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by

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FORMULARY

FOR THE

PREPARATION AND MODE OF EMPLOYING

SEVERAL

NEW REMEDIES;

NAMELY,

MORPHINE, IODINE, QUININE, CINCHONINE, THE HYDRO-CYANIC ACID, NARCOTINE, STRYCHNINE, NUX VOMICA, EMETINE, ATROPINE, PICROTOXINE, BRUCINE, LUPULINE, &c. &c.

WITH

AN INTRODUCTION, AND COPIOUS NOTES.

BY THE LATE

CHARLES THOMAS HADEN, Esq.

Translated from the French of the Third Edition of MAGENDIE'S "*Formulaire.*"

By ROBLEY DUNGLISON, M. D.

Professor of the Institutes and Practice of Medicine, in the University of Virginia; F. R. S. Nancy; F. L. S. Paris; Secretary for Foreign Correspondence to the Medical, and Member of the Hunterian Society of London, &c.

REVISED AND CORRECTED BY A PHYSICIAN OF PHILADELPHIA.

WITH AN APPENDIX.

PHILADELPHIA:

PUBLISHED BY JAMES WEBSTER, AT THE OFFICE OF THE MEDICAL RECORDER, NO. 24, S. EIGHTH ST.

1824.

PREFACE

TO THE

FIRST AMERICAN EDITION.

THE rapid sale MAGENDIE'S FORMULARY has met with in Europe, and the high encomiums passed upon it by the most respectable Journalists, it is presumed, cannot fail to ensure it similar success on this side of the Atlantic.

The Appendix added to the present edition, the Editor flatters himself will render the work still more valuable to the *Practitioner* and *Student.*

Philadelphia, November, 1824.

PREFACE

TO THE SECOND LONDON EDITION.

Owing to the lamented death of the Author of the first edition of this little Manual, and the favourable reception which the work has met with from the Profession, the whole of the first impression having been sold off in an unusually short space of time, the present Editor has been requested to prepare a new edition for the press: he has accordingly endeavoured, by the addition of all the important information which has appeared since the first edition was sent forth, on the various subjects embraced by the Formulary—as well as of a copious Index, Posological Table, Tables of the proportion of active ingredients contained in the various compounds, the Latin synonyms, &c.—to render the work more extensively useful, not only to the prescriber, but also to the compounder.

ROBLEY DUNGLISON.

15, *Fenchurch Street, April 8th*, 1824.

THE

TRANSLATOR'S PREFACE

TO THE FIRST EDITION.

GREAT credit is due to the French chemists, and especially to MM. Pelletier and Caventou, for having discovered that the active principle of several of our chief remedies resides in peculiar alkalis; and also for isolating these alkalis so that they may be used in practice according to a determinate and intelligent principle. Great praise is also due to M. Magendie for the indefatigable way in which he has investigated the action of these new alkalis on the human body. It cannot, therefore, be unacceptable to all classes of the Medical Profession, to have laid before them a translation of M. Magendie's little work respecting them. To druggists, and to operative apothecaries, it must be acceptable to have thus collected a full account of the mode of preparing these different alkalis; and it must be acceptable to the practising part of the Profession, to have thus collected all that is at present known respecting the properties and mode of exhibition of these powerful remedies.

M. Magendie, however, in his preface, avows a principle respecting the similarity of the action of poisons and other new remedies on man and on animals, which, perhaps, ought to be taken with some caution. M. Magendie is probably correct in the main; and we are bound to place much dependence on an assertion made by such a man as he is, when he says that the truth of his opinion has been proved by ten years' experience. If, indeed, we can believe what we read in Withering's Botany, M. Magendie cannot be entirely correct; because we see statements in that work of many plants being poisonous to one animal, and often also to man, whilst they are harmless when eaten by others, even of the higher class of animals. It is very well known, also, that the doses of different medicines vary so largely when given to the different domestic animals, as to afford comparative deductions, which, if we were to apply the information thus gained to the exhibition of the same remedies in man, would often lead us to err greatly, either as to giving the medicine in an under or over dose. It is perfectly well known, too, that there is perhaps none, even of the most virulent vegetable poisons, which does not afford nourishment to one or more individuals of the lower class of animals.

Nevertheless, as it is rational to believe that M. Magendie's principle is correct, and that the cases mentioned in opposition to it, are only those exceptions which we find appertain to all our general and artificial principles, these cases should only teach us caution in the application of the principle to practice.

There exists, however, an objection to the principle of thus isolating and concentrating the active parts of our remedies. Perhaps every practitioner feels that medicinal substances are more efficacious as they are presented to us combined by the hand of Nature, than when their active part is isolated and recombined by the hand of man. Thus then we are all inclined to give our remedies in substance, as it is called, rather than as prepared in a more convenient form by the chemist or the druggist; and we are only deterred from using these natural preparations by the greater bulk, and other inconvenient properties of them, as compared with our more artificial preparations. Thus, also, we all feel that our artificial mineral waters, however accurately they may imitate the natural ones, do not produce the same good effect as those natural ones do; and even some of them, for instance the Bath waters, appear on analysis to be so pure, and free from extraneous ingredients, that we are re-

duced to the necessity of attributing their often powerful effects to the presence of some evanescent principle, which cannot be detected by chemical analysis.

It is probable, that if these objections were rigorously investigated, it would be found that there is but little truth in them. The superficial grounds on which most men take up their opinions, are very likely to lead to error in cases like this, where so many collateral circumstances are to be taken into the account. Medicines, for instance, in the form of extract, are not usually to be depended on; but that much of this arises from the action of heat on the remedy, and much on other injurious modes of preparation, is proved by the great improvements that have been lately made in the preparation of extracts. And even with regard to the mineral waters, it is a fair question whether the artificial substitutes for them would not be equally efficacious, if taken exactly under the same circumstances, and the takers were made to believe that they were swallowing the natural and not the artificial production?

At all events, if we take these isolated and concentrated remedies as they are, we find that at least many of them are endowed with peculiar and powerful properties; and as nobody can deny that it is far more convenient to use

remedies which are thus small in bulk, we have only to take such remedies as if they were simple remedies, and investigate their properties as we would those of any natural production, and we have no right to find fault.

