inquire whether or not they were likely to answer the purposes of the true bark. Upon trial they were found far inferior. Towards the end of the year 1779, or the beginning of 1780,

considerable quantities of both these species were found mixed with the common bark; and, likewise, a great deal of a certain spurious bark, in colour not unlike the true, but smoother externally, and internally remarkable for its longitudinal fibres. I do not know, that any experiment has been made with this drug, or that it is a quinquina; but, from its taste and appearance, it should seem of much less value than the common.—The question, therefore, whether the difficulties, which embarrassed physicians in the treatment of this fever, were owing to the weakness of the remedy, or to the strength

of the disease, must be left undetermined. May not both causes have concurred in creating the evil?

The ordinary method of cure having thus generally failed, other medicines, extolled for their febrifuge power, were tried, but not often with success. I am informed, that the powder, mentioned by Morton, consisting of one scruple of chamæmel flowers, and ten grains of salt of wormwood, and the same quantity of *calx* of antimony, given every sixth hour, subdued an obstinate tertian in two instances. Dr. Heberden informs me that with two drachms

of the powder of myrrh, taken just before the time of the expected fit he intirely relieved a patient from an ague, which for a long time had resisted the power of the bark, though taken in very large quantities. It is said, that a medicine, compounded of arsenic and opium (the dose of which is a very few drops in water) was taken by some of the inferior ranks of people, and sometimes successfully; but that, now and then, violent vomitings, colic, and dysentery, were the effects of it, especially when a patient, too desirous of a compendious cure, exceeded the dose limited. Arsenic is mentioned in books as

a febrifuge: but it is one of those substances, of which we arenot, as yet, so far masters, as to be able, by any art, to render it transferable from the list of poisons to our *materia medica;* and it cannot be deemed to be a proper remedy for an intermittent fever, whilst an intermittent fever is less formidable than arsenic.*

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* A practitioner in the county of Dorset bought a large quantity of this medicine, and dispensed it among his patients with great success. He says, that it hardly ever failed to stop the fits very soon: but that the fever was apt to return, though it was as easily prevented by the same means repeated. However, he had reason to think that the medicine had some active poison in it,

It was, in general, however, found necessary to recur to the bark, as the remedy ultimately to be relied on; and, I believe, there were not many instances in London, where a steady perseverance in the use of it did not at last succeed. The quantities, indeed, sometimes required, were enormous. And, in order to make the largest dose effectual, it was administered soon after the commencement of the sweat, and continued from

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which injured the constitution afterwards, in several instances; so that he was at length deterred from the use of it. He saw more than one case, where an ague, thus cured, was followed by a palsy of the lower extremities.

that time every hour during the interval: and, in some cases, during the succeeding cold and hot fits. Nor was the patient judged to be secure from a relapse, until, at least, an ounce of the bark had been taken every fourth day during two or three weeks. This load of medicine was by some taken and retained without much difficulty: whilst others were unwilling to submit to it, and others unable to bear it. In cases, where the stomach began to nauseate so frequent a repetition of the bark, it was prudent to suspend the use of it for some days; and, instead of it to give a neutral saline draught,

with the addition of fifteen grains of the powder of chamæmel flowers, and the same quantity of myrrh, every six hours. And it was observable, that stomachs, which had before rejected the bark, were well reconciled to it after the use of the draught, above mentioned, taken for a few days.

Sydenham has said, that to add any thing to the bark argues either ignorance or craft. There is less of reason than of severity, in this remark. For it was found, that, according to different circumstances, sometimes the Virginian snake root, and in other cases myrrh, was

added with propriety and with advantage; and, according to the experience of an intelligent practitioner, one drachm of the rust of steel prepared, and the same of the powder of black pepper, added to each ounce of bark, were, at this time the means of subduing the most inveterate agues. With respect to increasing the bulk of the medicine, that cannot be urged as a reasonable objection, if its power be increased in the same proportion.

About this time, we first became acquainted with a new species of quinquina, now dis-

tinguished by the name of* *the red bark;* a considerable quan-

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* In the Philosophical Transactions, No. 446, there is a memoir extracted, by Mr. Gray, from the papers of Mr. William Arrot, a Scotch surgeon, who had gathered the Peruvian bark in the place where it grows. Here four sorts of the bark are mentioned, to which the Spaniards give the following names, viz. *cascarilla colorada, amarylla crespilla,* and *blanca.* But Mr. Arrot could only find two different sorts of the tree (viz. the *colorada* and *amarylla*); and he believed that the other two are owing to the different climates where they grow, and not to a different species of the tree. The *crespilla* and *blanca* are said to be of an inferior quality. We are hitherto ignorant of the natural history of *the red bark;* but it may possibly be the *cascarilla colorada* spoken of by M. Arrot. At a public sale, made at Lisbon, this bark was

tity of which was part of the cargo of a Spanish ship from South America, captured in the last war. The first trials of this drug abundantly testified the superior virtue of it, as a febrifuge: and it appeared to be a most valuable acquisition. Two parts of it have, I believe been very justly supposed equal, in febrifuge power, to three parts of the common bark. But though the superiority of it, in

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very little esteemed. It was sold at, from 1*s.* 11*d.* to 2*s.* 4*d.*; when the bark, imported for the Spanish court, bore the price of 1*l.* 2*s.* the pound weight.

A very old practitioner informs me, that when he first applied himself to pharmacy, this *red bark* was in frequent use.

this respect, be indisputable, I have for some time avoided the use of it, having observed that even a moderate dose of it has sometimes oppressed the stomach, and excited *nausea* and vomiting. These effects may probably be owing to the larger proportion of resin which it contains. A drachm of this bark was given to a stout man. He fainted immediately; continued very sick several hours; and was not relieved but by an emetic. The bowels seem to bear it better than the stomach. Indeed, it is not so apt to purge as the common bark. But there has arisen an additional objection to the use of *the red bark;*

for it is said, that the original quantity of it, which was imported by Mr. Johnstone, being exhausted, a spurious drug, under the title of *the red bark*, has lately been brought hither from Ostend.

What follows is an extract of a letter, with which I am favoured by Dr. Petrie, containing the result of his experience on the subject of this paper.

" We had many cases of the " intermittent fever, both at " Lincoln, and in the neigh- " bourhood; in which the " peruvian bark, though admi-

" nistered in very large quanti-
" ties, produced not the least ef-
" fect; and that, notwithstand-
" ing that, previously to the
" use of it, sufficient care was
" taken that the stomach and
" bowels might be prepared
" for the medicine, by a repe-
" tition of* emetics and purga-
" tives, as long as any appear-
" ance of visceral obstructions
" might seem to make those

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* On the approach of the cold fit, a solution of emetic tartar was given by spoonfuls, every five minutes, till it had operated: and, the patient being desired not to drink much water, by this means a great quantity of bile was discharged; and the cold fit, and indeed the whole paroxysm, were thus rendered less severe.

" operations necessary. This
" method having often failed, I
" was induced to try a mixture
" of the bark and alum. It an-
" swered in some cases, and dis-
" appointed us in others. The
" crude ammoniac salt had not
" a more certain effect. Seve-
" ral women were cured in our
" hospital by what is called the
" Dutch remedy for an ague;
" which is compounded of the
" bark and cream of tartar, each
" two ounces, and sixty cloves
" powdered. A drachm and
" half of this powder was taken
" every third hour. Yet this,
" likewise, frequently failed.
" We at last thought, that we
" had fallen on a specific in

" the powder of bay-leaves,
" plucked from the tree, and
" dried in the shade. It was
" given from one to two scru-
" ples, in the beginning of the
" cold fit. This powder was
" very efficacious in preventing
" the fits in many cases, where
" the bark, in the largest quan-
" tities, had been unsuccessful.
" But almost all, who used it,
" had a relapse in the space of a
" fortnight, three weeks, or a
" month. One patient, just at
" the time when the fit was ex-
" pected, took sixty drops of
" the thebaic tincture. On this,
" he fell into a profound sleep ;
" sweated profusely ; and es-
" caped the fever, not only

" then, but at two successive
" periods, Eight quartans, in
" the hospital, and four in pri-
" vate practice, were entirely
" cured by one drachm of *theri-*
" *aca andromachi*, the same of
" the root of *calamus aromaticus*,
" in powder, and fifteen grains
" of salt of tartar. This mix-
" ture was taken in warm ale,
" or wine and water, an hour
" or two before the fit. It ap-
" peared, however, at last, that
" neither this nor any other
" medicine, which we tried,
" was so constantly and perma-
" nently effectual as the bark,
" when properly administered.
" But its efficacy depended on
" the taking immense quanti-

" ties, and on a steady perseve-
" rance in the use of it for
" many weeks. Nevertheless,
" I must confess, that I met
" with several cases where no
" medicine prevailed; and
" many patients, despairing of
" relief, left themselves to na-
" ture; some of whom went
" into a pulmonary consump-
" tion, jaundice, or dropsy.
" Many, whom I thought cu-
" red of quartans, have lately
" relapsed. I have now, on
" the hospital books, four pa-
" tients, ill of quartan fevers,
" who have received no benefit,
" and I have no hope left, but
" in a long course of deobstru-
" ent bitters, and *tinctura sacra*,

"aided by the approaching "summer."

