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OBSERVATIONS

ON

ANTIMONY,

Read before the MEDICAL SOCIETY of LONDON,

And published at their Request,

BY

JOHN MILLAR, M. D.

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311

LECTURE 1

MECHANICS

LECTURE 1

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LECTURE 1

MECHANICS

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TO THE
MEMBERS
OF THE
MEDICAL SOCIETY
OF
LONDON.
GENTLEMEN,

THE following observations
having been honoured with
your approbation, are now pub-
lished at your request, and pre-
sented to you as a testimony of
the author's respectful regard.

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Can-

Candour requires him to acknowledge that some gentlemen of the Society were averse to the publication, judging that the free censure of popular opinions would rather provoke resentment than produce reformation. Not deterred from his purpose, he has availed himself of their friendly cautions to obviate some objections which may be made to the design.

The account of the earlier chymists may, on a superficial view, appear superfluous; but it was thought necessary to illustrate

strate the Medical History of Antimony, and to shew how little credit is due to those writers whose exaggerated praises of that medicine have contributed so much to mislead and abuse mankind.

It may be objected that the author has not himself assayed the antimonial ores, nor repeated the chymical processes. But by drawing the chymical and mineralogical materials from other sources, all imputation of prejudice or partiality, on his part, is prevented, since he appeals to the testimony of the patrons of antimony

antimony themselves, for the authenticity of the facts by which some of their opinions are subverted.

I am,

GENTLEMEN,

Your most obedient, and

most humble servant,

Pall Mall,
April 2, 1774.

JOHN MILLAR.

T H E

C O N T E N T S.

INTRODUCTION Page 1

S E C T I O N I.

*Some Account of the earlier Chymists, and
of their opinions concerning Antimony* 4

S E C T I O N II.

Of the Natural History of Antimony 13

S E C T I O N III.

*Of the Chymical Properties and Analysis of
Antimony* - - - - - 27

S E C T I O N. IV.

*Of the Antimonial Preparations and their
Medical Effects* - - - - - 48

S E C-

S E C T I O N V.

*Of the Secret Antimonial Medicines,
and particularly of the Fever-Pow-
der - - - - - 7^E*

OBSERVATIONS

O N

ANTIMONY.

INTRODUCTION.

Read 1st and
15th Febr.
1774.

REMEDIES have often acquired reputation without sufficient evidence of their innocence and efficacy. Some have been introduced by an injudicious application of the theory of the schools, others by rash and precipitate conclusions drawn from partial experiment, and many by a refined spe-

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cies

cies of imposition on the credulity of mankind, veiled under the specious pretence of strict morality, extensive benevolence, and disinterested love of science.

It is not surprising that a steady exertion of these arts should prevail, when we consider that physicians, whose duty it is intelligently to examine these boasted remedies, and if frivolous or dangerous, to expose and resist the patrons of them, have too often contributed to establish the deceit. Some are borne along by the torrent of vulgar prejudice; while others stand aloof beholding, with indignant pride, the triumph of imposture; and many judging a compliance with popular prejudices their surest and safest course, unite in supporting error and imposition, and in confirming the most pernicious practices.

Thus is the publick confidence betrayed, the art of physick brought into contempt, bold and extravagant as-

fertions gain ground, and dangerous remedies are established.

The common interest calls us to expose these intrigues, since men do not knowingly sacrifice life and health, but are unwarily misled by misrepresentation. Let us therefore unite in promoting a safe and effectual practice, and in repelling the common enemies of science and of mankind.

Among the delusions of the present age, one of the most dangerous is the universal belief of the perfect innocence and superlative efficacy of antimony. The extensive use of this mineral demands our particular attention, since it not only obtains among regular physicians, but has been generally adopted in domestic practice. But if its reputation shall appear to have been raised by falsehood or misrepresentation, it becomes us to resist that tyrannical fashion by which it hath been established.

SECTION I.

Some Account of the ancient Chymists, and of their opinions concerning Antimony.

ANTIMONY was originally used by the Chymists, who, as they pretended to preternatural illumination, affected to conceal from the vulgar and profane, the sacred mysteries of the adepts, who arrogantly stiled themselves the favourites of Heaven. An exact chronological account is not to be expected in an art which took its rise among illiterate Miners, and in the most superstitious country in the world. How long it was cultivated by the lower set of people, with whom it originated, is uncertain; but Trimegistus, having, as is believed, first treated it in a scientific manner, has been honoured by his successors as the Inventor and founder of the art. He is

is stiled a philosopher, a priest and a King, is said to have been instructed in all manner of learning, to have been the Inventor of medicine among the Egyptians, and to have lived about fifteen hundred years before the christian æra, or according to some about the time of Moses.

Chymistry, among the Egyptians, was joined to the magic art, it passed, thus corrupted, from them to the Arabians, where it was rendered still more unintelligible; and, in the course of the pilgrimages, and warlike expeditions to the holy land, it was imported into Europe, during the dark ages of ignorance, where it was still further vitiated by those impostors who scrupled not to corrupt the christian doctrines, and to pervert a religion, instituted to promote the happiness of mankind, to the purpose of oppressing them, by erecting, under the pretence of obedience to its precepts, a tem-

poral and spiritual dominion over all whom they could intimidate or deceive.

In these rude times, when the nations of Europe were overwhelmed with ignorance and slavery, it was not to be expected that Chymistry could be much reformed. The little learning of that age was confined to the ecclesiastical orders, who avowedly reprobated all knowledge which was not derived from divine illumination.

Hence we find the chymical writers of that period boasting of their weakness, yielding up all confidence in their faculties, glorying in what they termed poverty of spirit, which was a state of absolute quietism, and betaking themselves to the invocation of supernatural assistance, on which they depended for that information which had been wisely placed within the reach of their natural capacity. An implicit submission to these monkish tenets was, however, strictly enforced, and all
who

who presumed to depart from them, called forth the severest censures of the catholic church.

But, even in those times of ignorance an ecclesiastic arose worthy of a better age and happier fate. Roger Bacon, undaunted by the terrors of the church, boldly attempted to stem the torrent of superstition, and recal the world to truth and sound philosophy. Such of his writings as yet remain, are composed in a rational, manly style, void of hypocrisy and dissimulation. He leads us to examine the works of nature and of art, chastly distinguishing those from the sacred truths of revelation, and clearly demonstrating their united operations to be far more wonderful than the pretended miracles of those who boasted of supernatural assistance, whom he justly censures as amusing the ignorant with the fumes of drunkenness, or the ravings of a distempered brain.

The age in which he lived was too much depressed to be roused by his vigorous efforts ; and his laudable attempts to emancipate the christian world from that slavish ignorance in which it was held, were, for very obvious reasons, severely censured by the Roman church : he was arraigned, condemned, and cast into prison, where he was exhausted by a tedious confinement and severe penance †, and soon after fell a victim to the vengeance of his enemies.

The papal tyranny having thus prevailed against the strenuous efforts of this rational and intelligent philosopher, it was easy, under the pretence of exalted devotion, to suppress more feeble attempts toward improvement and reformation.

† *Prelati enim, et fratres, me jejuniis macerantes tuto custodiebant, nec aliquem ad me venire voluerant, veriti ne scripta mea, aliis quam summo pontifici et sibi ipsis pervenirent. Epistola Rogeri Bacon ad Clement. IV.*

But

But those high pretensions to extraordinary sanctity have been so often used as a cloak, by men of an intriguing spirit, that they are now justly deemed suspicious; and we need only look into the lives and writings of the ecclesiastical chymists to be convinced that they were assumed by them, to cover their ignorance, ambition, and dissolute manners. An overweening conceit of their own opinions, and an arrogant contempt for those of others, is, notwithstanding all their pretensions to humility and self-denial, the genuine characteristic of those hypocritical writers. Thus we find them extolling themselves to the disparagement of all mankind. *Ye doctors of physick and surgery,* says Basil Valentine, *come to me, a religious person, and servant of God, I will shew you what ye have never seen, I will make manifest to you the*
way

way of health and salvation, which you have not yet known. †

In delivering their chymical processes, an invocation of God is the first precept, and they, then, proceed in the name of the Lord. But not content with having magnified themselves beyond their equals, they address their disciples in the stile and manner of the founder of the christian religion: *I warn you*, says the same ecclesiastical chymist, *my disciple and apostle, if you would imitate me, you must take up your cross, and suffer as I have suffered, and learn to bear persecution as I also have done**: and having thus made themselves equal with God, they proceeded to disclaim all dependance on the supreme Being, declaring, in their pride, that, if God would not assist them, they would rather consult the Devil than the works of former writers †.

† Triumphal Chariot of Antimony.

* Id p. 3, and p. 118.

† Paracelsus.

But if the chymists were more intitled to our confidence; the extravagant praises which they bestow on antimony, would justly render their evidence suspected. Not content with attributing to it an infallible efficacy in the cure of diseases, they assert its influence over the temper and disposition of the mind, and seriously affirm that it disposes to probity and chastity. Notwithstanding these miraculous effects they scruple not to own that, in its original state, it is of a poisonous nature; but they pretend that they can easily convert the most noxious substances into salutary medicines, and the mildest nourishment into deadly poison; and thus is antimony rendered an infallible cure for all diseases, and honey destructive to the human race †.