In this point of view the several advantages pointed out by M. Magendie in using remedies thus concentrated and freed from their nauseous and often jarring principles, stand good in full force; and we often find particular patients, and especially children, so averse to take medicine in the ordinary form, that life is often lost by the delay which is thus produced, or even by the injurious excitation which offering medicine to such persons frequently occasions.

A further objection to the employment of these remedies remains. The expense of preparing them is very great. It is to be hoped, however, that such improvements will in future be made, as will obviate these inconveniences in a great degree.

The Translator, however, cannot refrain from mentioning one species of objection to the adoption of such new forms of remedy, because he considers it to be a superficial one, and an injurious one too; for it is subversive of one of our best means of improving the therapeutical branch of our profession. He is almost angry when he sees the popular authors of the day

sneering at the introduction of new remedies, and saying, with what he considers to be an ignorant self-conceit, "Ay, here they come, one after another, vaunted to the skies for properties which sober investigation shows not to belong to them; we shall soon see them laid on the shelf, until they are again held up to the world as prodigies by some future enthusiastic searchers after novelty." How humiliating such remarks are to the person who makes them! for it is easy to prove, that in the great majority of cases, the sneer is applicable, not to the remedy, but to persons who are too ignorant or too indolent to investigate its properties so thoroughly as to use it with success. Men who really think for themselves, and are not content with conclusions unless they are drawn from an accurate and philosophical consideration of *all* the circumstances of each individual case, know full well, that the trials of new remedies which are made by the Profession at large, are so superficial and inconclusive, as to be a disgrace to themselves, and not worthy of the slightest attention when the value of such remedies is under discussion. It should be recollected, that the majority of persons who bring forward a new remedy, have studied the properties of the remedy more or less accurately—at least enthusiastically; and it is too much

to give the direct lie to their assertions. It cannot be doubted that most of them have done with the remedy what they say they have done; and it would be at least cautious, as well as properly humble, if those who come after the first promulgator were to ask themselves, before they condemn the remedy, if they have taken sufficient pains to make themselves as well acquainted with its powers as the promulgator had done.

To show to what an injurious extent the practice of superficially sneering at new remedies exists, the Translator cannot help recording the observations of one of the chief London medical men respecting the stethoscope. He laughed at it as a piece of quackery. He was asked if he had ever used it, or personally knew any thing about it, or if he had read Laennec's book? He answered, no!

It will be easy to illustrate these apparently severe remarks. Take any of the depreciated remedies, and will it not be seen that many individuals exist in the Profession who have the power of using them with equal, if not greater effect than the original promulgators had done? Digitalis, for instance, is decried by the great majority of practitioners; and yet the Translator knows one practitioner at least who uses it largely, and with the very best effect. But then

he does not order *so* many drops of the tincture to be taken *so* often, and then leave his patient to take his chance; but he increases every dose until he produces the effect which he wishes: besides, he has industry enough to watch the effects which follow each dose; so that he at once acquires a full power over the remedy, and secures his patient from the injurious consequences of an over-dose. If the rest of the Profession acted with the same acuteness and industry, they would probably change their opinions with regard to the powers of digitalis.

The same observations apply to these use of prussic acid, colchicum, and many other remedies, which are now sneered at by ignorant or idle persons.

Indeed, it may be said that they apply almost equally to our most common remedies. Few *study* the powers of any remedy as they ought to do; and hence they use calomel to purge or to salivate—ipecacuanha to produce sickness—and so on, without ever dreaming that all these remedies have much more important powers, if industry were employed in searching for them. Thus many persons use calomel beneficially for several purposes; and one, at least, with whose practice the Translator is acquainted, has taught himself the power of employing ipecacuanha, not only as what may be called a

new and most efficacious remedy in certain extensive classes of disease, namely, those of the mucous membranes, but to use it as a powerful means of subduing general increased action.

Again, if a review be made of the different new remedies which have been lately proposed, will it not be seen that each of them is pretended to have certain peculiar and distinctive properties, which, if they really belong to them, are greatly to be valued when properly applied to the treatment of disease? Digitalis, for instance, seems to exert a direct influence on the action of the heart and arteries. Colchicum appears to do the same thing, with the addition o a purgative quality. Prussic acid seems to have similar powers, with the additional one of appearing to act particularly on the mucous membranes. Strychnine, in like manner, is said to exert a peculiar influence over the nerves which supply muscles with their energy; or perhaps it has the power of increasing the irritability of the muscles themselves. Iodine seems to possess a similar stimulating power, which is particularly expended on that part of the system which is called lymphatic.

It need not be said, that it is very advantageous to possess remedies (if we do possess them) of such useful as well as distinctive powers; and, therefore, it is to be hoped that me-

dical men will cease to humiliate themselves by superficially sneering at new remedies, until they have qualified themselves to give an opinion, by faithfully and industriously investigating the real properties of these remedies.

Lastly, the fact that some of these remedies produce inordinate effects on particular persons, forms no reason for discarding them from practice; because the same fault appertains even to our most favoured remedies. The Translator has seen the sixth of a grain of tartarized antimony vomit and purge an exceedingly robust farmer, until it brought his life into danger; cases are on record in which persons could not bear even the smell of ipecacuanha; and the Translator has seen four grains of calomel produce a violent and even dangerous salivation. On the contrary, he has used colchicum almost as largely as any man; and yet he can say that it produces those unlooked-for bad consequences quite as seldom as any of the three remedies he has mentioned above:* and he

* The following anecdote is decisive of the safety of using colchicum, and of its utility. A gentleman, whose practice as a general practitioner exceeds £3000 a year, and who uses colchicum (principally the powder) as his general remedy for inflammatory complaints, lately told the translator that only two persons had died in his practice during the preceding twelve months; one

knows that a practitioner, who is spoken of in a former page, rarely, if ever, sees inconveniences produced by digitalis in his practice, although he sometimes pushes its use to an extent which would frighten less accomplished practitioners; but then he uses it with a philosophic caution, and a determinate object, which are well worthy of imitation by the Profession at large.