Lincoln, 12 March, 1782.

It is observable, that, from the year 1781 to the present time, intermittent fevers have been more frequent than was formerly usual in London. They prevailed much in 1782; but towards the close of that year, began to be less obstinate and intractable. During the very severe cold of the last winter and spring, this constitution was remarkably predominant; but, in general, the disease yielded an easy victory to the bark. The type of the fever was either tertian or quotidian;

the former being more common in the first part of the winter ; the latter from the middle of February to the end of June. With respect to the former, nothing occurred to my observation, which is worthy of notice. On the latter, Dr. Reynolds has communicated to me the following remarks ; and any addition would be unnecessary, relative to a subject which he has so well exhausted.

" The quotidian fevers of
" this season were irregular in
" their invasion, and uncom-
" mon in their appearance.
" No two cases resembled each

" other, except in very few cir-
" cumstances. The first attack
" of this fever upon a patient
" generally began with *horror*.
" The subsequent paroxysms,
" though often beginning with
" a sense of cold, were chiefly
" without *horror*. The inter-
" mission was short, and sel-
" dom perfect. Several awoke
" from disturbed sleep, with a
" slight chilliness, which was
" soon followed by head ach,
" giddiness, and sickness.
" Most complained of a sense
" of weight in their heads:
" some started up abruptly in
" their beds; and, when I ask-
" ed them why they did so,
" answered, that they had a

" very disagreeable and, to
" them, alarming sensation, as
" if their head were about to
" be fixed to the bed ; and that,
" in order to set themseves at
" liberty, they made this ef-
" fort. Almost all were dispi-
" rited : many had a low mut-
" tering *delirium :* two or three
" had a laborious respiration.
" A few had spasms and twitch-
" ings of the tendons. *Apthæ*
" appeared in two or three ca-
" ses. The tongues of almost
" all were, in the hot fit, dry
" and parched. Several had
" their tongues red, with pat-
" ches of a brownish *mucus*,
" in the middle. In general,
" however, the tongues were

" less foul, less covered with
" *mucus* than any that I ever
" saw in fevers accompanied
" with symptoms of such appa-
" rent danger; and there was
" seldom much thirst. The
" pulse, during the exacerba-
" tion, was low and quick in
" all, especially in those whose
" respiration was laborious.
" Many had an intermitting
pulse. The heat was not in-
" tense; and the sweat, in ge-
" neral, was rather long conti-
" nued than profuse. I saw
" one woman, between fifty
" and sixty years of age, in
" whom the symptoms appear-
" ed of violently acute rheuma-
" tism: and this was the only

" patient that I saw, whose
" pulse was full and hard, and
" whose tongue was covered
" with much white *mucus*. Few
" of those who vomited sponta-
" neously, or by the assistance
" of medicine, threw up much
" bile from their stomach.
" The only symptom, which I
" found to prevail universally,
" in those whom I attended,
" (except the intermission, or
" rather the remission) was
" very high coloured urine.
" This, in almost all, was of a
" dark red colour, clear, with-
" out sediment, and without
" even a cloud, except in very
" few instances. This deep
" colour of the urine began to

" disappear, as soon as two or
" three periods of the fever
" had been prevented by the
" bark ; and, about the sixth
" day from the last period, va-
" nished ; but in no one in-
" stance did I see a copious
" sediment in the urine, either
" at the end of any paroxysm,
" or at the final departure of
" the fever. The state of the
" bowels was as various as the
" constitutions and habit of
" the patients.

" I shall say little more with
" respect to my mode of treat-
" ing my patients in this fever,
" than that the bark was uni-
" versally successful ; and that

" I was as much pleased with
" its present efficacy, as I was
" in the year 1781, morti-
" fied by its extraordinary
" want of power. Half the
" quantity of it, which I used
" on that occasion, was suf-
" ficient on this. I obser-
" ved, however, that the first,
" and even second fit, after the
" exhibition of the bark, was
" not entirely stopped by it.
" Indeed, I could discover
" some vestiges of the fever for
" four or five days; but they
" became fainter and fainter
" every day, till they could no
" longer be traced. A relapse
" happened to two or three of
" my patients, once only to

" each : but they were less vio-
" lent than the first attack, and
" yielded easily to the bark."

It would be a matter of curiosity (and not wholly unconnected with the present subject) to inquire, in what manner the peruvian bark was received at its first introduction into Europe ; what prejudices and passions it had to encounter ; how various was its fortune in the medical world ; and with what difficulty it at length gained its establishment. Physicians were, at first, unable to emancipate themselves from the slavery of system, under

which they had been bred; and had not as yet learned that experiment on the human body is of more authority than the unsound doctrines of Galen. The enemies of this novelty could easily find passages in ancient authors, which would encourage them in their opposition; and they, who patronized and befriended it, seem to have been but little satisfied with themselves, unless they could, by mere violence, and even distortion, force some Greek quotation into their service. And it must be acknowledged, that some of the advocates of the bark, as well as of its opponents, prosecuted this

controversy rather with the animosity of faction, than with the calm temper of philosophy; making victory, rather than truth, their object; and that, sometimes, too little regard was paid to experience, on either side.—But a slight and cursory view of this subject is all that is intended, and perhaps, more than may be deemed proper for the present time and place.

According to the authority of a letter,* written by D. Joseph Villerobel, a Spanish physician, (some extracts of which letter

* *Anastasis corticis peruviani a Sebastiano Bado Genuensi, p.* 202 *Genuæ* 1663.

are preserved by Badus) the peruvian bark was first brought to Spain in the year 1632. It is not to be supposed, that an exotic drug, imported from so distant a part of the world, would at once be eagerly adopted in any country. But the Spanish nation seems to have been, in an extraordinary manner, inattentive to the peruvian bark, on its first reception; for if we give credit to the testimony of Villerobel, it had been seven years in the possession of the Spaniards, before any trial was made of its virtues; a certain ecclesiastic of Alcala being the first person, in Spain, to whom it was admi-

nistered; and this was in the year 1639. Though this first trial of the bark is said to have been successful; and though the Count del Cinchon was at all times willing to supply the physicians of Madrid with it, for the use of their patients, I do not find, that its reputation in Spain advanced very rapidly; nor can we imagine that the consumption of it was considerable; since we are informed that a very large quantity imported by the Count del Cinchon, many years after his death, remained in the hands of his family.* It should therefore

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* Villerobel's letter, above cited.

seem, that the Spanish physicians were not at this time zealous in promoting the use of it; and that their prejudices were not in its favour. But the coldness with which it was received by the Spanish physicians, was abundantly counteracted by the activity of the Spanish Jesuites; who, having received large quantities of this drug from their brethren, resident in South America, supported its reputation with their whole influence. The same spirit quickly diffused itself through that religious society in Italy, principally by the means of a distinguished member of it, John de Lugo, a Spaniard, who

being, in the year 1643, promoted to the dignity of Cardinal, gave weight and authority to a most humane plan, which his benevolence afterwards suggested to the college of Jesuites at Rome. Nor was the supreme power of the Roman church unconcerned in removing from men's minds their doubts and apprehensions with respect to the safety and the efficacy of the bark. For* In-

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* Archiater Pont. Max. Innocentii X. pulveris naturam et indolem, suasu Cardinalis de Lugo, diligenter indagavit, et propriis experimentis edoctus, non innoxium solum, sed etiam saluberrimum esse deprehendit T. Bartholini historiarum Anat. et Med. Cent. v. Hafniæ, 1661.

nocent the tenth, at the intercession of Cardinal de Lugo, ordered that the nature and effects of it should be examined; and, when the Pope's first physician (whose power in whatever relates to medicine is unlimited) had reported, that it was both innocent and salutary, all medical opposition to it ceased; and Rome became its grand emporium. In the year 1649 (or according to Brunaccius, 1650, the year of the jubilee) the Father Provincial of the Jesuites returning from America, brought with him a large supply of this drug; and there being, at that time, a convention of the whole order assembled

at Rome, he had an opportunity of sending parcels of it over all Europe, by the hands of his brethren, when they returned to their respective countries.