• The writings of modern physicians are indeed free from those gross ab-

† Triumphal Chariot of Antimony, p. 93.

furdities;

furdities ; yet the high character given, even by them, to antimonial medicines, so greatly exceeds all bounds of probability, that we shall be justified in withholding our assent, till it is supported by proofs bearing some proportion to the boldness of their assertions.

By the study of mathematics a habit of accuracy and precision is acquired, and it may be suspected that chymistry leads to credulity ; or else, some of the modern chymists, after the example of their predecessors, have craftily obtained wealth and fame, by the most criminal practices. Upon the whole, the evidence, as well ancient as modern, concerning the superlative efficacy of antimony is to be suspected, and it is necessary impartially to enquire into its natural history, chymical analysis, and medical effects.

SECTION II.

Of the Natural History of Antimony.

ANTIMONY is of different kinds: by some it is described a blackish mineral substance staining the hands, full of long, shining needle-like striæ, hard, brittle, and considerably heavy. It is found in different parts of Europe, as Bohemia, Saxony, Transylvania, Hungary, France, and England, commonly in mines, intermixed with earth and stones. Sometimes it is blended with the richer ores of silver, which renders the extraction of that metal difficult, volatilising a part of the silver, or, in the language of the miners, robbing the ore*.

* Poppius's *Basilica Antimonii*, Newman's *Chemistry*, &c. &c.

The Hungarian and Transylvanian, of which little or none comes to us, is esteemed much the best for medicinal use. The English seems of all others the least proper for that purpose, frequently containing a portion of lead *, which is not separable by any of the common methods of purification, or else the English miners are unacquainted with the method of purifying it in foreign countries.

The celebrated Dr. Hunter has in his museum, eighteen curious specimens of antimony, very different from each other: some are covered with a white calcareous crust; some, in external appearance, resemble cobalt †; others the lead ores; and others, those of arsenic; some are almost perfectly black; some

* New Dispensatory, p. 21.

† Dr. James describes cobalt, from which the most virulent kind of arsenic is extracted, a ponderous, hard, fossil substance, almost black, not unlike antimony. Universal English Dispensatory, p. 288.

have red striæ, interspersed throughout the ore, and others shining spiculæ like polished steel. But as they have not yet been assayed, no very probable conjecture can be formed concerning their component parts, nor of the proportion they bear to each other.

Chymists have not been sufficiently accurate in pointing out the signs by which the purity of this mineral is to be distinguished. Basil Valentine says, it is of two kinds which are very different, one is beautiful and possessed of some of the properties of gold. The other has more of sulphur and not so much affinity to gold, it is distinguished by beautiful, white shining striæ. The one is much to be preferred to the other for the purpose of the medicine as well as alchemy †.

Some direct antimony to be tried by rubbing the powder with a strong

† Triumphal Chariot of Antimony, p. 37.

dog's tooth upon yellow paper, where, if it leaves a red spot it is pure. Others order a tincture to be made with spirit of vinegar and evaporated on an iron plate, and if it leaves a red powder it is reputed good. It is also said to be good, when it is not spongy, but heavy, and when it evaporates by a strong heat †.

The earlier chymical writers who praise it highly, scruple not to own that it is, in its natural state, a virulent poison. Basil Valentine, its greatest advocate, though he admits that it is given by farmers to their cattle, when they intend to make them fat and smooth; yet declares it to be truly poisonous, and strictly prohibits the use of it unprepared.

Paracelsus, as well as Glauber, * recommends it as an external appli-

† See Schroder's Pharmacopœia, Poppius's *Basilica Antimonii*.

* *Philosophical Furnaces*, book i. and ii. and *Mineral Work*, part first.

cation in the cure of cancers, judging it superior even to arsenic in all corroding diseases, and expresses his ardent wishes that it should be substituted in place of all other remedies, that the reproach of the chirurgical art might be removed, and our humanity might not be offended with such numbers of maimed and mutilated objects †. He highly extols its preparations, and attributes to some of them the power of giving the bloom of youth to decrepit old age, but strictly prohibits its internal use unprepared, and treats particularly of the baneful influence of the crude mineral, in his book on the diseases occasioned by working in mines and in metals.

Some later writers are silent concerning its noxious qualities, and others positively assert, that antimony, in its crude state, is not a poison, but if given from four grains to half a drachm,

† Ninth chapter of the first book of Surgery.

an excellent resolvent and purifier of the blood.

Dr. James in the universal English Dispensatory says, *it is astonishing that so many physicians, and some of them men of learning, should so strenuously oppose the introduction of antimony into medicine, and without any manner of evidence or experience, treat it as a deleterious poison. For it appears that antimony reduced to powder is neither emetic nor cathartic: though, if given in large quantities, it may perhaps, by its weight, gently loosen the belly; and so far is it from being deleterious, that it is an excellent alterative in the mange of horses, and a salutary medicine in some diseases of men as well as cattle. It is therefore astonishing that any instances should occur of patients who have been deserted by physicians, and afterwards found a remedy in antimony, administered by quacks, who do not so much as pretend to any degree of medicinal knowledge.*

But

But the arguments drawn from the example of giving antimony in large quantities to horses, do not prove its innocence in the human body. The crocus metallorum is used by farriers to the quantity of an ounce or two in the day, yet a few grains of this preparation produce in men the most violent and dangerous effects.

The authority of Basil Valentine, which is brought to prove the innocence of crude antimony is also directly perverted, and the story of his having introduced it into medicine from an accidental observation of its effects upon swine, is no where to be found in the Triumphal Chariot of Antimony. Basil Valentine, *to whom, says the same author, we are obliged for discovering the medical uses of antimony, first using it internally, and enriching medicine with many of its preparations, having thrown away some antimony which he had used in*

the fusion of metals, and observing some swine, who had accidentally eaten it, to purge considerably; and afterwards become sleek and fat, took the hint of trying what it would do in human bodies.

But this matter is very differently represented by Basil Valentine himself. Let mankind, says he, be instructed, that antimony not only purifies and refines gold, and frees it from all metals and every foreign matter, but accomplishes the same in men and cattle by its innate virtue. I shall explain this by a rude experiment. If a farmer should set apart any animal, a hog for instance, to be fed, let him give the animal half a drachm of antimony, for two or three days, mixed with his food, so that he may be purged, by which he will not only acquire an appetite and become sooner fat; but if he labours under any disease the antimony will expel it †. But I would

† *Triumphal Chariot of Antimony*, p. 187.

not advise any person to give crude antimony to the human race, as a medicine, for he that would use it with safety and success, must first know the method of preparing it, in which the greatest part of the mystery consists; and an imprudent physician, who gives it without this necessary knowledge, will do more hurt than good*.

This is not taking a hint from the effects of antimony on swine, but a direction to give it to those animals when they are to be made fat. It is the more necessary to point out this mistake, since Basil Valentine is quoted by this author, as having maintained the safety and efficacy of crude antimony, though he constantly asserts it, in its natural state, to be virulent and poisonous. *I shall be the first*, says he, *to protest and exclaim against those, who, be-*

* Triumphal Chariot of Antimony, p. 188 and 189.

ing ignorant of the method of preparation, give poisons to mankind, for mercury, orpiment, and antimony are poisonous, and will ever remain so, unless they are fitly prepared : and again, If antimony is given without being prepared, it will quickly kill the patient †.*

Hence it appears, though he highly extols the preparations of antimony, yet he not only exclaims against using it in its crude state, but ranks it with orpiment, and declares it poisonous.

It may indeed be suspected that the writers of that age went to the opposite extreme, too easily admitting the poisonous quality of these minerals, which were the subject of their Chymical operations, the more illustriously to display, among the ignorant laity, the supernatural powers of their mystical art.

* *Triumphal Chariot of Antimony*, p. 64.

† *Ibid.* p. 49.

Yet this difference of opinion, between the earlier and some of the later writers, may be otherwise accounted for, from the present mode of purifying that mineral before it comes into the hands of the Chymists. It is not improbable it may have been formerly sent to them without any preparation, but it is now separated from its natural impurities at the mines, by fusion in an earthen pot, whose bottom is perforated with a number of holes, the fusible antimony passing through, whilst the infusible substances remain behind. The melting vessel is let into another pot, sunk into the ground, which serves as a receiver. This last is of a conical figure, and such is the shape of the loaves of antimony met with in the shops*.

* Lemery *Cours. de Chymie.* p. 283. Geoffrey's *Treatise of the Materia Medica*, tom. i. p. 41. Poppius *Basil.* cap. 8. p. 216. Newman's *Chymistry, New Dispensatory, &c.*

But some of the modern chymists assert that, if crude antimony is reduced to so fine a powder that the shining spiculæ cannot be seen, its operation is similar to mild kermes mineral †, and Doctor James †, and the author of the New Dispensatory §, the greatest advocates for its perfect innocence, admit, that when acid, alkaline or oleaginous food have been taken liberally, it has proved violently emetic. It may therefore be fairly concluded, even on their authority, that the crude mineral contains such active particles as may, by accident or mismanagement be rendered extremely virulent.