The Translator has added Notes, which comprise a reference, he believes, to almost all the authorities on the subjects treated of. He wishes he could add records of the several remedies having been employed by British practitioners; but, with the exception of the prussic acid and iodine, which have been somewhat extensively used, he believes that the other preparations have not been even seen in this country, except as matters of curiosity. It were to be wished that M. Magendie had given the particulars of his experience of their prescription in the human subject. Several French Journals, and especially his own excellent *Journal de Physiologie*, contain an abundance of cases in which the sulphate of quinine has been

of the two having been a phthisical patient, and the other an old lady who had gradually sunk, worn out by an illness of three years' continuance.

used with marked benefit in the latter stages of malignant fevers, in all forms of intermittent fever, and especially in many varieties of neuralgia; but the Translator is ignorant that any published cases exist in which the other alkalis have been employed.

N. B.—In addition to the Notes added by the Translator, it may be remarked, that a good general article on the properties of the new alkalis may be found in the *Edinburgh Medical and Surgical Journal*. It is in Number LXX. for January, 1822.

Sloane Street, May, 1823.

AUTHOR'S PREFACE.

In spite of the opposition of the physicians of the seventeenth century—notwithstanding the celebrated decree of parliament which proscribed emetic tartar—and in spite of the spiritual sarcasms of Guy Patin—the utility of antimonial remedies has been long recognised. For once, at least, prejudice gave way before evidence.

The same thing, I trust, will occur with other new substances which chemistry and physiology hold out to us as valuable remedies; and that the repugnance with which many enlightened practitioners look on them, will soon disappear before the results of an experience which daily shows their advantages.

The impossibility of isolating by chemical analysis the elements of medicines, has much retarded the progress towards perfection of the materia medica; and even now, when such an analysis can be made, the belief that existed, and which still exists in some degree, that medicines act altogether differently on man to what they do on animals, has prevented the ultimate

principles of remedies from being investigated. Still nothing is more unfounded than this belief. A varied experience of more than ten years, both in the laboratory and at the bedside, induces me to affirm, that medicines and poisons act in the same manner on man as on animals.* I am so sure of this, that I would willingly try on myself substances which have been proved to be innocent when given to animals; but I would not recommend any one to make the experiment inversely.

The physiological properties and medical virtues of most of the substances described in this Formulary, have been determined by a reference to the above principle.

These substances, which are already sufficiently numerous, act when given in small doses; every principle which might mask or hinder their action has been separated from them; their effects bear a decisive character, which cannot be misunderstood, for they have been studied with care both on animals and on man when in health and when in disease; a perfect knowledge of their chemical properties, and great accuracy in their mode of preparation, are sufficient to secure uniformity with regard

* See remarks on this important observation in the Translator's Preface, p. viii.—Tr.

to their strength and manner of action; and, lastly, each of them forms a medicine in its most simple and energetic state.

Time alone can pronounce definitively on the advantages and inconveniences of these new remedies; but whichever way it may be, the following pages may be useful, by teaching the mode of preparing them, without making it necessary to consult general treatises on chemistry or pharmacy; and by giving medical men every facility in submitting them to personal experience, which is frequently, after all, the only truly profitable course.

I shall feel extremely grateful for any critical or other remarks appertaining to the substances treated of in this work. To those of my medical brethren who may be kind enough to address them to me, I return my thanks beforehand; and I shall hasten to turn them to the improvement of science, by inserting them in the next edition.

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ERRATUM.

At page 103, Note, for *M. Carzoneri*, read *M. Canzoneri*.

Dan.l Lacus
June 6th 1829.

FORMULARY, &c.

MORPHINA[a]. MORPHIUM, MORPHIA.

Morphine.

NOTHING better shows the imperfection of the science of medicines, so singularly denominated *Materia Medica*, than the history of opium; alternately it has been proscribed as eminently hurtful, or vaunted as a pana-

[a] [The ending in *ina* has been preferred, inasmuch as errors will be less likely to arise, from the greater dissimilarity between the terminations of the names of the plant and its base, than when any other of the terms which have been proposed are employed: as regards *strychnia* no inaccuracy need have been apprehended; but the terms *cinchonia*, *veratria*, *solania*, *atropia*, are so similar to those of the plants of which they are the bases, that, especially if the words were abridged, the occurrence of many mistakes might be apprehended. Added to which, those bases, as *morphina* and *emetina*, which have been admitted into the Parisian Pharmacopœia, have been latinized according to the plan here adopted.]

cea. By some it has been supposed to calm, and procure sleep; others, on the contrary, have averred that it is always a stimulant: whilst others, less exclusive, have described it to have stupifying, soporific, narcotic, acrid, calming, and other properties. Led by this latter *dictum*, the chemists of the last age endeavoured to find the divers properties of opium in different principles. On the other hand, the most celebrated physicians have not scrupled to put their names to certain preparations of opium which they thought preferable to any other. What effects are there, however, to authorize the celebrity of the laudanum of Sydenham—Rousseau's drops—the tinctures of opium—the syrups of diacodium—the resinous and aqueous extracts, &c.? And what reason is there why a practitioner should employ any of these preparations to the exclusion of the others?

The sciences mutually depend upon, and assist, each other; and it would have been impossible to remedy this uncertainty without the recent perfection in our chemical modes of analyzing vegetables, and without the successful application which has been made of them in analyzing opium.

The result of this chemical analysis, and especially of the researches of MM. De-

rosnes,[b] Sertuerner,[c] and Robiquet,[d] is, that opium is composed, 1st, of a fixed oil; 2dly, of matter analogous to caoutchouc; 3dly, of a vegeto-animal substance, which has not yet been sufficiently investigated; 4thly, of mucilage; 5thly, of feculent matter; 6thly, of resin; 7thly, of the remains of vegetable fibre; 8thly, of narcotine; 9thly, of meconic acid; 10thly, of the acid discovered by M. Robiquet; and, 11thly, of morphine. This last principle will alone occupy us on the present occasion.

PREPARATION OF MORPHINE.

M. Robiquet's method is as follows:[e]—He boils, for a quarter of an hour, a very

[b] In 1803. See *Annales de Chimie*, vol. xlv.—Tr.

[c] *Ibid.* vol. v. His principal paper was published in 1817.—Tr.

[d] *Ibid.* vol. v. p. 276.—In addition to these gentlemen, M. Seguin, in 1804, discovered a crystalline body in opium, and described most of its properties; but he seems to have been perfectly unaware of its alkaline qualities. *Ibid.* vol. xcii.—Tr.