Thus countenanced and protected, it seemed to be in a fair way to recommend itself to general practice. But an unsuccessful trial of it, on a great personage, checked its career; for, in the autumn of the year 1652, Leopold, archduke of Austria, and governor of the Low Countries, had a double quartan fever; on which account the bark was administered to him according to the *Schedula Romana*. The effect of it

was only a temporary cure ; for the fever returned, after an absence of more than thirty days. Disappointed at this relapse, he ordered his principal physician (who himself appears to have been very well inclined to the undertaking) to publish an account of his case, with a view to discourage mankind from the use of so fallacious a medicine. Chifletius, accordingly, in the year 1653, published his book,* wherein he professes to attack the credit of the bark, with the

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* Pulvis febrifugus orbis Americani ventilatus a Joanne Jacobo Chifletio, equite, Regio Archiatrorum comite, et Archiducali medico primario. 1653.

joint force of argument, authority, and experience; insisting, that not a single person, at Brussels, had received from it a permanent cure; and that, at Naples, Florence, Madrid, Vienna, and Paris, complaints were made, that it had not only been ineffectual as a febrifuge, but that it had even proved deleterious. On the appearance of this publication, the author received the highest compliments from his brethren, as if he had relieved the world from a monster or a pestilence. At Paris, particularly, the book met with a most honourable reception, and was there immediately reprinted. It is singular,

that the immediate answer to this book had not a physician for its author. The task was undertaken and executed by Fabre, a French Jesuite, under the feigned name of Antimus Conygius. He had distinguished himself by some writings on the subject of natural philosophy: and was judged, by Cardinal de Lugo, to be the fittest person whom he could employ on the occasion. This author affirms, that, in the year 1653, the cure of some thousand patients had been completed, at Rome, by the bark. But he would have acted more judiciously as an advocate, had he rested the cause wholly on

the testimony of experience, without adding any speculative opinions, or entering upon a physical examination of the remedy.

An angry reply was soon published by * Vopiscus Fortunatus Plempius, professor of physic at Louvain, calling himself, by a transposition of letters, Melippus Protimus. Chifletius, though a determined enemy to the bark, had been temperate in his opposition; but his defender, Plempius,

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* Antimus Conygius, peruviani pulveris febrifugi defensor, repulsus a Melippo Protimo Belga. 1665.

was a writer of a different character: his style savouring more of prejudice and malice, than regard to truth. Indeed, we afterwards find him accused by Badus* of having descended even to the forgery of a letter from the catholic king's physician, with a design to bring disgrace on the bark. Several, however, of his works shew, that he was not wanting in professional merit; but he seems to

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* Item et meminit testimonii Marchionis de Mancera non probantis testimonium Guttierez medici, et negantis ita fuisse, ut ex eo assertum a Plempio est. An non rectè dixi olim, literas illas fuisse mihi suspectas, suppositias saltem, apocryphas; Seb. Badus, p. 202.

have been too fond of displaying his parts by cavil and contradiction; and therefore it is matter of less surprise to us when we afterwards find this vehement adversary of the bark, employing his pen against Harvey's great discovery.

During this controversy (in which several others were warmly engaged) popular prejudices so generally prevailed against the bark, that the use of it was, for some time, nearly confined to the Pope's territory. But there was another cause, which concurred in preventing this medicine from being sub-

jected to frequent experiment. This was its great scarcity, and the high price at which it was sold. The Jesuites, who had the monopoly of it, were obliged to sell it dear to the generality of people, in order to make themselves a compensation for their acts of charity to the poor. And the consumption of it, in Rome, was so great, that we find Cardinal de Lugo, in his* letter to Badus, complaining of its scarcity and danger of adulteration. A

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* V 'è ben di male, che per l' uso introdotto così frequente ella in Roma comincia à mancare, e quella che potra correre per via di venalità, non sò quanto sia per salvar-

friend of Sturmius* laments, that it was no where to be found except in the hands of the great and opulent, who kept it for their own use, and that of their friends. Sturmius† himself

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si da pericoli di esser adulterata, come d'altri preziosi, e stranieri medicamenti, è solito d'avvenire.

Lettera del Signor Card. di Lugo al Signor Sebastiano Bado.

This letter is prefixed to the anast. cort. peruv. by Badus.

* —— adeo nusquam comparet, aut certè non communicatur, quod domini illum sibi et amicis servent. Et forte medicorum, lucro suo metuentium, auctoritas effecit, ut minus expetatur.

Febrifugi peruviani vindiciarum pars prior, p. 84. *auctore Rolando Sturmio. Antverp.* 1659.

† *The book last cited, p.* 15.

could not be persuaded, that the tree, to which it belongs, was so common in the mountains about Loxa, as had been represented. For, upon such a supposition, he knew not how to account for its dearness, and for its being a present worthy of the acceptance of princes. In the year 1658, he saw twenty doses of the powder sold, at Brussels, for sixty florins, in order to be sent to Paris. He would willingly have been a purchaser of some doses even at that price; but the apothecary was unable to supply him, having none either of the bark or powder remaining. One of his patients (of whose case he

gives an history in his ninth observation) had an obstinate intermittent fever, with which he was seized in the month of February, 1658; and it was not till the end of the June following, that a dose of the bark could be procured for his relief. Even two years after the publication of his *febrifugi peruviani vindiciæ*, namely, in the year 1661,* we find Sturmius making a complaint to his friend, that he had no bark; that he had been informed, that some person sold it at Amsterdam;

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* Appendix ad armamentarium chirurgicum Joannis Sculteti ab I. Baptista Lamsweerde. Lug. Batav. 1692.

that he was very desirous to procure some at any price ; but that he knew not where to inquire for it. It appears then that, from the year 1656 to 1661, he supplied his patients with this remedy from a quantity of it which a friend had given him ; and that, when that stock was exhausted, he had no certain resource. Now if a man, who was so distinguished by his defence of the bark, so often found himself straitened in his practice by the want of it, can we reasonably suppose that it was more attainable by other physicians of the same country ? The scarcity of it appears to have been still greater

at Copenhagen than in Holland. Three doses of it having been presented to T. Bartholine* by some friends, on their return from Italy, he was induced by the novelty of the remedy, to make a trial of it on a lady who had a quartan fever. The first dose having been rejected from the patient's stomach, in order to prevent a repetition of that accident, he macerated his two remaining doses in wine, for forty hours, and gave her the liquor at two successive paroxysms. But all the effect, produced, was, that

* Thomæ Bartholini Hist. anat. et med. Cent. v. Hist. L. Hafniæ, 1661.

the fever was changed from a double to a single quartan. Nor could he farther prosecute the experiment, having no more of the remedy.

There can be no reason for supposing that the bark was brought to England, about this time, in greater abundance than to Brussels or Amsterdam. Indeed the very contrary supposition should seem most probable, since we are informed, that on its first introduction into Europe, the physicians of London were particularly averse from the use of it. We may collect from Sydenham, that it began to be in vogue here about the

year 1655; but that, after a short time, the more* prudent physicians were deterred from the use of it, partly because it gave no security against a relapse; and partly because, when administered immediately before the fit, it had, in some instances, proved fatal. One of the supposed victims to the bark, mentioned by Sydenham, is Mr. Underwood, an alderman of London. The late Dr. Letherland, who was curious on this subject, upon enquiry, found, that Mr. Underwood's death happened in the year

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* *In desuetudinem abiit* was the expression in his first edition.