The best modern authors on mineralogy who have carefully examined the anti-

† Geoffroy Memoires de l'Academie des Sciences 1735.

† Dr. James's Dispensatory, page 282.

§ New Dispensatory, page 236.

monial ores, in their natural state, affirm that all of them are arsenical; and some of them were found in Carls ort, in the mine of Salberg, about the end of the last century, so similar to arsenical ores as to be preserved in cabinets, as specimens of arsenical pyrites, their real nature remaining undiscovered, till it was explained in the year 1748, by Mr. Van Swob master of the mines, in a treatise communicated to the royal academy of sciences at Stockholm*.

Antimony also frequently contains a portion of lead †, the poisonous qualities of which have been clearly demonstrated by the learned Doctor Ba-

* Cronstedt's Essay toward a System of Mineralogy, translated by Da Costa, Sect. 135. p. 223. London 1772.

† See p. 14. Cronstedt's Essay, sect. 236, and the New Dispensatory.

ker in his elaborate critical dissertations on that subject, published in the transactions of the college of physicians of London, and by the ingenious Doctor Percival in his observations and experiments on the poison of lead,

SECTION. III.

*Of the Chymical Properties and Analysis
of Antimony.*

IT appears from Dioscorides, Pliny and Galen, that in their time antimony was not chymically examined, nor used internally though they recommend it as an external application. It is not surprising that modern chymists should differ concerning its constituent parts, since they cannot be separated without losing something in the operation. Their proportions are also various in different specimens of the crude mineral, a pound of some yielding ten or eleven ounces of regulus, whilst others scarce afford eight ounces*.

* Newman's Chymistry, New Dispensatory, &c.

But

But whatever may be their opinion concerning the effects of crude antimony, they are almost unanimous in affirming, that it contains a portion of arsenic, which by different management, may be either converted into an efficacious remedy or a deadly poison. *

It is a fact, says Hoffman, proved beyond all doubt among the chymists, that antimony is composed of sulphur and a mercurial or arsenical substance †. The same is asserted by Stahl. Antimony, says he, consists of two or three mineral substances, sulphur, a portion of arsenic, and an imperfect metallic matter. That arsenic enters its composition is proved by the red tinge of sulphur of antimony; its great power of vomiting, and that sickness of sto-

* Cronstedt's Essay toward a System of Mineralogy, p. 223, 224. Stahl on the Arsenical Substance of Antimony. Hoffman of the wonderful, virulent and medical powers of Antimony, and the easy transition from one to the other.

† Id. Ibid.

mach and faintness with which its operation is attended; by the resemblance of glass of antimony, to the saturnine arsenical glass; by its solution in aqua-regia, and many other appearances. But it is particularly demonstrated, by the purity of antimony, which is regenerated from regulus and pure sulphur, which is much finer and milder than vulgar or native antimony*.

The author of the *New Dispensatory*, however, in opposition to these weighty authorities, and to the concurring testimony of almost all the chymists, affirms, that this opinion, however plausible, does not seem to have any just foundation. Nothing arsenical, he says, has ever been separated from pure antimony. The most violent antimonial preparations are rendered inactive by means which do not

* Stahl's *Chymico-Physico-Medical Works*, page 488—591. On the arsenical substance of antimony.

lessen the poisonous quality of arsenic, and the most inactive are rendered virulent by operations in which arsenic would either be dissipated, or its violence abated*.

This opinion, contradicted by the general voice of mineralogical and chymical writers, since it is not supported by more convincing proofs, should not have been published in a book intended for the use of every pupil in pharmacy; if the prevailing opinion of the poisonous quality of antimony should be erroneous, it cannot affect the lives of mankind, but if it is well founded, what words can express the dangerous tendency of a false doctrine so universally propagated!

He has not indeed treated this subject with his usual accuracy, for with Hoffman and other celebrated chymists, he elsewhere compares antimony to arse-

* New Dispensatory, page 343.

nic, as well with respect to its virulence, as the means of correcting it: *Orpiment*, says he, *from which a perfect arsenic is obtainable in notable quantity, is when it participates more largely of sulphur, almost perfectly innocent; and sulphur, which restrains the power of the antimonial semimetal, remarkably abates the virulence of this poisonous mineral also* §.

Poppius affirms, that an impure, bituminous and arsenical sulphur, noxious to the eyes, nose, and lungs, with a blue flame and arsenical smell, which cannot be endured without danger, is raised during the calcination or sublimation of antimony †.

Glauber also directs antimonial cups to be made for the purpose of communicating an emetic quality to acid liquors, which according to him produce the same effects as those prepared from or-

§ New Dispensatory, p. 85 and 86.

† Basilica Antimonii, in the Appendix to Hartman's Chymistry, p. 896.

piment *; Boerhaave asserts that antimony seems to be of the same nature with arsenic †; Macquer informs us, that some of the antimonial ores contain a portion of the same poisonous mineral §; and Cronstedt affirms that all of them are arsenical ‡.

Unless therefore those modern chymists, who assert the perfect innocence of antimony, expect from us that implicit confidence which their predecessors, who held a very different opinion, rigorously exacted, it cannot, on their authority, be admitted that it does not contain arsenic. Wonderful as the works are which they have achieved, many secrets of nature have escaped their researches, which may hereafter

* See the fifth part of the Philosophical Furnaces.

† Vol. I. Of the Theory of Chymistry, p. 31. of sulphureous semi-metals.

§ Chymical Dictionary on the Ores of Antimony.

‡ Cronstedt's Essay toward a System of Mineralogy, translated by Da Costa. London, 1772.

be discovered, and many will, undoubtedly, elude all human investigation.

Nor is more credit due to those who assert that all arsenical particles are volatilised, and carried off by the force of fire; the crocus, regulus and glass of antimony containing such subtil virulent particles as must for ever escape observation, since without losing in any degree their specific gravity, they impart, almost inexhaustibly, an emetic power to wine and other liquors, and the operation of these essences of antimony, as they have been emphatically called, is similar to those of arsenic. *

But although, in opposition to the testimony of the best chymical writers, it should be granted that there is no arsenic in antimony, it cannot be affirmed, that it does not contain poison, since by unfolding its texture by

* Compare Glauber's account of the effect of orpiment cups, in page 31, with that of essence of antimony in the fourth section.

the force of fire, it is rendered highly virulent ; and by the addition of various substances, in the stomach, it becomes violently emetic *.

By those who assert the perfect innocence of antimony, and extol its virtues, orpiment is allowed to be a poisonous substance, and giving it as a medicine, is declared a practice too dangerous to be followed †, yet it is ranked by Hoffman with antimony. It ought to be remarked, says he, that orpiment was known to the ancient philosophers and physicians, and universally deemed a poison, and to this day is sold for arsenic. Yet it does not, when taken internally, give any molestation, either by vomiting or purging, and may be given, in a large quantity, to dogs, without hurting them. But if it is exposed to the fire,

* Mais quelquefois il se (antimoine) rencontre avec des sels acides qui l'ouvrent, (dans l'estomach, et dans les intestines) luy donnent une nouvelle fermentation, et lui font produire des super-purgations incommodes Traite de l'antimoine, par M. Nicolas Lemery, p. 7.

† Dr. James's, in his Dispensatory, page 285.

then, indeed, it acquires a poisonous quality, as is also the case with antimony, which, though in its natural crude state, it is rather a medicine than a poison, yet when melted by fire it exerts a violent emetic power †.

Crude white arsenic, the most virulent poison of that tribe, is not always baneful †. It is now more than
 twenty

† *Observationes Physico-Chymicæ*, p. 233.

† We are told by Newman, that the utmost caution is necessary to avoid the fumes of arsenic, and that it is on account of the danger arising from them that this mineral has been so little examined by the chymists; but according to Dr. Percival's late observations, they seem to have been mistaken. I have, says he, some doubt, whether the vapours of arsenic be so poisonous as is commonly supposed, and if the candid reader will excuse the digression, I will lay before him my reasons for it. To solder works of silver filligree, and other delicate manufactures of that kind, a composition is used of which arsenic is the principal ingredient. The solder is melted by the flame of a lamp, directed by a blow-pipe; and this operation cannot be performed with due accuracy, but in a close room. The greatest part of the arsenic is evaporated by the blast and flames, and some part also of the rest of the solder. The workmen must constantly breath these vapors, because there is little or no current of air to

twenty years since it was taken in large quantity by four persons, on whom it had no other effect than, what is usually produced by antimonial preparations, to excite violent vomiting. All of them were lately, and, I believe, are still in perfect health. To this I was an eye-witness, and took large lumps of white arsenic out of the pot in which their victuals were prepared. It happened at Kelfo, in the shire of Roxburgh, and is well known in that country.

carry them into the chimney. Yet the men appear to enjoy as good health, and to live as long as other artists who pursue their business in close rooms, and use lamps. Amongst other examples of the truth of this observation, I saw one lately at the manufactory at Soho, near Birmingham: a man, aged upwards of fifty years, who has soldered silver filligree more than five and thirty years, and has regularly passed from eight to twelve hours daily in his occupation, and is at present fat, strong, active, chearful, and of a complexion by no means sickly. Neither he, nor his brother artists, use any means to counteract the effects of their trade. Dr. Percival's Observations and Experiments on the Poison of Lead, p. 75, 76, and 77, London, 1774.