[e] *Annales de Chimie et Phys.* vol. v. p. 276.—Dr. Paris (*Pharm.* vol. ii. p. 313) gives the following as M. Robiquet's process, as contained in the *Codex Medicamentarius* of Paris, of 1818:—"Three hundred parts of pure opium are to be macerated, during five days, in one thousand parts of common water. To the filtered solution fifteen parts

concentrated solution of opium with a small quantity of magnesia, (10 grains [gr. 8.2 troy] to the pound of opium, [15 oz. 6 dr. 1 gr. troy[f]]). He collects the greyish and somewhat abundant deposit on the filter, and washes it with cold water. When this precipitate is well dried, he treats it by weak alcohol for some time, at a temperature less than that of ebullition. By this means he separates very little morphine and much colouring matter. He filtrates and washes the precipitate by means of a little cold alcohol; then strongly boils it in a large quantity of

of perfectly pure magnesia (carefully avoiding the carbonate) are to be added. Boil this mixture for ten minutes, and separate the sediment by a filter, washing it with cold water until the water passes off clear. After which, treat it alternately with hot and cold alcohol 12-22° Beaumé, (or s. g. 923), as long as the menstruum takes up any colouring matter. The residue is then to be treated with boiling alcohol of 22-32° Beaumé, (or s. g. .868,) for a few minutes. The solution, on cooling, will deposit crystals of morphia."—Tr.

[f] Mr. Thomson says 184 grains to the lb. of opium, which is probably a mistake; because, although he quotes from M. Robiquet's paper in the *Annales de Chimie*, his words are, "boil, &c., *with a small quantity* (184 grains to lib. 1. of opium) of magnesia." 184 grains is not a small quantity.—Tr.

rectified alcohol; filtrates again whilst the liquor still boils, and he finds that the morphine separates as the liquor cools. The colouring matter is got rid of by repeated crystallization.[g]

[M. Choulant recommends a dilute aqueous infusion of opium to be concentrated and left at rest, until it spontaneously lets fall its sulphate of lime in minute crystals; the liquor is then evaporated to dryness, the residuum dissolved in a little water, and any remaining lime and sulphuric acid thrown down by the cautious addition, first, of oxalate of ammonia, and then of muriate of barytes. The liquid is next diluted with a large body of water, and caustic ammonia added so long as any precipitate subsides. This is dissolved in vinegar, and thrown down again with ammonia. The precipitate is digested with about twice its weight of sulphuric ether, and the whole thrown upon a filter. The dry powder is to be digested three times in caustic ammonia,

[g] Mr. Thomson obtained "from good *Turkey* opium nearly three times the quantity of morphine yielded by the same weight of *East Indian* opium. That from the latter was also more coloured and in smaller crystals." This fact sufficiently accounts for the superiority of the opium from Turkey.—Tr.

and as often in cold alcohol. The remaining powder being dissolved in twelve ounces of boiling alcohol, and the filtered hot solution being set aside for eighteen hours, it deposits colourless transparent crystals, consisting of double pyramids. By concentrating the supernatant alcoholic solution, more crystals may be obtained.[h]]

Dr. Thomson has given the elementary composition of morphine in the Annals of Philosophy for June, 1820.[i] He also there describes what he considers to be an easy method for procuring this base in a state of purity. He precipitates a strong infusion of opium by caustic ammonia, separates the brownish-white precipitate by means of the filter, evaporates the infusion to a sixth of its volume; and on mixing it with a fresh quantity of ammonia, he obtains a new precipitate of pure morphine. He gives time for the deposit to form; then separates it, by means of the filter, and washes it with cold water. After it is sufficiently drained, he sprinkles it with a little alcohol, which he permits to pass through the filter; this fluid dissolves a large portion of the colour-

[h] [Ure's *Dictionary of Chemistry*, 2d edition, 1823.]

[i] It is useless to give this account, because Dr. T. himself shows that it must be inaccurate.—Tr.

ing matter, and also a little of the morphine. He then entirely dissolves the morphine in acetic acid, and takes away the colouring matter which remains, by treating the solution with a little ivory-black, shakes this mixture often during twenty-four hours, and then throws it on the filter. The liquid passes through entirely colourless; and on treating it again with ammonia, the morphine is precipitated in the form of a white powder. If this base be then dissolved in alcohol, and the solution permitted to evaporate spontaneously, the morphine crystallizes in the form of beautiful regular crystals. These crystals are perfectly white, have a slight opaline transparency, are entirely devoid of odour, and have an extremely bitter taste. They appear in the form of rectangular four-sided prisms.

Sertuerner also uses ammonia, instead of magnesia, to decompose the natural meconate. He then forms a sulphate of morphine by adding sulphuric acid, which he again decomposes by means of ammonia; and after dissolving the free morphine in boiling alcohol, he obtains it in crystals, as the liquor cools. This latter method is said, however, to form an impure coloured salt, and also not to yield as much morphine as those described above.

[Mr. Brande has lately given the following estimate of the relative proportions of the ultimate elements of morphine:

Carbon	72.00
Nitrogen	5.50
Hydrogen	5.50
Oxygen	17.
	100 [k]

ACTION OF MORPHINE ON MAN AND ON ANIMALS.

Pure morphine being but little soluble, would scarcely seem to form the narcotic part of opium.[1] Nevertheless, direct experiment has abundantly proved that such is the fact. For example, even the weak dose of a quarter of a grain, or half a grain (gr. .205, or 0.41 troy) of morphine, dissolved in oil, produces effects very markedly narcotic; but this narcotic power becomes very manifest when the morphine is combined with acids; because the salts of mor-

[k] [*Journal of Science*, &c. No. 32.]

[1] It must be recollected that morphine does not exist free in opium. It is united to the meconic acid, and is thus in the state of a salt of morphine. Should not the meconate be made and tried, it being the natural preparation?—Tr.

phine are more soluble than the morphine itself.[m]

I employed the acetate, the sulphate, and the hydrochlorate, of morphine, as remedies, nearly three years ago; and found that these salts afford all the advantages which we can expect to meet with in opium, without having any of its inconveniences.[n] As my first trials showed that the hydrochlorate was less useful than the acetate and sulphate, I soon discontinued my researches on that salt. Perhaps it would be well were they resumed.

MORPHINÆ ACETAS.

Acetate of Morphine.