1658. The epidemic remittent fever of that year is recorded, both by Willis and Morton; the latter of whom goes so far as to say, that this whole island had then, particularly during the autumn, the appearance of a public hospital. Morton says, that this was the fever which destroyed Oliver Cromwell; who, according to the account of his death, published by authority, *died of a sickness of fourteen days, which had appeared an ague in the beginning*. It has been suggested, that, on account of the fatal accidents, which had lately happened, the physicians were afraid to make a trial of the bark in the case of

the protector. Morton's testimony is, that* *nondum vires corticis in hoc veneno subigendo, saltem hic loci, comprobatæ erant.*

But if we examine other authorities, we shall find no reason to suppose that it was, about this time, declining in its reputation, or sinking into disuse. On the contrary, we shall rather judge, that it was now rising out of obscurity. It was, as yet, a rarity, which the apothecary's shop was not supplied with; for in the end of the year 1658, we find it advertised

* Pyretologia, p. 17.

in a periodical newspaper,* to be sold by a merchant of Antwerp with the approbation of Dr. Prujean, to whom the pub-

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* The fever bark commonly called the Jesuite's powder, which is so famous for the cure of all manner of agues, brought over by James Thompson, merchant of Antwerp, is to be had either at his own lodgings, at the Black Spread Eagle, in the old Bailey, over against Black and White Court, or at Mr. John Crook's Bookseller, at the Ship, in St. Paul's church-yard, with directions for the use. Which bark, or powder, is attested to be perfectly true by Dr. Prujean, and other eminent doctors and physicians, who have made experience of it.

Mercurius Politicus, comprising the sum of foreign intelligence, with the affairs now on foot in the three nations for the information of the people. From Thursday December 9, *to Thursday December* 16, 1658.

lic is referred for a proof of the genuineness of *the Jesuite's powder*.* Prujean therefore, a physician of high character, was so far from having laid it aside, that he even appears to have stepped forward as the patron and protector of it. And, it was about this time that Dr. Brady, professor of physic at Cambridge, first began to use the bark; as appears from his letter to Sydenham, dated in 1679.† Willis first published

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* Dr. Prujean was elected president of the college of Physicians in the year 1650, and was continued five years. In 1654 Dr. Harvey was elected; but, he excusing himself on account of his age and infirmities, Prujean was chosen for the fifth time.

† Ego quidem per 20, plus minus, annos

his two dissertations *de fermentatione, et de febribus* in 1659. By the manner in which he speaks of the *pulvis e cortice quâdam ex Indiis petitâ, quæ hunc morbum certissime curare perhibetur*, he seems to acknowledge, that he had, at that time, had no experience of it in his practice. In the subsequent year, he gave another edition of his dissertations; and here he adds to his chapter on the quartan fever a supplement respecting the bark; which, he says, was then (viz. in 1660) coming into daily use.

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dictam corticem variâ formâ et multiplici præparatione maximo cum successu exhibendum curavi.

He now not only speaks of it experimentally, but undertakes to explain the nature of it, and its *modus operandi*. His practical determination, concerning it, is, that it suspends the paroxysms, but does not subdue the fever. Morton* fixes the year 1663 to be the æra of its establishment. But in this we have not the concurrent testimony of Sydenham, at least with respect to his own practice. It is evident, that Sydenham's opinion was, for a long time, adverse to the bark. The cases of Underwood, and of Potter (the particular circum-

* Pyretologia, p. 136.

stances of which he does not mention, and, perhaps, himself did not exactly know) seem to have made an early impression on his mind; some traces of which were, perhaps, not intirely obliterated whilst he lived. Nor, indeed, was it in his power intirely to extricate himself from the influence of a prejudice, which not only coincided with his theory, but likewise seemed to give it full confirmation. Even so late as the year* 1668, he speaks of the bark in such terms, as plainly

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* This edition of Sydenham's *methodus curàndi febres*, so far as it relates to the bark, is a transcript of that published in 1666.

shew that he was afraid of using it; and all that he can at this time allow, tending to the favourable side of the question, is that *hujusmodi medicamenta*, when given prudently and cautiously, and in the declension of a fever, have sometimes been of service, and have wholly removed the fits.* From his *observationes Medicæ*, published in 1676, it appears that he had, indeed, at that time, conceived a better opinion of the bark; but that he still administered it with hesitation and diffidence; and was by no means master of

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* *Thomæ Sydenham methodus curandi febres, p.* 111. *Lond.* 1668.

the subject. As to vernal intermittents, he committed them *suo arbitrio*, affirming that they either ceased spontaneously, or required very little assistance of medicine. For tertian fevers, of the autumn, he prescribes a particular method of cure, quite independent of the bark; the object of which is to interrupt and confound the regular process of the paroxysm, by exciting, at the same time, the two different operations of purging and sweating. But, in quartans, he insists vehemently on the futility of every medicine and method of cure, that had been tried, the bark only excepted; of which, however,

with respect to the duration of its good effects, he speaks in an unfavourable manner. At the same time he expresses a serious apprehension of danger, even to the life of the patient, if this medicine should be given, and the fermentation of the blood too hastily checked, before the fever has weakened itself *suo marte*. And* upon this principle, he professes to have introduced a new method

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* Mihi magis è re fore videtur, ut sanguinem dicto medicamine sensim, longioreque a paroxysmis intervallo levitèr inficiamus, quam ut uno omninò ictu paroxysmum jam instantem tentemus confodere. *Observat. Med. Auctore T. Sydenham, p.* 99. *Londini,* 1676.

of exhibiting the bark, in the intervals rather than in the paroxysms. One ounce, therefore, of the powder of bark, and two ounces of conserve of roses, being mixed into an electuary, his patients are ordered to take the size of a nutmeg of it twice a day during the intermission, till the whole be consumed. And the same composition is to be repeated afterwards three times at the interval of fourteen days. He here likewise observes, that the same treatment is applicable to tertian fevers, as well as quartans of the autumn, particularly in patients of an advanced age.

Whilst this continued to be Sydenham's method of cure, we cannot wonder that the disease oftener granted a truce, than yielded to the remedy.

It seems likely, that Sydenham, about this time, had received a general intimation, with respect to the proper time and manner of using the bark. And he was now in the right path; but, being probably retarded by the incumbrance of his theory, did not pursue it.*

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* It is observable, that Sydenham claims a title to this discovery prior to 1676.—*Quæ et ante id tempus mihi innotuisse omninò est credibile—Epist. Resp. prima, p.* 41. *Londini*, 1680.

In his epistle to Brady, first published in 1680, he declares himself convinced of the efficacy of the bark, and of its innocence; never having seen, or even had reason to suspect, that any mischief had arisen from the use of it.* He now, in more direct terms than before, claims to himself the merit of an important discovery. How to remove the two great † objections to the use of the bark, *diu multúmque apud se agebat;*

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* An exception, with regard to the scorbutic rheumatism, is added in the second edition of this letter, published in 1685.

† 1. Periculum a pulveris usu impendens. 2. recidivæ intra paucos dies subsecuturæ *Epist Resp. p.* 30. *Lond.* 1680.

and, after much thinking on the subject, his mind suggested to him a successful method of providing against both difficulties. He now, therefore, gives, in quartan fevers, two drachms of the bark twice a day during the intermission; and, he pursues a similar mode in tertians and quotidians. The fit being stopped, in order to prevent a relapse, he orders an ounce of the powder to be taken every week for three or four times, in doses of two drachms, night and morning. In the second edition of this letter, the quantity is changed from two drachms twice a day, to two scruples every fourth hour. He has

now attained his utmost improvement in this matter: but is it not very singular and remarkable, that this author, after having frequently expressed a perfect conviction of the innocence of this medicine, should, even in the year 1685, repeat his serious apprehensions of danger to the* life of a patient from the premature use of it; that is, before the disease has been in some measure its own remedy? So strongly was he

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* Neque enim id solum est metuendum, &c. sed etiam ne de ægri vitâ agatur, si sanguini omni fermentationis nisu se despumanti de repentè injiciamus remoram. *Epist. Respons. p.* 25. *Lond.* 1685.

attached to the fanciful doctrines of the fermentation and despumation of the blood, that he could not look at the objects of his own experience but through the medium of his favourite system.*

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* It may be observed, that Sydenham conceived a higher opinion of the bark, in proportion as he advanced in age; so that, had his life been much longer continued, it seems likely that he would have divested himself of all his prejudices. He, in no part of his writings, expresses himself so strongly in favour of this medicine, as in his *dissertatio epistolaris*, addressed to Dr. Cole. Here he asserts (what indeed, I fear, has not been confirmed by the experience of his successors) that neither mercury is more efficacious in the venereal disease, nor the bark in agues, than the exercise of riding in the consumption of the lungs: even

From Morton, who published his *Pyretologia* in 1692, three years after the death of Sydenham, no very exact information can be collected, respecting the improved method of administering the bark. He asserts, in one* part of his book, that

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though the patient be affected with colliquative sweats and *diarrhœa*. But, in the first edition of this epistle, dated $168\frac{1}{2}$, no such sentence is to be found; nor does it appear till the year 1685. Nearly the same words occur in the *processus integri*, which Sydenham had drawn up for the use of his son, and which were published, by Mapletoft, after the decease of the author.