I was

I was a few years afterwards, desired to visit a gentleman in Northumberland, who had taken white arsenic: it operated in the same manner, and for several years after this accident he continued in his usual health.

Thus far does arsenic resemble antimony, but their affinity is still more strongly asserted by Hoffman. While, says he, the sulphureous part of antimony is intimately combined with the arsenical or reguline*; it cannot exert its violence. For mineral poisons cannot act or become noxious, till the

* The word reguline signifies royal, and has been applied by chymists to the harder or more fixed parts of minerals or metals. Hoffman uses reguline and arsenical indifferently when applied to antimony; and Carthusier asserts that the intimate union of the reguline part with the arsenical principle of antimony, is the cause of its being caustic, drastic, emetic, and virulent.

La parte reguline est etroitement unie au principe arsenical, qu'elle est par elle-meme caustique drastic, emetique, et virulente. *Matiere Medicale*, tom. ii. sect. xv. chap. v. De l'antimoine crud. A Paris, 1765.

poisonous parts are freed from their union with those which correct their virulence.

But that mineral sulphur has a power of correcting poison, is clearly proved by that experiment which shews, that arsenic, the greatest poison, being melted on a slow fire, with an equal portion of mineral sulphur, is converted into a mass, almost void of virulence; and if regulus of antimony is fused with an equal portion of the same sulphur, it immediately loses its drastic power*.

This theory probably introduced an arsenical medicine into practice at Berlin, where Hoffman, who was physician to the king of Prussia, resided. Newman, professor of chymistry and director of the Royal Elaboratory and Dispensatory in that city, observes, that *chymistry is capable of converting sundry poisons into remedies; thus the virulent an-*

* Observaciones Physico-Chymicæ, p. 251 & 252.

timonial regulus is changed, by that art, into the mild diaphoretic antimony; and some have been hence induced to imagine, that arsenic might also be corrected and rendered safe, and have even ventured to put so dangerous a speculation in practice. A preparation of arsenic with nitre has been actually sold at Berlin, and in other places, under the title of a specific febrifuge †.

There is, in many instances, a strong analogy not only between antimony and orpiment, but the more virulent poison of white arsenic; and those who have been bold enough to use that poisonous mineral as a medicine, have found, in its preparations, a more certain and efficacious remedy than in those of antimony. The illustrious Stahl gives some account of a famous fever powder, which obtained great reputation in Germany, and was used by most of the nobility in his

† Newman, p. 146.

neighbourhood. This celebrated chymist does not deny its great efficacy, but, alarmed by a suspicion of poison in its composition, earnestly declaims against its use: it was at length acknowledged to be a preparation of white arsenic*.

The same fever-powder, or a similar preparation, was used, with great success, by the German Physicians and Surgeons, in the late Flanders war. It was also introduced among the English, but the late Mr. Pringle, Inspector General of the British hospitals in Flanders, on whose authority this fact is related, alarmed at the danger and uncertainty of this remedy, ordered all the preparations of it to be destroyed. This gentleman acknowledged it had proved successful, but dropsies and visceral obstructions, which sometimes followed

* *Opuscula Chymico-Physico-Medica.* p. 434—

the fevers in which it was given, were, perhaps unjustly, ascribed to its use.

Some account of an arsenical fever-powder is given by Doctor Werlhoff, late physician to his Britannic Majesty at Hanover. He mentions its being recommended from successful experience by Michael Friccius*, who had used some drachms of it, and by Sleuogtius †, who had given it with safety in fifty cases, but, notwithstanding these and many other recommendations, he expressly condemns this dangerous remedy ‡.

Lemery also affirms, that many diseases have been cured by giving four grains of white arsenic in a large quantity of water. It operates, according to this intelligent chymist, by vomiting, in the same manner as antimony. But

* In a treatise on the medical virtues of poisons, published in 1702.

† In an inaugural speech printed in 1700. This and the last quoted author I have not seen.

‡ Observations, on fevers, p. 42, and 204, published at Hanover in 1745.

he highly disapproves of using it as an internal remedy †.

Poisons having been lately strongly recommended for the cure of many obstinate diseases, and generally adopted in practice, the dread of them, wisely implanted in our nature, is in a great measure banished; and such is the influence of novelty and fashion, and so much has prejudice prevailed, that one of the most eminent physicians in Europe has been disgraced for exposing a practice fraught with danger, and supported by misrepresentation ‡.

But

† Cours de Chemie, p. 374.

‡ This matter is explained in a letter from Doctor De Haen, of Vienna, to a physician in England. I have, *says this celebrated physician*, made many experiments with hemlock, in consequence of an order from high authority: the result was, that not one of one hundred and twenty patients was cured or relieved by it; many grew worse, and seven unhappy women, with cancers in their breasts, perished in
my

But though the strong proofs of the
poison of antimony, drawn from its natural

my hands, some of whom might have been saved by the knife. How did I intreat those to whom it belonged to use more precaution, or at least to suspend publishing in praise of poisons, till repeated trials had been made by several hands, lest the public faith should be abused, and the author rendered ridiculous in the face of the universe. But my remonstrances were fruitless, and, to my great concern, my best friend abruptly fell out with me, and I have incurred the disgrace of the best of sovereigns.

Since I have spoke my sentiments freely, I am looked upon as the chief of heretics, as an enemy of the public and of the author's reputation; and for this reason I have been unhappily disgraced, and defamatory libels, of the most virulent kind, have been printed against me. I expect yet more terrible storms; however, I adore that Providence which directs all for his glory and my good, from whom I should deserve a disgrace infinitely more fearful than that which I now suffer, if for the sake of transitory glory, perishable treasures, or tranquillity of life, that may be taken from me in this world, I should become a confederate with those who have thus
infa-

tural history and chymical analysis, should be rejected by prejudice or scepticism, yet the easy transition of this mineral, by the simplest processes and slightest accidents, from a salutary medicine to a deadly poison, has not yet, been seriously denied.

It is found by chymists generally to contain mercury, arsenic, lead, sulphur, and sometimes copper, silver, and other metals *. When it is melted by fire, or deflagrated with half its weight of nitre, it becomes a poison. But if antimony, or its regulus, is mixed with an equal portion of common salt, and calcined with a gentle heat, stirring it constantly, and afterwards washing it with pure water, it becomes a gentle diaphoretic.

infamously abused the publick confidence, to the disgrace of physick. See Medical Museum, vol. III. London, 1764.

* Cronstedt, Hoffman, Stahl, &c. &c.

The mildest preparation of antimony; its white calx, which may be safely taken to the quantity of some drachms, if melted with an equal portion of nitre, a little powder of charcoal, and a small quantity of animal fat, is immediately rendered poisonous.

If antimony is melted with a fourth part of salt of tartar, a salutary medicine is obtained; but if the same process is performed with two or three times that quantity of the salt, so nice is the management of this wonderful mineral, in place of a medicine it becomes a poison *

When antimony is combined with other medicines, as it frequently is by practical physicians, unless the composition is directed with chymical skill, it may

* See Hoffinan's Physico-Chymical Observations. Of the wonderful, virulent and medical powers of antimony, and by what means the one may easily be changed into the other.

be so changed, or, in the language of the chymists, decomposed, as totally to alter its usual qualities.

By marine acids the activity of antimonials is increased, and they are rendered corrosive, or virulently emetic and purgative; but by the addition of the nitrous acid this virulence is diminished or destroyed, and they become mild diaphoretics*.

Such being the uncertainty and variety in the operation of antimonial preparations, it cannot be improper, since they are now in common family use, to lay before the public the objections against the general application of them, which arise from the accurate observations of the best chymists, and most experienced physicians; since it is not improbable, that many who deal

* Newman, p. 133. New Dispensatory, p. 343. Geoffroy Tractatus de Materia Medica, tom. I. p. 234—239.

them out with a liberal hand, and with the most charitable and benevolent intentions, would dread the danger of a drug, which though published as an infallible remedy, may, without great skill and precision in the direction of it, in place of a remedy become a poison.

But the ultimate decision of this point must depend on the real effects of antimonial medicines on the human body, which are therefore now to be considered.

SECTION. IV.

Of the preparations of antimony, and their medical effects.

THE limits to which dissertations of this kind ought to be confined, will not permit us to enter into a minute detail of the various antimonial preparations which may be found in every dispensatory. Those in most frequent use are calx of antimony, crocus of antimony, antimonial wine, tartar emetic, and kermes mineral.