This salt is formed by combining directly, in an evaporating dish, acetic acid and morphine, and letting the mixture slowly evaporate to dryness. The difficulty of obtaining it crystallized, on account of its extreme deliquescence, renders it necessary to adopt this mode of preparation.[o]

[m] See MM. Orfila and Magendie's experiments on this subject in the *Nouveau Journal de Médecine*, tom. i. p. 123.—Tr.

[n] *Nouveau Journal de Médecine*, Paris, 1818.

[o] The *acetate* of *morphine* crystallizes in soft silky prisms, which are very soluble; the *sulphate*,

[The acetate of morphine has obtained a place in the Paris Pharmacopœia, and the following directions are laid down for its preparation: "Take of morphine 4 parts; distilled water 8 parts; dilute the morphine in a porcelain vessel, afterwards add acetic acid s. g. 1.075, until turnsol paper becomes scarcely converted red: evaporate the solution to the consistence of syrup. Continue the evaporation slowly, either in the sun or in a stove; collect the salt, and reduce it to powder.[P]]

MORPHINÆ SULPHAS.

Sulphate of Morphine.

Dissolve the morphine in sulphuric acid previously diluted with water. The solution, made hot and evaporated to a certain point, crystallizes, on cooling, in silky tufts. This salt very much resembles the sulphate of quinine, with which it may be confounded; but it becomes red when treated

in arborescent or branching crystals, soluble in two parts of water at 60°; the *carbonate*, in short prismatic crystals, soluble in four parts of water at 60°. (Thomson's *Dispensatory*, p. 419.)—Tr.

[P] [*Codex Medicamentarius*, sive *Pharmacopœia Gallica*, 1818. P. 387.]

with concentrated nitric acid, which is not the case with the sulphate of quinine.

[The Paris Pharmacopœia directs 6 parts of morphine to 12 of distilled water to be used, and that the sulphuric acid should be diluted with twice its bulk of water, and added to the morphine, until turnsol paper is no longer converted red.]

MODE OF PRESCRIBING THE SALTS OF MORPHINE.

As it was my desire to form officinal preparations of the salts of morphine, which should resemble as closely as possible the most common preparations of opium, I first made a syrup of morphine according to the following formula :—

SYRUPUS MORPHINÆ ACETATIS.

Syrup of Acetate of Morphine.

Take of

Perfectly clarified syrup . . 1 pound (15 oz. 6 dr. 1 gr. troy).

Acetate of morphine . . . 4 grains (gr. 3.281 troy).

Form a syrup which will supply the place of the syrup of diacodium; and the more advantageously, as the latter preparation is, as it were, arbitrary, and therefore not uniform.

The syrup of morphine is at present generally used in Paris. The dose is two tea-spoonfuls (*cuillerée à café*)[q] every three hours. Sleep, however, is often produced by a much smaller quantity—by two tea-spoonfuls, for example, given at bed-time in a little water.

SYRUPUS MORPHINÆ SULPHATIS.

Syrup of Sulphate of Morphine.

Take of
Perfectly clarified syrup . . . 1 pound (15 oz. 6 dr. 1 gr. troy).
Sulphate of morphine . . . . 4 grains (gr. 3.28 troy).
Form a syrup.

The dose is the same as that of the syrup of acetate of morphine.

I employ this syrup when patients have become accustomed to the action of the syrup of the acetate: for, generally speaking, by varying the salts of alkaline medicines, their action on the animal economy may be kept up for a very long time, and

[q] [In the first edition the *cuillerée à café* was incorrectly rendered, Anglicè, "a *tea-spoonful*;" whereas its capacity is two drams, French; or, at least, two tea-spoonfuls, English.]

without increasing the dose too considerably.[r]

GUTTÆ ANODYNÆ.

Anodyne Drops.

Take of

Acetate of morphine .	16 grains (gr. 13.12 troy).
Distilled water . . .	1 ounce (7 dr. 52.5 gr. troy).
Acetic acid	3 or 4 drops.
Alcohol	1 gpos (gr. 59 troy).

To keep the salt in solution.

These drops are a good substitute for liquid laudanum, Rousseau's drops,[s] tincture of opium, &c.

[r] Some English writers have denied the truth of this observation; but they have not given any reason for their scepticism. Why should it not be true?—M.

[s] Rousseau's drops resemble the black drop. The mode of forming them is as follows:—"Take of white honey ℥xij. (11 oz. 6 dr. 30.72 gr. troy); warm water ℔iij. (oz. 47.203 troy); dissolve the honey in the water; pour the mixture into a matrass, and place it in a very warm situation: when the fermentation commences, add 4 ounces (3 oz. 7 dr. 30.2 gr. troy) of opium, previously dissolved in ℥xij. (11 oz. 6 dr. 30.7 gr. troy) of water; suffer the fermentation to continue for a month, in a situation the temperature of which is 30°

The dose is from 6 to 24 drops. The sulphate of morphine may be used instead of the acetate, if it be thought proper.

[As, however, the above drops are apt to allow of the morphine being deposited when kept for a short time, the present formula had better be substituted:—

LIQUOR MORPHINÆ ACETATIS.

Solution of Acetate of Morphine.

Take of

Acetate of morphine	gr. 16
Distilled water	℥vj.
Dilute acetic acid (P. L.) . .	℥ij.]

Besides these forms of prescription, the acetate and sulphate of morphine may be given in pills, in electuary, in draughts, or in mixtures; the dose being from a quarter of a grain to a grain (from gr. 0.205 to 0.82 troy), in the twenty-four hours.

(86° Fah.); then strain, filter the liquor, and evaporate it until only 10 ounces (9 oz. 6 dr. 45.6 gr. troy) remain; strain again, and add of alcohol ℥ivss. (4 oz. 3 dr. 26 gr. troy). Seven drops of this liquid contain about one grain of opium. *Conspectus des Pharmacopées de Dublin, d'Edimbourg, de Londres, et de Paris, &c.* Paris 1820. —Tr.

NARCOTINA.

Narcotine—Opiane—Matter, or Salt of Derosnes.

My researches have not led me to consider this matter as a medicine; I shall, however, give its history here, because it is one of the immediate principles of opium, and has thrown, and still continues to throw, much uncertainty over the subject.

[PREPARATION OF NARCOTINE.