* Ego sanè, qui jam ad viginti annos, et quod excurrit, hoc polychrestum remedium ferè quotidiè præscripsi——

Pyretolog. p. 114.

during twenty years, in another* part, during five and twenty years, he had given this *antidote* in every seaon of the year, to persons of all ages and constitutions; and that he had cured every species of intermittent fever with it quickly and radically; it not having failed, in his hands, in more than three instances, and never having produced any mischief, a temporary deafness excepted.

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* Ego fidentèr dico, idque postquam jam ad quinque et viginti annos quotidiano usu ejus vires explorando expertus sum, me nusquam novisse aliquid mali ab usu corticis cuiquam evenisse, præter surditatem aliqualem tempore usûs molestam.

Ibidem, p. 132.

He likewise asserts, that before the year 1678, he had never used to exceed two drachms of the bark in the cure of any intermittent fevers; but that afterwards, the drug being inert, rotten, and adulterated, it became necessary to increase the dose of it to one, two, or three ounces. Nor is any other reason given by Morton, for departing from his former method, than that one ounce of the bark not being then equivalent to the power of two drachms (of such bark as used formerly to be imported) it was found less oppressive to the patient's stomach, to take one drachm once in three or four

hours ; and, that it was expedient to give it in the intervals rather than in the fits, because at that time it may generally be taken without exciting *nausea*, and is more certainly retained ; and that the virtue of the *antidote* is conveyed into the body intire, and with great advantage, whilst the poison lies dormant and inactive.

Morton then neither claims to himself the merit of a discovery, nor acknowledges an obligation to any of his contemporaries. If we examine his practice, it is exactly that of Sydenham; but he takes pains to persuade us, that he was not

led to adopt that practice by choice, but compelled to it by necessity; and that he then first quitted the dose and the method directed in the *Schedula Romana*, when he found the medicine not to be genuine.

But it is not easy to form a conjecture which would in any measure account for Morton's continual and almost uninterrupted success, in curing intermittent fevers, whilst his dose was confined to two drachms; how perfect soever the bark may be supposed to have been. The reason why a less quantity may have succeeded in Italy, than what has generally been

found necessary in the northern parts of Europe, may, with some degree of probability, be referred to the difference of climate. But when we are informed by Plempius, that this powder never succeeded at Brussels ; and by Sturmius, that it never failed at Delft ; we necessarily suspend our faith in both testimonies ; and are apt to suspect exaggeration, as well on one side of the controversy as the other. And our own experience of the effects of the best bark, that can be selected, will not justify us in adopting an opinion, that, at the distance of a century it was more constantly and per-

manently successful in this country, than it is at present.

Lister,* who was contemporary with Sydenham and Morton, expresses no good opinion of† either of them, with respect to this part of their practice. The latter, indeed, he does not mention by name; but he points at him, where he defends the merchants and druggists from a reflection very injurious

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* M. Lister octo exercitationes medicinales. De corticis peruviani exhibendi tempore. p. 125.

† From the very contemptuous manner, in which Lister ridicules both these writers in his *exercitatio de variolis,* it appears that he held neither in any degree of esteem.

to their credit, and that of the bark; which, he affirms, was then as free from adulteration, and as good in quality, as it had been for twenty years before. But he treats Sydenham, who was not then living, with much greater asperity; and calls* his mode of exhibiting the bark *ineptum, ne pejus dicam, et intempestivum, auctore suo, misero illo agyrtâ Talbor, dignum inventum.*

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* This author insists that one dose, given at the approach of the fit, has more power than ten given according to Sydenham's method. Nay, he goes so far as to affirm that the bark of the trunk, even when carious, never failed, in his hands, of producing the best effects.

It is now generally acknowledged, that the person, thus mentioned in terms of the utmost contempt, strengthened the hands of physicians by a discovery, which deserves epithets very different from those given to it by Lister. Talbor, whilst apprenticed to an* apothecary at Cambridge, is said to have received some hints res-

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* Mr. Dent. This part of Talbor's history is a little obscure; for, in 1663, being then in the twenty-first year of his age, he was admitted a Sizer of St. John's College, in Cambridge. But might he not have taken this step, having first served his apprenticeship? It is, however, certain, that his academical residence must have been very short. It appears, that, after his re-

pecting the more effectual method of giving the bark, than what was at that time in use, from a* member of that university; which hints were the foundation of his future practice

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turn from Paris, he was, in the year 1681, admitted a fellow commoner of St. John's College.

Robertus Tabor Cantabrigiensis, de oppido Cantabr. filius Johan. Tabor defuncti, annos natus viginti et quod excurrit, literis institutus intra Cantabr. sub. Mro. Griffin, per quinquennium, admissus Subsizator, pro Mro. Sorsby, Tutore Mro. Crouch, Maii 19, 1663.

Ds. Robertus Tabor, eques auratus, sociorum Commensalis, 1681. *Taken from the register of admissions in St. John's College.*

* Mr. Nott, a fellow of Trinity College.

and fortune.* Thus instructed that he might have frequent opportunities of making experiments with his remedy, he planted himself near the sea coast in Essex. His success in Essex gained him so much credit, that he was occasionally called to London ; and, in the year 1671 (probably sooner) he had fixed his residence in this metropolis. Here his reputation advanced rapidly ; and it may be supposed, that in proportion as he gained the favour of the great world, he lost

* Preface to Pyretologia, auctore Roberto Talbor, Pyretiatro.

that of the physicians. In the year 1678, he was protected by the court against the power of the* College. But (what is of

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* Comitiis censoriis, Maii 3, 1678.

Missæ sunt literæ Præsidi a Magno Camerario Dno Arlington.

Sir,

His Majesty, having received great satisfaction in the abilities and success of Dr. Talbor, for the cure of agues, has caused him to be admitted and sworn one of his physicians; and, being graciously inclined to give him all favour and assistance in this his practice, for the public good, has commanded me to signify his pleasure unto you and the rest of the college of physicians, that you should not give him any molestation or disturbance in his practice: and that, if you shall believe you have any just occasion of complaint against him, you bring the same to me, that I may acquaint his Majesty. Thus with my respects to you, I

more importance to the posthumous fame of Talbor, than his having been protected by the court of Charles the Second) there is extant an honourable testimony of him, written by a man of science. For Mr. Ray, his contemporary, notwithstanding the great respect which he bore to Sydenham, speaks of* Tal-

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remain your humble servant, ARLINGTON. May 2, 1678.

Concesserunt D. Micklethwait, Præses, &c. &c. *Annal. Coll. Med.*

*—— Ob suspiciones nescio quas in crimen adduci cæpit, et paullatim in desuetudinem abire: donec nuperis annis Dominus Robertus Talbor dosi ejus valdè auctâ, non minus felici successu quam incepto audaci, febribus omnibus profligatis usum resuscitavit. Hic enim non intra scrupulos

bor as the person to whom the world is indebted for the revival of the bark, when it had gone into disuse. Whether Sydenham (as has been confidently affirmed) had the secret communicated to him by Talbor; or whether he discovered it by any other means; cannot perhaps, be ascertained. But it is an indisputable fact, that in the year 1668,* whilst Talbor was administering the Je-

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subsistebat, sed ad drachmas et uncias adscendebat, indéque voti compos factus, magnam et sibi et pulveri famam conciliabat. *J. Raii Hist. Plant. tom. II. p.* 1797.

* The date of one of his histories is in the year 1666. *Pyretol. p.* 47.

suite's powder in Essex, Sydenham, then in the height of his reputation, had still strong prejudices against the use of it and that in 1676 (Talbor being then established in London) Sydenham had become acquainted with the principle, with respect to the right use of that powder; but had hardly carried the principle fully into practice even in 1680; Talbor having then received his reward from Lewis XIV. for his secret.*

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* Talbor has been accused of having condemned the bark in his book, whilst he trusted to it solely in his practice. It being his great object to keep his remedy a secret,

Sydenham does not mention the name of Talbor; nor does he seem any where to allude to him, except, perhaps, in a passage of his *methodus curandi febres*;* where he pronounces, in an emphatical manner, that "if any one conceals a method,

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he advises his reader *to beware of all palliative cures, especially of that known by the name of the Jesuite's powder, as it is given by unskilful hands.* But he adds, *yet is this a noble and safe medicine, if rightly prepared, and administered by a skilful hand.* This was as ingenuous a declaration as self-interest would allow. *Talbor's Pyretologia, p.* 44. Qu. Had not the bark been frequently found to be a mere palliative, before the time of Talbor?