The virtues of calx of antimony are variously represented by different writers, some ascribing to it the power of an excellent diaphoretic, others asserting that it even proves violently emetic, and others, among whom is the great Boerhaave, declaring it a mere inert earth intirely destitute of all medicinal virtue.

virtue. The College of Physicians of London, who had formerly directed this preparation, under the title of diaphoretic antimony, thought proper, because of the various opinions concerning its operation, to change its name to that of calx of antimony, till its medicinal qualities should be better ascertained*.

These different judgments can scarce be supposed to have been delivered by competent judges concerning the same medicine; but may be accounted for from the different manner in which the process for making the calx may have been conducted. The common nitre, with which it is prepared, contains some portion of sea-salt, and when that abounds, the proportion of nitre being

* See a narrative of the proceedings of the committee appointed by the College of Physicians to review their Pharmacopœia. p. 64.

less, the calx may prove an active remedy †.

If it is not sufficiently calcined, or perfectly freed from the reguline parts by washing, such of these as remain, may produce more sensible effects than are to be expected when it is duly prepared, and hence perhaps proceed the contradictory opinions of chymists and physicians concerning this antimonial preparation.

But the assertion of its being a mere inert earth, is not well founded, since a small dose of it sometimes produces violent effects; and it may be reduced by fusion, with inflammable fluxes, into pure regulus. It enters the composition of a medicine described by the judicious Doctor Morton, with which, in three instances, he cured an obstinate intermitting fever. In one case the disease was of two years standing, and

† New Dispensatory, page 347.

in all of them had resisted a diligent and skilful application of the Peruvian bark. But these were the only opportunities he had of trying it; for having never met with any other case in which that excellent febrifuge disappointed his expectation, he deemed it an unpardonable wantonness to use a precarious remedy, while he was possessed of one more certain and efficacious †. It is also recommended by Van Swieten in the peripneumony, as a deobstruent and expectorant †.

Crocus of antimony is made by deflagrating equal parts of antimony and nitre: it operates as a violent emetic when given from two to six grains. A preparation of this kind, recommended to the London College of Physicians by one of their own mem-

† See Morton's Treatise of Acute Diseases, printed at Geneva, 1727.

† See Baron Van Swieten's Commentaries on Boerhaave's Aphorisms, Vol. II. p. 797.

bers, under the title of milder crocus of antimony, as a medicine of mild operation and eminently efficacious, was inserted in their Dispensatory; but the committee appointed to review and correct it having had some comparative trials reported to them of this and the common crocus, which rendered them dubious of their effects, were induced to leave the matter to be further examined*.

It is seldom prescribed: but an extraordinary cure is said to have been performed by the milk of an ass that had drunk water in which it was accidentally infused †; and from such an improbable story, an eminent physician was induced to use the milk of a goat which drank the same kind of water.

* See the narrative of the proceedings of the committee appointed by the College of Physicians to review their Pharmacopœia.

† Medical Museum, Vol. III. p. 530. London, 1764.

Antimonial wine was formerly ordered, in the London Dispensatory, to be made, by infusing an ounce of powdered glass of antimony in two pints of claret; and is commended by Salmon, as a strong vomit, under the name of *vinum rubellum*.

The *vinum benedictum* is made by infusing an ounce of *crocus metallorum* in a pint and an half of Spanish white wine. A third form is, to digest two ounces of *regulus* of antimony in three pints of white wine. This last preparation is declared by Salmon to be an excellent medicine in fevers and agues, and in obstructions of the bowels, emptying them of all evil humours. It perfectly cures the falling-sickness, convulsions, cramps, gout, sciatica and almost all other disorders. Another tincture of antimony is directed by the same author, and is said, on account of its many virtues, to be a gift sent

from God. It cures the plague and all pestilential fevers. A tincture of antimony is also directed by Basil Valentine, eight drops of which are said to be a remedy for all diseases.

The simple infusion of crocus, glass, or regulus of antimony in wine, if not more efficacious, is at least less dangerous than those preparations which are made by more elaborate chymical processes, since the accuracy and attention of those who prescribe it, will not so readily be defeated by the carelessness or ignorance of an operative chymist. But though it may be given with greater safety than other antimonials, yet the extravagant encomiums bestowed upon it are contradicted by the testimony of the faithful, attentive and judicious Sydenham. That candid physician expresses his wishes, that instead of the infusion of crocus of antimony, we had safer vomits sufficiently efficacious. When called to infants, and observing a vomit

mit indicated, whereby they might have been preserved from danger, he durst not give this infusion for fear of bad consequences. He was cautious of giving it, even to grown people, though, when plentifully diluted, he found no ill effect from it; but he positively declares that, in a continued fever, it is by no means safe to give it to children under the age of fourteen; and expects no other benefit from it, than what might be obtained by milder emetics*.

But the obsolete opinions of the universal efficacy of antimonial wine, although expressly contradicted by the chaster judgement of Sydenham, were again revived in their full force by Dr. Huxham. In the year 1737 he recommended the *vinum benedictum*, in a manner that might rather have been expected from the mystical chymists, in times of ignorance and superstition,

* Sydenhami Opera, p. 67. Lipsiæ, 1695.

than from an able and experienced physician, in a liberal and enlightened age*. As he had obtained much influence and authority in his profession, his earnest recommendation could not fail widely to extend the use of this medicine in regular practice; and when further experience induced him to speak of it in more moderate terms, and physicians to look out for less precarious remedies, a new and infallible antimonial medicine, known by the name of the fever-powder, was published, which brought us again back to the abuse of antimonial preparations, which had already been often exploded.

That which next became fashionable, as having the greatest supposed resemblance, in its operation, to the celebrated fever-powder, was tartar emetic.

* Observations made at Plymouth, on the weather and prevailing diseases from the year one thousand seven hundred and twenty-eight, to one thousand seven hundred and thirty-seven, p. 140, &c.

It is prepared by boiling equal quantities of washed crocus of antimony and crystals of tartar in water. This, as being soluble in liquids, is said to be less precarious in its effects than the other solid preparations; yet the strength of it greatly depends upon the manner of conducting the process, for some of the tartar, in the ordinary method, will be apt to shoot by itself, retaining little of the crocus. Some have therefore advised, as soon as the solution is filtered, to carry the evaporation much further than is usually done, if not to the total exhalation of the liquor*. Its effects, however, are uncertain, six or eight grains sometimes proving a mild emetic; though in other cases, I have seen half a grain operate so severely as to bring on violent convulsions, and Newman has known three or four grains prove mortal.

* Newman, page 137.

Fatal consequences have also happened from want of attention to the different methods of preparing this medicine. A Dutch physician, being accustomed to an emetic tartar made with salt of tartar, which was given in doses of ten, twelve, or fifteen grains, prescribed a like dose from a German shop, by which the patient vomited to death*.

Kermes mineral, a preparation familiar to golden sulphur of antimony, has been vended as a quack medicine in France and Germany, under the title of Mineral Centaury, Kermes or Alkermes Mineral, or Poudre des Chartreux, and in England by that of Wilson's Panacea, and Ruffel's Powder.

The king of France was at length persuaded by M. Dodart, his first physician, to purchase it from M. La Ligerie, a surgeon at Paris, and it was made publick in the year 1720: but,

* Newman's Chymistry, p. 137.

like all other catholicons, has lost its consequence since the secret has been divulged, and the medicine found to be a well-known preparation described by Glauber, † and the elder Lemery. ‡

How long this medicine was used by the mystical chymists cannot be known, since they seldom communicated any of their processes excepting for a valuable consideration, and under the strictest obligation to secrecy. But Christopher Farnner, who was a humble retainer of Glauber's, on the small stock of chymical knowledge which he had gleaned from him and from a servant whom he seduced to betray his master and discover his secrets, attempted to become his rival, and set the process for making the golden sul-

† Geoffroy's Treatise on the Materia Medica, tom. i. p. 225. and Glauber's Apology against the lying calumnies of Christopher Farnner.

‡ Histoire de l'Academie Royale des Sciences, pour l'annee 1720, and Lemery Traite de l'Antimoine,

phur of antimony to sale, at the price of thirty rixdollars. Glauber, incensed at his treachery, published his own improved method of preparing this medicine, which he calls a Panacea of common antimony, and it has since under different names, and with some variation, been transcribed into most of the chymical books †.

According to Geoffroy, as well as the earlier chymists, it was esteemed an universal medicine. It sometimes vomits, often purges, and generally operates by sweat and urine; in a word, says this celebrated writer, it promotes the several evacuations, according to the different channels by which nature may be disposed to throw of the vitiated humours.

It is recommended in the small-pox and measles, in obstinate autumnal intermittents, in spitting of blood, and other pulmonary complaints, in

† See the apology of John Rudolph Glauber, against the lying calumnies of Christopher Farnner.

chronic diseases arising from obstructions in the bowels, in dropsies and in the bloody-flux. It is made by boiling antimony repeatedly in water, with a certain proportion of alkaline salt, and owes its virtues to a portion of regulus being rendered soluble in water*.