In order to obtain Narcotine, according to the process of Sertuerner, opium must be exhausted by two parts of boiling ether; and this operation be repeated five successive times. The solution thus obtained must be mixed and filtered, and the ether volatilized, until the whole is reduced to three-fourths. A product is then obtained, formed of two distinct parts, viz. of a saline crust, which consists of narcotine united with an acid, and of a brown, bitter, and acid liquor,

containing resin, narcotine, and an acid,—probably the acetic. In order to obtain the narcotine from this liquor, it must be subjected to evaporation; the residuum treated with boiling water, which does not dissolve the resin, and the narcotine be precipitated from the filtered liquor by ammonia. The narcotine is afterwards obtained from the saline crust, by depriving it first of the resin and caoutchouc, by means of rectified oil of turpentine, washing the residuum with cold alcohol, dissolving it afterwards in hot, and precipitating the narcotine by ammonia. This precipitate, as well as the former, is then dissolved in the least quantity possible of hydrochloric acid, and again precipitated by ammonia.

CHEMICAL PROPERTIES OF NARCOTINE.

Narcotine crystallizes from its alcoholic or ethereal solution, in fine needles or in rhomboidal prisms. It has no action on vegetable colours. It is without smell and taste. Cold alcohol dissolves $\frac{1}{100}$th part, and boiling $\frac{1}{24}$th, of its weight. Hot ether dissolves it in considerable quantity, and suffers it to be deposited in a crystalline form on cooling.[a]]

[a] [*Chimie Organique de Gmelin*—Edition de Virey. p. 392.]

PHYSIOLOGICAL PROPERTIES OF NARCOTINE.

If a grain (gr. 0.82 troy) of narcotine, dissolved in oil, be given to a dog, it produces a state of stupor, which superficial observers might readily confound with sleep; it differs, however, evidently from sleep: the animal's eyes are open, but the respiration is not deep, as in sleep, and it is impossible to rouse it from its sullen and motionless state. Death generally takes place in twenty-four hours.

Narcotine, combined with acetic acid, produces entirely different effects. Animals can support a dose of even 24 grains (gr. 19.68 troy), without perishing; and whilst under its influence, they are agitated by convulsions like those which camphor produces. They exhibit the same signs of fright, the same motions backwards, the incapability of going forwards; and, lastly, the foaming at the mouth, the convulsions of the jaws, &c.

When I have given morphine and narcotine together, the different effects of each have been produced at the same time.

A grain (gr. 0.82 troy) of morphine, for instance, and a grain of narcotine, each dis-

solved in acetic acid, were placed in the pleura of a dog. The animal soon became drowsy, and even fell asleep under the influence of the morphine; but a very singular and remarkable struggle appeared, at the same time, to go on for an hour and a half between the stimulating effects of the narcotine and the anodyne effects of the morphine. At last, however, the animal slept soundly; it being probably then under the sole influence of the morphine. May it not be inferred from this experiment, which I have often repeated in various ways, and with analogous results, that the variable effects of opium are to be attributed to its containing these two opposite principles?

This opinion derives support from the fact, that persons who take morphine do not experience the exciting property, which they can readily distinguish in the aqueous extracts of the shops, in which the narcotine and morphine are contained together.[b]

[b] M. Magendie's conjecture is probably true; and, as is said in the Translator's Preface, it forms one of the most valuable properties of the isolated morphine, that the stimulating and constipating effects of opium are thus avoided. Mr. Battley ought to publish the formula for his *liquor opii sedativus*. It is beneath him, as an old practising member of the profession, and *really*

EXTRACTUM OPII NARCOTINA PRIVATUM.

Extract of Opium deprived of Narcotine.

My experiments on the matter of Derosnes having shown that it is hurtful when not united to an acid, and very exciting when

useful chemist, or rather druggist, to practise such a paltry concealment; but the Translator knows, by personal experience, that the liquor opii sedativus is devoid of exciting, and almost of constipating, properties—his pulse has repeatedly fallen several beats within a minute after taking 12 or 15 drops.

It seems that Dr. Porter, of Bristol, recommends a *liquor morphii citratus*, which he makes as follows:—Beat four ounces of the best crude opium in a mortar with ℥ij. of crystallized citric acid; mix well with a pint of boiling water; filtrate after twenty-four hours' maceration. Dr. Paris speaks well of this preparation, and probably with justice.

The Translator, who has, unfortunately, taken more than he likes of Mr. Battley's preparation, once, from necessity, made a substitute, by macerating the dregs remaining after making tincture of opium in a solution of tartaric acid. The preparation formed a tolerably deep tincture, and 40 drops acted, he thinks, in all respects, like 20 of the liquor opii sedativus. It neither stimulated nor produced costiveness.—Tr.

so united,[c] M. Robiquet attempted to prepare an extract of opium which should be entirely devoid of this substance.

He macerates coarsely divided opium in cold water, filtrates and evaporates to the consistence of a thick syrup, digests in rectified ether, and, after frequent shakings, decants the ethereal tincture, and separates the ether by distillation. He repeats this operation so long as crystals of narcotine appear as the residue of the distillation. When the ether produces no further effect, he evaporates the solution of opium to a pilular consistence: and thus obtains an extract which is entirely devoid of narcotine.[d]

[c] This latter fact has been recently disputed by M. Orfila. I am ignorant what has prevented him from arriving at a similar result to myself; but I vouch for the exactness of the fact which I have advanced, and am ready to prove it to M. Orfila whenever he wishes.—M.

[d] Mr. Thomson, in a note to the account of the extractum opii, in his *Dispensatory*, says,

"This extract, however, contains some of Derosnes' salt also, or narcotine, as it has been lately termed; and this is supposed to produce the excitement, which even the aqueous extract occasions previous to its sedative effect. M. Robiquet (*Jour. de Pharmacie*, May, 1821), proposes to free it of this principle by agitating the extract as soon as it acquires the consistence of syrup with ether, and repeating this agitation

I have tried the extract thus prepared on animals. Its action appears to be decidedly narcotic and entirely like that of morphine; only weaker.

I have also employed it in practice with advantage, especially on a young Greek physician of the greatest promise, who had not been able to bear well the common aqueous extract of the shops.

This new preparation of opium, therefore, seems to deserve the attention of physicians.