* *T. Sydenham meth. curandi febres, p.* 106. *Lond.* 1666.

" or a specific medicine, by
" which autumnal intermittents
" are curable, he deserves nei-
" ther the name of a good citi-
" zen, nor of a prudent man.
" For a good citizen would not
" keep secret, for his own be-
" nefit, what might be benefi-
" cial to mankind ; and a pru-
" dent man would not preclude
" himself from the blessing of
" God."

Morton speaks of Talbor more than once ; but always in an uncandid and contemptuous manner.* It was probably too

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* —— quo tempore circumforaneus ille Talbor corticem peruvianum pro arca-

great a condescension for him to acknowledge, that the practice of physic had been improved by a vender of an *arcanum*. And it is as probable, that he would not tacitly have acquiesced in the claim set up by Sydenham, (in whose favour he was by no means biassed) but that he rather wished, that the credit of such an improvement should belong to a physician, than that posterity should believe, that it had Talbor for its author.

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no, cæteris medicis ignoto, venditans, sese febrium Æsculapium unicum jactabundè gloriabatur. *R. Morton, pyretol. p.* 428.

The imperfect sketch of history, which I have attempted to delineate, presents to the mind reflections a little humiliating to our profession. Had it not been for the casual experience of an uncivilized people, it might never have been discovered, that there existed, in the stores of nature, a specific febrifuge. Had not the influence of a great religious society, unconnected with the practice of physic, counteracted prevailing prejudices, at an early period, this medicine, though brought into Europe, might have long remained in obscurity, unknown, and useless. And lastly, had not physicians been

taught by a man,* whom they, both abroad and at home, vili-

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* The Jesuite's powder is not a medicine newly found (the virtue for stopping quartan agues having been experienced above *an hundred years* since) but revived by a debauched apothecary's apprentice of Cambridge ; and he in this empirical practice is most diligently imitated by our most famous physic doctors, as their Æsculapius and first master ; a hopeful tribe, in the mean time, that shall leave their sense, reason, and *dogmata*, to follow a quack or empiric.

See the conclave of physicians ; also a peculiar discourse on the Jesuite's bark, by Gideon Harvey, M. D. physician in ordinary to his Majesty, p. 165.

We learn from the letters of Madame la Marquise de Sévigné, in which Talbor is often mentioned, that he was much employed in France by persons of the highest rank ; and that his practice was not confined to fevers. His cures are here represented as so

fied, as an ignorant empiric, we might, at this day, have had a

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many miracles; but it appears that he was not treated with more kindness and liberality by the French physicians, than by those of his own country. " L'Anglois a " promis au roi, sur sa tête, et si positive- " ment, de guerir Monseigneur dans quatre " jours, et de la fievre et du devoiement, " que s'il n'y réussit, je crois qu'on le jettera " par les fenêtres; mais si ses prophéties " sont aussi veritables qu'elles l'ont été pour " toutes les maladies qu'il a traité, je dirai " qu'il lui faut un temple comme à Escu- " lape. C'est dommage que Moliere soit " mort; il feroit une scene merveilleuse de " D'Aquin, qui est enragé de n'avoir pas le " bon remede, et de tous les autres mede- " cins, qui sont accablés par les expérien- " ces, par le succés, et par les prophéties, " comme divines, de ce petit homme. Le " roi lui fait composer son remede devant " lui, et lui confie la santé de Monseigneur. Madame la Dauphine, elle est dejà mieux,

powerful instrument in our hands, without knowing how to

&c." *Lettres de Sévigné, vol.* 6, *p.* 233. 8 *Nov.* 1

M. D'Aquin, mentioned in the letter above cited, was first physician to the king of France. Upon the death of Talbor, his secret was published, at Paris, by the director of the college of new discoveries in physic; and M. D'Aquin did not omit this opportunity of inserting some severe animadversions on the English remedy and its author. That this remedy had cured the Dauphin of France, was a matter of public notoriety; and yet we find M. D'Aquin insisting strenuously, *that Talbor erred grossly in treating the Dauphin's disease; that the fever was increased considerably by the febrifuge; and, on the contrary, ceased of itself, when remedies were only applied to correct the indisposition of the stomach, which occasioned it.*

See the English remedy, or Talbor's wonderful secret for the cure of agues and fe-

use it in the most effectual manner.

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vers, sold by the author, Sir Robert Talbor, to the Most Christian King, and, since his death, ordered by his majesty to be published for the benefit of his subjects.

A little time before his death (which happened in 1681) Talbor erected a monument in Trinity church, at Cambridge, in memory of his family. The inscription on this monument shews, that he was not insensible of his own dignity and importance.

" Dignissimus Dominus Robertus Tal-
" bor, aliàs Tabor, Eques Auratus, ac medi-
" cus singularis, unicus febrium malleus,
" Carolo II. ac Ludovico XIV. illi M.
" Britanniæ, huic Galliæ, serenissimo Gal-
" liarum Delphino, plurimisque principibus
" nec non minorum gentium ducibus, ac
" Dominis probatissimis, sic suis parenta-
" vit," &c. &c.

XIII. *An Appendix to a Paper of* Dr. Darwin's, *on the use of Foxglove.*

Read at the COLLEGE, March 16, 1785.

A GENTLEMAN, aged about sixty years, had, for several winters, seldom escaped a catarrh, which generally was aggravated, if ever he went abroad in an evening. During the hottest weather of two or three of the last summers, his ankles had become œdematous towards night. He was first attacked by a sudden difficulty of respiration towards the autumn of

the year 1782. In the ensuing winter, that difficulty was particularly oppressive to him on his ascending two or three flights of stairs; and it greatly increased as the spring advanced. His ankles likewise were more œdematous towards night: but in the morning were quite free from swelling.

In this situation he took, every second night for two weeks, a bolus compounded of purified quicksilver, and fresh squill, each five grains, and ten grains of the conserve of red roses, ground together until perfectly incorporated. This medicine almost entirely removed

both the *dyspnœa* and the swelling; but, in six, or seven weeks, both these symptoms returned. The difficulty of going up stairs now increased on him gradually. On such occasions he used first to feel an unusual heaviness from hip to hip; then in the middle of his thighs; his neckcloth then became too tight; and it was necessary for him to stop, until his breath was relieved. And, after all, he has frequently been obliged to rest for some time, before that it has been in his power to enter into conversation.

Such was nearly his state during two years. On every

return of the *œdema* and difficult respiration, (which happened once in six, five, four, or three weeks) he had recourse to the bolus, above described; which, after having been twice or thrice repeated, used certainly to give him great relief, by promoting urine. With a view to prevent so frequent returns of his disorder, he now took salt of wormwood, dissolved in a decoction of the peruvian bark; a decoction of *lignum quassiæ;* and the powder of dried squill, which, in the dose of one or two grains, was his medicine at bed time, together with a solution of half a drachm of salt of wormwood. The

squill, and the salt of wormwood, seemed to have the most powerful effect; but, though taken at different times, for ten, or perhaps twelve months in the last two years, they were not so far successful as to prevent a relapse.

Since the commencement of the present year, he has tried several other diuretics; namely; the essential oil of juniper-berries; a decoction of the tops of broom, with salt of tartar; the powder of broomseeds, taken in the quantity of one drachm every morning; and broomseeds, prepared like coffee. But these several medi-

cines only produced a frequent *nausea*, and at length a total loss of appetite. And now the mercurial bolus had entirely lost its accustomed power.

In February last, a recent catarrh was so violent, as to make the use of opium adviseable. By this the secretion of urine was very much lessened; which is an effect of opium, that he has always experienced whenever obliged to take it. His legs and thighs now became œdematous; and his *abdomen* seemed fuller; but there was no perceptible fluctuation. The *dyspnœa*, on every motion, and particularly at night, was most

oppressive. He had a perpetual drowsiness; but was no sooner asleep, than he was immediately awakened by a sense of suffocation, attended with the utmost anguish and anxiety, affecting principally the region of the stomach, and the *abdomen*.