But this manner of preparing it is condemned by Hoffman; who affirms, that the reguline or arsenical parts are not sufficiently sheathed by the sulphureous, as appears from many circumstances which he mentions, but especially from its violent emetic quality. He recommends a different process, by which he supposes the sulphur to be so blended with the reguline, or arsenical particles as to render it a mild and effectual diaphoretic.

The fate of antimony and its preparations has been as various as the reports concerning their efficacy are contradictory. They have been ranked

* Geoffroy's Treatise of the Materia Medica, tom. i p. 225.

among

among the wonders of the world, and their virtues extolled beyond all probability. They have again been proscribed as baneful, and prohibited under the severest penalties.

Those who used antimony in Rome were sent to the galleys. It was prohibited in France by an edict of parliament in 1566; and in 1609 a physician was expelled the faculty of Paris for prescribing it. The edict was repealed in 1650, and it was again received into the number of purgatives; but this having been found inconvenient or dangerous, its general use was prohibited by a new edict in 1668, and it was only permitted to be prescribed by Doctors of the faculty.

The opinions of different authors on this subject have not been more various than those of the same person at different times. In the year 1737 Dr. Huxham asserts, without reserve, that no medicine is more safe or more efficacious

ficacious than Vinum Benedictum, which, from a supposition of its possessing all the powers of this mineral, he calls essence of antimony *. But after almost twenty years further experience, he declares, whoever would give antimony with safety and success, should be well acquainted with its analysis and component principles, and should know what different combinations, preparations, and doses, will effect, otherwise it may prove a poison instead of a remedy †.

From what has already been advanced, it will not be difficult to account for these contradictory reports. Different specimens of antimony when dug out of the mines are not made up of the same component parts; and it

* *Observationes de Aere et Morbis Epidemicis ab anno 1728, ad finem anni 1737, Plymuthi factæ*, p. 140, 141, & 142. London. 1752.

† *Medical and Chymical Observations on Antimony*, p. 6 and 75. London. 1756.

is so changed by fusion, that different pieces of the same lump are not of equal virtue †. There are few antimonial preparations which may not be made by various processes, none of which can be conducted with such accuracy as uniformly to produce a medicine of invariable strength, and their operation is rendered yet more precarious by their combination with a variety of humours, food, drink and medicines in the stomach.

But since no judgment can be formed from the opposite and contradictory opinions of others, it may now be proper to mention the result of my own experience and observation. In one instance, I have seen a dangerous pleuritic fever, of seven days standing, accompanied with an incessant cough, a hard, full, quick pulse, laborious breathing, and violent pain in the breast, perfectly cured in a

† New Dispensatory, p. 351.

few hours by the use of antimonial wine *.

A dropfy of two years standing, occasioned by a tedious remitting fever, and accompanied with an obstruction in the liver, which had withstood the diligent application of a variety of medicines, under the direction of several skilful practitioners, was cured in a few days by a medicine which owed its efficacy to tartar emetic †.

An obstinate dysentery, which had long resisted many other methods of cure, was perfectly removed by two doses of the vitrum antimonii ceratum.

Encouraged by these signal instances of the efficacy of antimonial medicines, and by the universal prejudice in their favour, I have used them in many thousand cases, but never, even in

* Observations on the prevailing Diseases of Great Britain, part i. chap. iv. case 2d, p. 34.

† Ibid. part 2d, chap. x. p. 305.

slighter diseases with the same success. When given with much attention and caution, they have generally failed where milder medicines have proved effectual, and in some instances they have been prejudicial.

In a recent dropfy and visceral obstructions occasioned by a remitting fever, tartar emetic was prescribed not only without success, but with an apparent aggravation of the symptoms, which were afterwards perfectly removed by the use of Peruvian bark, snake-root and rhubarb *.

I have been desired to visit children and some grown persons in fevers, attended with convulsions, which were, with good reason, attributed to the misapplication of antimonials, and in one case an imprudent use of them was judged to be the cause of death.

Observations on the Diseases of Great Britain, part i. chap. iii. case x. p. 106.

Though

Though it is asserted that antimonial preparations may be so directed as to vomit, purge, or sweat according to the intention of the prescriber, yet those who have had much experience will not obstinately defend the assertion, since nothing perhaps is more difficult than to foretel their effects when administered alone. If they are combined with other medicines their operation may be more certainly directed, since by opium they may be determined to the skin, by senna or manna they may be carried off by the intestines, and by an addition of ipecacuan or oxymel of squills they may be rendered emetic.

But much prudence and skill are requisite in conducting the operation of these compound medicines. For tho' no danger were to be apprehended from joining antimonials with emetics or purgatives, yet, by unskilful combinations,

binations, the peculiar efficacy of antimony may be destroyed; and by opiates those virulent particles may be retained, and prove noxious, which would have been carried off, without any other inconvenience than what might arise from the violence of their operation.

Upon the whole, the evidence in favour of antimony and its preparations is too slight to justify the exaggerated encomiums with which it has been extolled: it contains in its crude state, and in all its preparations, such virulent particles as may, by slight accidents, become poisonous in the stomach: well-attested instances of remarkable cures performed by it are few; cases in which it has failed or been prejudicial, numerous; the reports of chymists and physicians concerning it are various and contradictory; its effects are precarious, and more
skill,

skill, experience and attention requisite to conduct its operation than are to be expected among the generality, even of regular practitioners †. It is therefore very improper for common use; and as there is no certain rule to direct the management of it, every physician must form his judgment by comparing his own observations with the opposite and contradictory assertions of others.

It would be imprudent to reprobate a medicine which, in some instances, has certainly performed such cures as are seldom obtained by milder methods. No bounds are to be fixed to discreet and experienced practitioners, who, on mature deliberation, may determine the propriety of hazarding, in particular circumstances, a violent and precarious remedy, and can conduct its

† See p. 49—66.

operation with skill and sagacity. Yet the present indiscriminate use of animosity, which is now grown up into a fashion too formidable to be attacked with much hope of success, must, after a candid and impartial examination, be condemned as pernicious.

S E C T.

SECTION. V.

Of the Secret Antimonial Medicines, and particularly of the fever-powder.

IF the difficulty of conducting the operation of antimony, renders the general application of it, in regular practice, dangerous, it must, as a secret remedy, in the hands of those who have no medicinal skill, be still more pernicious. But as some secrets, now, universally extolled, are avowed, by their proprietors, to be preparations of antimony, let us next proceed to examine their claim to the high character which they have obtained. For this purpose the fever-powder may be selected, since if the impropriety and danger of its general use should be demonstrated, the arguments in favour of less celebrated secrets will not require a serious refutation,

Unpleasing as the task may be, and however odious, to some, it may render the man who undertakes it, yet the great importance of life and health requires, that the precepts of the most illustrious physicians should not pass without examination, nor secret and mysterious remedies be adopted with implicit faith.

The devout solemnity with which the fever-powder is ushered into the world, the exorcisms against detractors and malicious persecutors, and the invocation of God to support his own work, being in the usual stile of the mystical chymists, require no comment. *As there may be some, says the Inventor, whose lucrative views may tempt them to persecute me, and the method I propose, with all the detraction and falsehood which may be expected from self-interest and unprovoked revenge, these I shall advise to save themselves a good deal of unnecessary trouble, and to let it alone; for if it be of men it will come to nought,*
but

but if it be of God ye cannot overthrow it †. When magical chymistry and superstition reigned over the dark ages of ignorance, this charm would have secured it from all enquiry. But as the sober light of religion and philosophy hath now illuminated the world, and displayed the absurdity of that servile bondage which obstructed all improvement, we may, notwithstanding this solemn prohibition, with candor and modesty, proceed to examine the real merit of this boasted arcanum.

The process for making it has been carefully concealed, while its being an antimonial preparation, hath, with industry and ostentation, been universally published. From the view which has already been given of the natural history of antimony, its analysis and chymical properties, its preparations and their medical effects, it has, I

† *Dissertation on Fevers*, p. 6. London, 1770.

think, been clearly proved, that however efficacious it may have been in particular circumstances, and under judicious management, yet there is not, in unskilful hands, a medicine more dangerous and destructive.

By a judicious regulation of the doses of different preparations of antimony, by guarding against the pernicious effects which might arise from the virulent particles which it contains, by directing such food, drink, and medicines as may promote its salutary operation, and prohibiting those by which it might be rendered noxious; skilful and experienced physicians have been able, in singular instances, to render it a safe and efficacious remedy: but when it has been accidentally or imprudently given in too large doses †, or joined with such food or medicines as excite its poisonous qualities *, it has not only proved too violent in its

† See p. 57 and 58.

* See p. 24, 45 and 46.

operations, but has been productive of fatal consequences.

Had, therefore, the Inventor discovered a method of divesting this Proteus-like mineral of all pernicious qualities, and rendering it a medicine invariably safe and efficacious, however combined with other remedies, or mixed with a variety of humours, food, and drink in the stomach, his powder would have been more proper for common use, and might have been trusted, in unskilful hands, with less danger, than other antimonial preparations. But it does not in this respect lay any claim to superiority. *Supposing*, says the Inventor, *physicians perfectly well skilled in the preparation and uses of it, that knowledge will inform them, that nothing can be added to it that will in any degree increase its virtues; or rather that no addition can be made to it that will not diminish them* *.