EXTRACTUM OPII MORPHINA PRIVATUM.

Extract of Opium deprived of Morphine.

The process described under the article MORPHINE does not entirely deprive the opium of this alkali. The residuum always contains a certain quantity. M. Robiquet

with fresh portions of ether as long as the extract on distillation deposits any crystals of narcotine. The extract, thus prepared, contains only morphia, gum, and extractive," p. 769.

It may be added, that the freedom from narcotine which characterizes the extractum opii (which is aqueous) ought to recommend it to medical men as preferable to the tincture of opium, which contains narcotine in abundance on account of its being a spiritous solution.—Tr.

having communicated to me this fact, I was desirous of seeing whether some further preparation could not be obtained from a matter considered to be useless, and abandoned as such by the apothecaries.

I remarked that this residuum still exerted a certain narcotic property on animals and on man: a less marked one, it is true, than that of the common aqueous extracts, but sufficiently strong to make it perhaps useful in practice.

This extract may be given by grains; four grains are not apparently equivalent to a grain of the ordinary aqueous extract, or to a quarter of a grain of morphine.

Extract of opium deprived of morphine ought to be kept by all apothecaries who prepare their morphine.

IODINA.

Iodine.

IODINE is a simple body, discovered, in 1813, by M. Courtois, in the mother waters of soda, as it is obtained from sea-weed. [a]The name of iodine is derived from the Greek word ἰωδὴς, on account of the blue

[a] [Iodine has been obtained from a great variety of sea-plants, as the Fucus *saccharinus*, *digitatus*, *serratus*, *vesiculosus*, *siliquosus*, *filum*, *nodosus*, *palmatus*, *digitatus*, *rubens*, *cartilagineus*, *membranaceus*, and *filamentosus*; Ulva *pavonia*, *umbilicalis*, and *linza*, &c. It has also been procured from sponge by Dr. Fyfe and M. Straub of Hofwyl; M. Fodéré, however, has strong doubts whether this substance really exist in sponge; and he informs us that M. Hecht, a pharmacien at Strasburg, has not in any case been able to detect it by means of starch, which is the best test for it: it is difficult to account for the results of M. Hecht's experiments, as the ashes of sponge do incontestibly turn slightly blue on the addition of starch: from the small quantity, however, of iodine comprised in it, it is very improbable that the medicinal efficacy of burnt sponge can be wholly dependent on the iodine which it contains.]

colour of its vapour. Iodine is solid at the ordinary temperature, in the form of small greyish crystals, which have but a feeble tenacity, and the aspect of plumbago. It fuses at 170° c. (338° Fah.) and volatilizes at 175° c. (347° Fah.) forming a very beautiful violet-coloured vapour. This vapour, when enclosed in a receiver, re-condenses into crystalline scales.

Iodine is soluble in ether and in spirit of wine; the former taking up more or less according to its degree of rectification. At 35° (.842) and a temperature of 15 c. (59° Fah.) it dissolves nearly $\frac{1}{9}$th of its weight. At 40° (.817) of concentration, and at the same temperature (104° Fah.) it dissolves $\frac{1}{6}$th. Water only dissolves $\frac{1}{7000}$th of its weight.

Iodine enjoys the property of forming an acid with hydrogen, and another with oxygen.

Iodine cannot be combined with oxygen in the gaseous form: it unites, however, with it when the gas is in a nascent state, and forms iodic acid.

Iodine has much affinity for hydrogen, and takes it from a great number of bodies. It absorbs it in a gaseous state when the temperature is elevated; and forms with this gas the hydriodic acid, which is com-

posed exclusively of iodine and hydrogen. This acid presents itself under the form of a colourless gas, which has a very strong taste, a very penetrating odour, powerfully reddens the tincture of turnsol, and extinguishes burning bodies.

This gas is very rapidly absorbed by water, and is very largely dissolved in it. It gives out also white fumes in the air by uniting with the aqueous vapour contained in the atmosphere.

Hydriodic acid is obtained by pouring water on an ioduret of phosphorus, made of eight parts of iodine and one of phosphorus, and distilling the liquor. The first part which rises is scarcely any thing but water; the last, on the contrary, when collected separately, is very concentrated, and throws up thick fumes into the air.

Hydriodic acid can be united to a great number of bases, and forms neutral salts with some of them, of which the hydriodate of potash has hitherto been the most commonly employed in medicine. The hydriodate of soda has sometimes also been exhibited, and apparently with similar success.

PREPARATION OF IODINE.

It has been stated that iodine is extracted from the mother waters formed in the preparation of soda from sea-weeds, where it exists in the form of hydriodate of potash.

These waters are obtained by burning the different fuci which grow on the sea-shores of Normandy, lixiviating the ashes and concentrating the liquor.

To obtain the iodine, pour an excess of concentrated sulphuric acid on these waters, and boil the liquor by degrees in a glass retort to which a receiver is attached. The sulphuric acid seizes on the base of the hydriodate, and on the hydrogen of the hydriodic acid. Hence result sulphate of potash, water, sulphureous acid, and iodine; which latter passes into the receiver along with a little acid in the form of a violet vapour, and is there condensed. To purify it, it must be washed, mixed with water which contains a little potash, and redissolved.

[Dr. Ure recommends the following formula to be adopted: Take eight fluid ounces of the brown liquid which drains from the salt which the soapmakers who employ kelp, boil up and evaporate to dry-

ness; heat it to 230° Fah. and add one fluid ounce of sulphuric acid, diluted with its own bulk of water. When the mixture cools, separate the crystals of the salts, which will form in it, by filtration through a woollen cloth, and add to the fluid poured into a matrass, 830 grains of black oxide of manganese in powder. A glass globe is then to be inverted over the mouth of the matrass, and the heat of a charcoal chaffer being applied, iodine will sublime in great abundance. It must be washed out of the globe with alcohol, then drained and dried on plates of glass, and purified by a second sublimation from dry quicklime.

POTASSÆ ET SODÆ HYDRIODATES.

The Hydriodates of Potash and Soda.

If a solution of soda or of potash be poured on iodine in its metallic state, an iodate and a hydriodate are formed, which may be separated by means of alcohol, which only dissolves the latter of these salts. The hydriodate may then be obtained by evaporation. The hydriodates of soda and of potash may also be obtained, like other neutral salts, by directly combining the acid with the oxide.