His stools had been natural; but, for many days, the urine had not exceeded six ounces each day.

Being now in the greatest distress, and most imminent danger, he was encouraged by Dr. Darwin's experience to make a trial of a decoction of foxglove,

prepared according to the directions given in the preceding paper. Of this medicine he took a large spoonful, together with an equal quantity of simple peppermint-water, in the morning of the 27th of February; and repeated the same dose thrice, at an interval of an hour between each dose. In the afternoon he sometimes felt a *nausea;* drank now and then a tea cup full of chicken water; and, at ten o'clock that night, had voided three quarts of urine. At eleven, he vomited very much. Afterwards he passed a tolerably quiet night; and at nine the next morning (viz. in 24 hours) had voided six quarts

of urine. This day, February 26, his *nausea* and sickness increased. His pulse, which for some time had been from 90 to 120, was now from 54 to 60 strokes in a minute; and was so very irregular, that hardly two successive pulsations of the artery corresponded. Whatever he took into his stomach in the course of this day, was instantly rejected.

1 March. He had a good night. Some sensation of *nausea* remained; but he had only once retched to vomit.

During the last two days, the urine was become pale, and

amounted nearly to six quarts each day. He now could eat a little animal food with an appetite; and felt less sickness after it.

2 March. His swellings had nearly subsided. The urine was less copious than that of the preceding day; but still in a considerable quantity. The *nausea* was in a less degree; and the pulse more regular.

3 March. The swellings had disappeared; and he had no complaint, except what seemed to be the effect of weakness. His appetite was now more

keen than it had usually been in his best health.

8 March. He had every day advanced nearer to a perfect recovery. But, in the last 24 hours, his urine had not amounted to more than half the quantity of liquids taken.

9 March. On the preceding night, he had felt some degree of oppression, and *dyspnœa;* and his ankles had been slightly swollen. He awoke early, with great anxiety and distress; which induced him to take a spoonful of the decoction of foxglove, and to repeat the same after four hours. He

suffered much *nausea* through the whole day; but did not vomit. His urine was now voided in a larger quantity, and of a paler colour, than in the two preceding days.

10 March. Having passed a very uneasy night, he took another spoonful of the same decoction, which occasioned great sickness and vomiting. The medicine did not this day seem to promote the secretion of urine.

16 March. A constant *nausea*, excited by the decoction, had continued for three or four days. In the mean time, his

urine had been very red, turbid, and in small quantity ; and his legs and thighs more swollen than ever. And now weakness, languor, difficult respiration, and *præcordiorum anxietas* had made up such a compound of miserable sensations, as was inexpressible. Being, therefore, almost in a state of despair, he was inclined to repeat the use of the decoction ; which he was convinced, on the first trial of it, had saved his life. To a large spoonful of the decoction, he now added the same quantity of simple peppermint-water, and as much brandy, hoping that by this means less *nausea* might be ex-

cited: but, soon after that he had taken the fourth dose, (which he took about four hours after the first) he became very sick, and vomited large quantities of yellow bile. This experiment was attended with consequences disagreeable, and even alarming. A constant *nausea* and excessive vomitings, accompanied by coldness of the extremities, and cold sweats, continued two days; and the effects of the medicine, on the stomach, were felt, in a less degree, five days more. The pulse, in the mean time, was remarkably irregular and slow; being generally from 48 to 56 strokes in a minute. The ef-

fect of this medicine, on the optic nerve, was singular. Every thing was seen as through a fog. Whenever he attempted to look at a distant object numberless *muscæ volitantes* obstructed his view: and, if he covered his eyes with an handkerchief, and pressed them gently, as many luminous objects presented themselves, dancing before them. The flame of a candle appeared much larger than usual, and was particularly white. The face of every one, who entered the room, seemed to him like that of a dead person. Such were the virulent effects of the medicine; but no one symptom of

the disease was at all alleviated by it.

Towards the end of March, some other medicines were tried; of which it is sufficient to say, that they proved ineffectual.

It having been represented to the patient, on the authority of a person much conversant in the use of foxglove, that the powder of that plant, dried, is nearly equal in virtue to the decoction, he was induced to give it another trial in the following form. Ten grains of the powdered leaves of foxglove, and one scruple of the

aromatic *species*, were made into ten pills, with simple syrup. He began the use of these pills on the 1st of April ; and on the 11th had taken seventeen. Once he took two pills in the morning, and repeated the same dose in the evening. Excessive sickness and vomiting ensued. Every day, whilst he was in this course, he felt a slight *nausea*. Now the œdematous swellings sensibly decreased ; though the quantity of urine had not been promoted. He at this time determined to give up all medicine and to trust wholly to friction on the *abdomen*.

On the second night after his taking the last pill, he voided a considerable quantity of limpid straw coloured urine ; and has continued to do so from that time. The quantity discharged, from ten at night to ten the next morning, has sometime been two quarts, but never less than a pint and half. The swellings have now (May 14) intirely subsided. He feels no oppression on his breast, except on going up stairs, or on any quick motion. This, however, he in part attributes to weakness, which is now his only subject of complaint. His appetite is returned: and he enjoys quiet nights. His pulse

still continues irregular, but is become quicker; and his eyes are nearly in as good a state as before the use of the foxglove. His body and limbs are every day well rubbed; and to this operation he is inclined partly to attribute his recovery.

A woman servant, in this gentleman's family, had been for some time in a valetudinary state of health. She had complained of constant pain across the stomach; and great oppression and shortness of breath, particularly on motion. Her legs were œdematous; and her urine in small quantity, red, and turbid. To these symptoms

were added thirst, *nausea*, loss of appetite, and of sleep.

She took one of the foxglove pills twice a day ; and, in the whole, took one and thirty pills. The medicine immediately acted as a diuretic ; and all the symptoms gradually yielded. From the beginning, her pulse became slow and irregular. It is remarkable, that this medicine never made her sick. On the contrary, when she had taken it ten days her *nausea* ceased, and her appetite returned.

I have lately tried foxglove in two cases of the *ascites*. The

first patient took the decoction; and though I encreased the dose of it to six drachms every hour for five successive hours, during two days, it had not the least efficacy, not even exciting *nausea*.

The second patient first took one of the fox-glove pills, and gradually increased the dose to three pills, twice every day, for several successive days. They did not in any respect relieve her; producing no other effect than giddiness and dimness of sight.

It appears, that the fortune of foxglove, in the medical world,

has been various. At one time it has been esteemed to be a powerful remedy; at another time, it has been utterly rejected, as a plant *totâ substantiâ venenosa*. It is probable that a few fortunate experiments might bring it into a temporary vogue; and it is as probable, that other experiments, less fortunate, might afford a sufficient foundation for its disuse. Boerhaave* calls it a poison. On the other hand,† Alston,

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* Historia plantarum in horto academico Lugduni Batavorum, p. 308.

† Index medicamentorum simplicium, præfat. p. 5. This book probably was a *compendium* designed by the professor for the use of his pupils. In Alston's lectures

in a book, quoted by* Lewis, ranks it among those indigenous vegetables, which, though now disregarded, are medicines of great virtue.

The London *pharmacopœia*, published in the year 1650, has not *digitalis* among the articles of the *Materia Medica*. In the

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on the *Materia Medica*, foxglove is omitted; and *digitalis*, which is found in the index, directs the reader to *gratiola*; which by Tournefort, and some other botanists, has been called *digitalis minima*. May it not, therefore, be suspected, that, when foxglove was first used as a cure for a dropsy, it was mistaken for *gratiola?*

* An experimental history of the *Materia Medica*, p. 248.

edition of 1721 we find *digitalis (folia, flores, semen)* inserted; but not in the last edition, namely that of 1746.

It is received in the fourth edition of the *Pharmacopœia* of Edinburgh, published in 1744 —omitted in 1756, and 1774— inserted in 1783.

It occurs in the two last editions of the *Pharmacopœia* of Paris, namely in that of 1748, and 1758; and likewise, in the *Pharmacopœia* of Wirtenberg of 1754, and 1771.