* Introduction to the Dissertation on Fevers, p. 10.

By this frank declaration we understand that the fever-powder retains the mutability of antimony, and is, from slight accidents, changed from a salutary medicine to a noxious substance; and hence proceeds the Inventor's anxiety to prevent improper combinations. But the dread of dangerous consequences, or some other cause, has led him unwarily and inconsistently to depreciate his powder, and reduce it below all other antimonial preparations; for though by certain additions the virtues of antimony may be diminished, yet by others they may be improved; and this, it is probable, from the known properties of that mineral, will also hold with the fever-powder, although the contrary is here expressly asserted.

But, lest the assertion should give unfavourable impressions, it is immediately retracted; and we are told that, *occasion may sometimes occur of employing, advantageously,*

tagiously, a regimen, or even medicine, when judgment directs and integrity presides *. and again: It sometimes happens, when little or no putrid bile is contained in the stomach, bowels, &c. &c. that the powder, though given in the largest doses, will have no sensible operation of any kind whatever. In these cases half, or a whole paper should be repeated every four or six hours. But on those occasions, it will be proper to procure two stools in twenty four hours, either by a clyster, which is the most easy way, or by giving, with every dose of the powder, from five to ten grains of rhubarb †. But in some constitutions where a putrid bile has very much abounded, and for this reason the stimulus of the medicine, added to that of the bile, has been apt to operate more than was sufficient, it has been necessary to reduce the dose so low as two or three grains §: and thus, after a series of contradic-

* Introduction to the Dissertation on fevers, p. 11.

† Dissertation, p. 85.

§ Dissertation on Fevers, p. 91. *ibid.* p. 7.

tions,

tions, the fever-powder, as might have been expected, is declared to require the addition of other medicines, and to be as uncertain in its operation as other antimonials.

These contradictions are suspicious, but if the efficacy of the medicine is confirmed by authentic facts, the Inventor may still be intitled to our confidence; and for this purpose some cases are related in which it was successfully used: the first is that of Mrs. Morton, on which it is remarked, that *many gentlewomen were present during her whole disorder, saw her take the medicine, observed the effects, and are ready to give their testimony to the truth of what has been asserted* From what has been advanced on this subject, it clearly appears, that the operation of antimony is precarious, and its effects uncertain. Not only the most skilful physicians have given various and contradictory opinions concerning it, but

but the judgment of the same person has varied at different times † : it is not therefore to be expected, that a fact, which has not yet been agreed upon by the most intelligent and attentive practitioners, should be ascertained by these charitable *gentlewomen*, who, however sincere and humane their intentions might be, cannot be supposed to have any pretensions to that critical and discriminating skill which is necessary to determine a question so intricate. The Inventor therefore, in offering to the publick a proof so incompetent, must have relied on that credulity which, though generally abused, is still continued.

But though the cases had been attested by competent judges, yet the inferences in favour of the powder are not warranted by the circumstances related. Thus Mr. French of St. Albans street, late Surgeon of his Majesty's ship the *Levant*, “ *having given*

† See p. 62 and 63.

tartar emetic and other medicines unsuccessfully, prescribed the powder on the fourth day of the fever: it was continued on the fifth, and on the evening of that day, the fever being entirely removed, on account of the lowness and weakness of the patient, a drachm of bark was given every hour in a glass of Madeira.*” The misrepresentation, in this case, is evident, since the cure must be attributed, by candid and intelligent judges, not to the powder, but to the bark and Madeira; and the slovenliness of the deception is an insult to the credulity of the publick, as this is perhaps the only instance in which it has been pretended, on account of lowness and weakness, to give every hour a drachm of bark in a glass of Madeira.

These are not the only circumstances in which the evidence is deceitful; successful cases are industriously published, while those ending fatally

* Addenda to the Dissertation.

are carefully concealed. The medicine is frequently given in slight disorders which could not, even by improper management, be rendered dangerous, and when the sick recover, its praise is loudly proclaimed.

Those who use it often become insensibly interested in advancing its reputation, and are not only incompetent judges, but partial in their testimony. Thus some who, with horror and remorse have applied for assistance, accusing themselves of murder, and vowing, for ever, to renounce quackery, have afterwards triumphed and assumed the credit of cures of which they had absolutely despaired, though the sick were, by other means, rescued from the danger incurred by the severe operation of this violent remedy; while others, shocked by the fatal consequences of their facility and misplaced confidence, wish to banish it for ever from their remembrance. The cases must therefore be dismissed as in-

sufficient to justify the claim of infallibility to this antimonial preparation.

A proof of its salutary influence is attempted to be drawn from the bills of mortality. Fewer having, on an average, died in the space of thirteen years, from the year one thousand seven hundred and fifty, to the year one thousand seven hundred and sixty-three, than in the preceding thirteen years; this decrease in the funerals amounting to sixty-two thousand, two-hundred and sixty-six, is attributed to the fever-powder*.

It might with some plausibility be objected, that the bills of mortality being collected from the reports of incompetent judges, cannot be admitted as proper evidence of the fact; but as no extraordinary skill seems necessary for the employment, and as the bills cannot be supposed to be made up with any partial intention, this argument

* Introduction to the Dissertation, page 4.

must be admitted; and if the deaths, by fevers, shall be found to have decreased, in so great proportion, since the powder has been in general use, its reputation will be established by the most desirable evidence.

In collecting this proof, the whole circle of disorders, accidents and casualties has been calculated, though the powder was then only recommended for fevers. It has, indeed, been since extended to other diseases, but our examination shall be restricted to fevers, during the period to which the Inventor refers.

Though some of the cases which he relates happened in the year one thousand seven hundred and forty-one, yet the medicine was not much known till one thousand seven hundred and fifty, the æra from which its auspicious influence on the bills of mortality is dated. But antimonial medicines were more in fashion before the powder came into general use, than

at any future time. Dr. Huxham having, in the year one thousand seven hundred and thirty-seven, recommended, in the highest strain of panegyric, the *vinum benedictum*, it was universally adopted, though expressly condemned by the Inventor of the fever-powder. *Great numbers, says he, of those whose employment it is to attend the sick, cunningly exhibited to their patients something, which they asserted was like the fever-powder, and would do as well. I leave it to the relations of those who took the something, to judge the consequence, for I suppose few or none of them who were thus treated survive*.*

The something, it is well known, was essence of antimony or tartar emetic, medicines under the direction of prudent practitioners, similar in their operation and in their effects, not only to each other, but also to the fever-powder; and though the Inventor has perhaps too

* Introduction to the Dissertation, page 4.

much

much indulged his indignation against his competitors in the antimonial trade, yet his general position, concerning the fatal consequences of the universal administration of antimonial medicines, is well supported by the evidence to which he has appealed, the bills of mortality having greatly increased during the prevalence of that practice.

The numbers of those who died of fevers from the year one thousand seven hundred and thirty-eight, to one thousand seven hundred and fifty, including a series of thirteen years, is fifty-five thousand four hundred and ninety, and those in a like series of years, immediately succeeding, is thirty-six thousand three hundred and seventy-two; consequently nineteen thousand one hundred and eighteen fewer have died in the latter than in the former period, and this has, with some appearance of justice, been urged as a proof of the efficacy of the fever-powder.

But if this decrease in the funerals were actually owing to that medicine, it should have been still more observable in the last ten years, when the powder has been more universally used. But, in that period, thirty-five thousand four hundred and ninety-four have died, and consequently, the number of deaths, by fevers, have increased eight thousand seven hundred and eighty; and if inflammation, rash, and fore-throat, which were included in the former calculations, are added, the number will amount, nearly, to ten thousand, and therefore, on an average, *one thousand, or near one-third* more have died, of fevers, *every year*, in the last ten years, while the medicine has been universally used, than in the thirteen immediately preceding. The proof, therefore, from the bills of mortality is fatal to the fame of the fever-powder, and the decrease in the funerals during the thirteen years to which the Inventor appeals for the
success

success of his antimonial powder, must be attributed to the desertion of the antimonial practice, and not to its prevalence.

But an appeal to the sum-total of the funerals, to prove the efficacy of the fever-powder, is unfair and inconclusive, since a great number of deaths happen from disorders, accidents and casualties with which it cannot possibly have any connection. That it might have a fair trial, our calculation has been restricted to fevers; and if the other diseases, in which it is recommended, had been included, the evidence would have been still more unfavourable.

Another argument in favour of the powder is, *if it had not been attended with general success, it could not, amidst the opposition of Physicians, have grown into reputation.* But transitions, from the highest approbation of antimony, to the absolute condemnation of it, have been so frequent, and are so familiar

to those acquainted with its history, that no conclusion can be drawn from its casual reputation, or transitory condemnation; and since, in the course of our enquiry, no advantage has been taken of the penal laws enacted against its use, nor of the public edicts by which it has been prohibited, neither can any concession be made on account of the transient applause, *artfully*, obtained to some of its preparations.