It seems to be uncertain, nor indeed is it important, whether

or not this plant was known to Dioscorides or Pliny. Dodonæus relates, that some persons, having eaten the leaves of foxglove, mixed with other herbs in an omelette, were most severely vomited. It is probable, that a mistake of this kind first occasioned the discovery of its emetic quality; and that thus it became a domestic medicine among the common people in the country; who, as we are informed, made use of it, particularly in fevers,

Parkinson, seemingly on the authority of a single case, recommends a decoction of two handfuls of the leaves of fox-

glove, and four ounces of polypody of the oak, in ale, as a remedy for the epilepsy. A decoction, somewhat similar, is found in Bate's *Pharmacopœia, pro vomitorio in epilepsiâ.*

We cannot but acknowledge the justness of Ray's criticism on Parkinson's cure for the epilepsy—"Medicamentum hoc "robustioribus tantum conve- "nit, siquidem violentèr ad- "modum purgat, et vomitiones "immanes excitat." Indeed a medicine, capable of producing such violent effects on the stomach and bowels, should seem, *a priori*, more likely to excite than to prevent convulsions.

Salmon speaks with confidence, bordering on that of empiricism, concerning the juice of the leaves and flowers of foxglove, given in a consumption of the lungs; and it is said to be at this time much used for that purpose in some distant parts of England. If real benefit has at any time accrued to a consumptive patient from the use of this medicine, may it not be conjectured, that it has been, at least in part, effected by the action of vomiting? Emetics have sometimes been of use as well in an *hæmoptysis*, as in incipient ulcers of the lungs: and it was the observation of a physician, of great

experience, that he had not known a sea-voyage so beneficial in a consumption of the lungs as when it had been attended with its ordinary effects, sickness, and vomiting.

Foxglove has likewise been much celebrated for its efficacy in the cure of the *scrofula*. With this intention, the juice of the plant has been given internally; and the pounded leaves, after the expression of the juice, have been applied to the diseased parts. Bate has an ointment made of the flowers of this plant, to which, he says, no application whatever is equal in scrofulous ulcers. We

also find a *formula*, for preparing an *unguentum digitalis*, in the London *pharmacopœia* of 1721, and in that of Wirtenberg.

As a remedy for a dropsy, this plant seems to have been but of late introduction. But at what time, and by whom, it was first given in this disease, it has not, I believe, hitherto been ascertained. Salmon has mentioned *dropsy* in a list of several chronic diseases, which, according to the testimony of that author, are curable by foxglove. But neither Salmon, nor any other of the old authors whom I have consulted, has re-

commended it as a medicine specifically powerful in this malady. Some years since, the case of a gentleman of Oxford, who was reported to have been cured of a dropsy by a decoction of *the roots* of foxglove, became the subject of medical conversation in London; and, in consequence, some trials were made of that decoction in one of our hospitals; but the result of those trials did not, at that time, raise the credit of the medicine. Some of the late experiments in this town have been more successful; and many have failed.

It cannot be doubted, but that the gentleman, whose case has been related at large, owed the prolongation of his life to the plant in question. But the distress, which he suffered, during the operation of it, was most grievous: and it is much to be wished, particularly for the sake of very irritable stomachs, that some mode or management could be contrived, by the means of which its power of promoting absorption might be exerted, separately from its virulent effects. That such a discovery may hereafter be made, we have some foundation to hope; since a person, who speaks from original

experience, has informed me, that the success of this remedy does not depend on its exciting *nausea;* for that, in cases in which it has been most successful, the stomach has not been at all affected.* However, the power, which this plant pos-

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* The dried leaves of Virginian tobacco in infusion, tincture, and powder) have lately been much recommended in dropsies, upon the authority of successful experience. And it is said, that the greatest diuretic effects of this medicine are generally preceded by more or less of *vertigo* or *nausea,* or both; but that the vital powers are not at all, or very little, disturbed by these effects.

See *medical reports of the effects of tobacco, by Thomas Fowler, M. D. Physician to the general infirmary of the county of Stafford.*

sesses, of doing harm, ought not to be objected to the cautious use of it; since upon the same principle, the practice of physic would be deprived of some of its most effective instruments. And a medicine must be regarded as a valuable acquisition, which, in a disease, always difficult of cure, and too frequently incurable, is found to be now and then successful, even though it should much oftener disappoint us.

XIV. *Postscript to the Appendix to* Dr. Darwin's *Paper on Fox-glove.**

Read at the COLLEGE, August 6, 1785.

Our late worthy† collegue (the history of whose case is the principal subject of this *Appendix*) on the 15th of May, went

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* Whilst the last pages of this volume were in the press, Dr. Withering, of Birmingham, (who appears to have adopted foxglove from a family receipt, and to have for several years, recommended it as a diuretic) published a numerous collection of cases, in which foxglove has been given and frequently with good success. To these

† Dr. Richard Saunders.

to the sea coast in Sussex, judging himself to be at that time a convalescent, and to want only a restoration of strength. In a little more than a fortnight, he returned to London, much indisposed by the effects, as he thought, of an accidental catarrh. He had a teasing cough; and his respiration was very difficult. Both these symptoms, however, soon yielded; and he then, with very little exertion,

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cases the ingenious author has added some instructions respecting the use of this plant, which claim our attention: for a substance, possessing so extraordinary and peculiar a power over the motion of the heart, if administered by the hand of ignorance and inexperience, is, in its effect, much more likely to be a poison than a remedy.

and generally, even without coughing, expectorated large quantities of *mucus*, some of which had a purulent appearance, but was not determined to be real *pus*. This very profuse discharge continued several days: at the end of which time, he again entertained hopes of recovering his former health. The event was otherwise. By degrees, all his complaints returned, and with aggravation. His pulse became more and more weak and irregular. His breath became more and more difficult. His appetite and his strength failed, and at length death closed a scene of great distress.

About ten days before his decease (which happened on the 24th of July) the remembrance of the benefit, which he had received from fox-glove, prevailing over his dread of the operation of that medicine, he wished again to have recourse to it, in powder. At the same time, he was solicited by some of his medical friends to make trial of the extract of hemlock. A pill, therefore, compounded of one grain of the former, and three grains of the latter, was taken thrice a day for several days successively. This medicine neither occasioned *nausea*, nor promoted urine; but it seemed to quiet and compose

the patient. He afterwards took, twice in the same day, one grain of the powder of foxglove, without any addition to it. The second dose made him once vomit; and the quantity of his urine was afterwards somewhat increased. From this time, he took no more medicines, passing the short remainder of his life almost continually in restless sleep.

It is to be lamented, that an examination of the dead body was not allowed; for, it is probable, that the seat of this disease would thus have been fully ascertained; and that the cause, why it was ultimately incur-

able, would not have been, as it must now remain, a matter of conjecture.

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ERRATA.

Page.	Line.	For	Read
30,	last,	b imperfect in	bourhood
34,	*penult.*	endemeal	endemial
65,	9,	preceeding	preceding
85,	4, *note,*	over bearing	over-bearing
88,	9,	saturni ;	saturni,
100,	3,	ueasure	measure
121,	1,	s lution	solution
160,	10,	cerus	cerus-
183,	17,	begin	begin-
203,	18,	florence	Florence
212,	9,	*anchyloses*	*anchylosis*
219,	9,	insert a comma after	evadit
223,	10,	the γ imperfect in	γαστι
245,	8,	insert a colon after	suspectum
246,	17,	Scafhausen	Schaffhausen
267,	8,	dele the comma after	ignem
272,	9,	dele the comma after	this
305,	8,	cachetic	cachectic
307,	4,	Islemann	Ilsemann
309,	4,	precedentibus	præcedentibus
358*,	15,	dele the comma after	mented
359,	17,	do	do-
377,	11,	boir	boire
380,	1, *note,*	esèpce	espèce
402,	3,	Cremor	Cremer
405,	2, *note,*	Pharmacopœæ	Pharmacopœiæ
407,	5,	renata	re nata
408,	11,	pur.	pur-
447,	2, *note,*	bille	balle
474,	18,	at the end of the line	dele a
544,	10,	variolus	variolous
548,	2, *note,*	médicin	médecin
556,	17,	subtraendo	subtrahendo.
560,	6,	frequenly	frequently
632,	2, *note*	hoquer	hoquet
665,	18,	dele semicolon after	paroxysms
667,	18,	cuanha	coanha
671,	3,	cumei	cum ei
686,	9, *note,*	insert a comma after	*amarylla*
718,	last, *note,*	sò	so
719,	1, *note,*	da	da'
740,	4, *note,*	de repentè	derepentè
743,	4,	seaon	season