As to the opposition of physicians, the Inventor, indeed, that the prophecy with which he set out might be fulfilled*, complains, that all laws human and divine, have been trampled upon in opposing him; that he has been persecuted with *malice, rancour, virulence, detraction and unprovoked revenge*, and that his enemies have not only sacrificed *candour, honour, truth and reputation*, but even the *lives* committed

* See page 72.

to their care, in order to discredit his boasted arcanum*.

Were we not witnesses of his triumph, we should naturally conclude that he had suffered as a martyr in the cause of truth and humanity. Yet we find, in his Dissertation, many cases in which the powder was given under the sanction of eminent physicians, and these, too, produced by the author, in proof of its efficacy; though by his own account of the medicine, it is of all others the most improper to be used without an accurate knowledge of its composition, and cannot therefore be prescribed by physicians on any justifiable principles; although they may, from facility or complaisance, yield to the importunity and prejudice of the sick or their relations, and assent, even against their better judgement, to its administration.

When the fever-powder is given, says the Inventor, no other medicine should be taken either with it, or during the course

* Introduction to the Dissertation on Fevers, pages 1st, 2d, and 10th.

of it. For want of this caution many have perished. For it may be depended upon, that in the state of credit in which it has at present the honour of standing amongst many of the medicinal worthies, nothing is meant by any addition, but to counteract or discredit the powder at the expence of the patient's life. It is usual for them to say, that they are acquainted with the preparation of the medicine, or that they cannot use a medicine that they do not know, just as either favours the present intention and purpose. Now let us suppose they do not know it, which is very true; by what conjuration, magic, or inspiration are they taught a method of improving, by adding something to a medicine, of which they are so totally ignorant, that they choose to suffer their friends to perish rather than employ it*.

It may be left to the Author to explain how those physicians, who do not

* Introduction to the Dissertation on Fevers, pages 9, 10.

use the powder, *kill* their friends, by adding something to counteract or discredit it, while from his own declaration, we may fairly conclude that those who *do use it*, must, in *his* opinion, be destitute either of judgment or integrity. *For supposing them, says he, perfectly well skilled in the preparation and uses of it, their behaviour is, for this very reason, abundantly more infamous. For the same knowledge would inform them, that no addition can be made to it that will not diminish its virtues* *.

But so far is this heinous charge of committing *murder* to discredit the powder from being supported by any shadow of proof, that physicians, on the contrary, have been complaisant to excess, or culpably indolent, in suffering the many *misrepresentations* concerning this medicine to pass uncensured and unexposed; and those who, from the most laudable principles, have

* Introduction to the Dissertation on Fevers, page 10.

refused to adopt it, are wanting to themselves, to their profession, and to the public, in neglecting to explain the honourable principles on which they have acted; while others from different motives, *which they can best justify to themselves*, have acquired fame and fortune by a *studied* compliance with the popular prejudices in favour of this fashionable remedy.

In the course of more than twenty years practice, though I have never prescribed this medicine, yet, I have not, after fairly declaring my opinion, opposed its being given, when desired by the sick or their relations; and as the cure, where I have been concerned, has been wholly committed to it, without the addition of any medicine, or even regimen, excepting what is prescribed in the printed directions, or what the Inventor himself has ordered, some fair opportunities have occurred of observing its effects, to which, and

to

to every other information that could be obtained, with a mind open to conviction, I have carefully attended. But in this, as in all our former researches, the evidence has been unfavourable to the fame of the powder.

In some instances it has occasioned fainting, convulsions, and other violent symptoms, which terrified those who gave it. In all which I have seen, it has proved unsuccessful, though, in some cases the cure has afterwards been accomplished by safer methods; and in those where it was too late to use other remedies, the sick have died, although it was probable they might have recovered by a different management, which has succeeded in similar instances, but from an abused and misplaced confidence, has too often been set aside to make way for this favourite medicine.

An argument still remains in favour of the powder drawn from the credit due to its Inventor. If that is im-

peached by what has already been advanced, it is only by the force of the evidence, since all personal application has been avoided. But as the reputation of the medicine is chiefly supported by an implicit confidence in the Inventor, it is necessary, however unpleasing, that this should also be considered.

When our assent is demanded, on the credibility of the relator, to any fact which we are not permitted to examine, we can only judge of its probability from his known accuracy and ability. Several specimens of these have occurred in the course of our enquiry. Quotations have been misrepresented*. Authorities misapplied †. Evidence produced which establishes facts, directly opposite to those in support of which it is perverted§. Palpable contradictions have been pointed out †; and an air of mystery and de-

* See page 18—22. † Ibid. § Ibid. and page 79, 80, 86, and 87. † Page 75—78.

votion detected, the tendency of which, when joined to a train of suspicious circumstances, cannot be mistaken †.

But the inaccuracy betrayed in the directions given with the powder, is sufficient to put us on our guard. *The best general and plain direction, we are told, is to repeat half a paper, or ten grains and a half of the powder once in six hours **, but in South America they seldom give less than twenty, which the Inventor *thinks right †*, yet when it fell under the direction of the navy-surgeons, the general rule which was avowedly intended, and is still continued, for the common people, was found to be fraught with danger, and the Inventor admits that it has been necessary to reduce the dose so low as two or three grains ‡, thereby acknowledging *the best plain general direction, to be a very*

† See page 72, and 73.

* Dissertation on Fevers, p. 84.

† Ibid. p. 81. ‡ Ibid. p. 91.

improper one for the common people, since no good reason can be assigned, why ten or twenty-one grains should be given by those who have no medical skill, though it is judged necessary to warn others, who may be supposed capable of conducting its operation, and detecting and counteracting its pernicious effects, of the necessity of reducing it, in some cases, to two or three grains. The only solution of this paradox, is, there is one faith for the learned, and another for the unlearned.

But not to insist on the contradictions abounding in this dissertation, one more only shall be mentioned. No addition, it has been said, can be made to this medicine, by which its virtues will not be diminished, and that assertion has again been retracted; but as one affirmation is as good as another, that there may be no doubt which is to be credited, the Inventor *being extremely cautious of leading any one*
into

into error in an affair of so much importance as is that of life, thinks it imprudent to neglect repeated bleeding, purges, clysters, and all other assistances which the art of medicine can afford †, and is obliged to own, that, as he esteemed life too sacred to be hazarded for the sake of an experiment, he had never neglected to call in all other medical aids to his assistance when he thought the case required them, and believed they would be of service ‡. But though he is extremely cautious, and though life is too sacred to be hazarded, yet the experiment of using the powder without any addition or aid, is still to be tried throughout the whole British dominions, and in other parts of the world, where our commerce has conveyed it*; excepting by the Inventor and the Navy Surgeons, who being persons versed in practice will readily distin-

† Dissertation on Fevers, p. 76.

‡ Dissertation on Fevers, p. 70.

* Introduction to the Dissertation on Fevers,

guish when the rules laid down are punctually to be followed and when not †.

The real motives assigned for these contradictions and this mysterious conduct, waving whatever artifices might be employed by way of palliation or disguise, are represented without reserve, and with that sincerity which will stand the strictest scrutiny. The Inventor was very cautious of divulging a medicine of such vast importance, because if it failed of success, it would subject him to infinite reproach. He was so ignorant as to expect assistance and applause from every one concerned in any branch of physic, not considering that a miliary or nervous fever of twenty days continuance, was attended with greater emoluments than one that terminated in two or three. But he had soon an opportunity of discovering his error, for some became his avowed enemies, without the least pretence to any provocation; whilst others, with the coun-

† Dissertation on Fevers, p. 90.

tenance of friendship, pointed a dagger to his breast ‡, and therefore, after a contest between simplicity and caution, ignorance and shrewdness, the unsuspecting Inventor thought it time prudently to consult his own interest, and the advancement of his private fortune, by securing to himself the exclusive privilege, and putting it out of the power of others to disguise, misrepresent, deny, or forge facts †.

Thus, from the parade, ostentation, and mysterious secrecy, with which this medicine has been published, from its resemblance to the Berlin specific febrifuge, from its being prepared from an arsenical mineral, and easily converted into a noxious substance; from the difficulty of ascertaining the dose, and conducting its operation, and from the necessity of calling in other medi-

‡ Dissertation on Fevers, p. 72.

† Dissertation, p. 72.

cal aids to its assistance; from the incompetency of the generality of the witnesses in its favour; from the unfair conclusions drawn from their testimony; from the dangerous symptoms and fatal consequences, which have followed its administration; from the inaccuracy and inconsistency of its Inventor; and from the increase of the bills of mortality during its general use, it appears, not only, that no proof of its salutary efficacy has been produced, but that many circumstances and facts, which have been perverted to that purpose, concur to demonstrate its general and indiscriminate application to be highly dangerous to mankind, to whom, to borrow the language of the Inventor, *it is not material, whether they lose their lives by ignorance, mistake, or design.*

A D V E R -

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