The hydriodates of soda and of potash

are deliquescent salts, and therefore very soluble in water. Their solutions are still capable of dissolving iodine: thus forming an ioduretted hydriodate.

ACTION OF IODINE ON MAN AND ON ANIMALS.

M. Gay-Lussac, soon after the publication of his excellent work on iodine, sent a certain quantity to me, that I might study its effects on animals. In my first experiments I introduced as much as a gros (gr. 59.07 troy) of tincture of iodine into the veins, without any apparent effect.

Dogs, made to swallow it, vomited; but no other effect followed.

Finding that this new substance was innocuous, I myself swallowed a spoonful of the tincture, without further effect than a disagreeable taste, which went away by degrees after continuing several hours.

I lately also saw a child of four years old who had swallowed, by mistake, a tea-spoonful of the tincture of iodine, prepared by M. Pelletier. The child's lips and tongue were coloured yellow, but no bad consequences resulted.[b]

[b] The translator, who has used iodine freely and successfully in several cases of disease, finds

[Dr. Gairdner, however, in a recent *ex professo* work on iodine,[c] the first monograph of the kind which has appeared in England, has given a lamentable picture of the effects of that substance when injudiciously exhibited: the symptoms usually produced, in addition to those above described, are said to be, peculiar, great, and persevering anxiety and depression of spirits, which are very different from hypochondriasis, inasmuch as they dwell principally on the present, and have no reference to the future; the emaciation and cholera

that the above observations scarcely tally with his experience. The tincture frequently stimulates the arterial system so much, that it is necessary to discontinue its use. In one scrofulous case, a girl, six years of age, although she immediately began to recover when she first took the tincture of iodine, and has continued to improve under its use more rapidly than during any former plan of treatment, she is still unable to take the remedy for more than three or four days in succession, in consequence of her skin becoming hot, and a disposition to delirium on waking from sleep invariably coming on. However, if M. Magendie's observations be taken literally, they lead to an inference, that the tincture of iodine is an inert substance, unworthy of notice as a remedy.—Tr.

[c] [*Essay on the Effects of Iodine*, &c. By W. Gairdner, M. D. Underwoods, 1824.]

produced by it, are also described as frequently extending to a dangerous and even fatal result. When the patient is under the full constitutional influence of iodine, Dr. Gairdner has found a degree of tremor to come on, which he considers as a good guage of the extent of nervous excitement which has taken place, and is seldom or never absent when that excitement has proceeded to any considerable degree; this nervous excitement simulates chorea, and occasionally endures for a considerable length of time. In the cholera induced by iodine, Dr. Gairdner has found sedatives, such as opium, hyoscyamus, &c., more beneficial than any other class of medicines; purgatives are said invariably to do harm. It is somewhat curious that Decarro, Coindet, Erlinger, Formey, Hufeland, and others, have employed this remedy in a variety of cases, but have never witnessed its deleterious properties: or, at all events, have never described them.]

CASES IN WHICH THE PREPARATIONS OF IODINE MAY BE EMPLOYED.

M. Coindet, a physician of Geneva, first used iodine in medicine. He employed it in the treatment of goître with very marked

effects. These trials were repeated by several physicians, both in France and Switzerland; and their observations would seem to prove that we now possess, in iodine, an efficacious remedy for the removal of a disease which has been hitherto cured with difficulty.

Although success may be especially expected to follow the use of iodine when the goître is recent, and has occurred in individuals who have not yet arrived at maturity, the remedy has, nevertheless, been known to dissipate old, hard, and voluminous goîtres: but, as the treatment in these cases is necessarily more protracted, it is found that the long-continued use of iodine injures the stomach. To avoid this inconvenience, iodine has also been applied outwardly by means of friction.

Iodine has been employed in the treatment of scrofula with an equal appearance of success. This point, however, is not so well ascertained as in the case of goître; because much fewer observations have yet been made on the subject.

[In a *Mémoire* read by M. Zinck to the *Société Cantonnale* of Lausanne, two cases of white-swelling are related, which were cured by the administration of iodine. The following history of the same kind has also

been communicated to Dr. Gairdner, in a letter from Professor Maunoir of Geneva: —"On the 18th of March, 1821, I was consulted respecting a boy, eight years of age, who had laboured for nearly a year under a white-swelling of the right knee; for which blisters, leeches, discutient applications, internal remedies, &c., had been unsuccessfully employed. There was a considerable augmentation in the size of the knee, which augmentation the attendant physician considered to be seated in the bones rather than in the soft parts; and at the same time the size of the leg was considerably diminished. The child was unable to execute the least movement without pain, even with crutches; and the leg was permanently bent upon the thigh. I treated the case, in the first instance, by correspondence, without seeing him; frictions were directed to be made with the ointment of iodine, of the size of a hazel-nut, night and morning. He also took the tincture of iodine, in the dose of $\frac{1}{12}$th of a grain of the iodine at the most. His stomach was not at all affected by it, and eight months afterwards the father could not resist the pleasure of sending him to Geneva for my inspection; when I found him able to walk and run with facility, the right knee being

the same size as the left, and equally serviceable."]

M. Coindet recommends iodine as a powerful emmenagogue; but this latter assertion has not been hitherto confirmed by the observations of any other physician, and consequently requires to be proved by other facts.

[M. Gimele has also employed iodine in chronic leucorrhœa; but his observations have not been confirmed by any subsequent practitioner.[d]]

At the present day (November, 1822), the Genevese and Swiss physicians are much less enthusiastic with regard to the advantages which they at first imagined to have accrued from the preparations of iodine; they now say that serious accidents have followed their employment, such as chronic inflammation of the stomach, and considerable emaciation of the whole body, particularly of the mammæ. I have never witnessed similar accidents, unless the doses have been carried very high; but this is no reason why we should not be very circumspect in the employment of these new preparations.

[d] [*Revue Médicale*, t. vii. p. 249.]

[Dr. Coster of Paris, who had an opportunitunity of witnessing the practice of Dr. Coindet of Geneva, and who asserts that he has frequently used this medicine with the greatest advantage, has lately published a *Memoire*, in which he ascribes to iodine a more generally efficacious action than, it is to be feared, it is entitled to; this is the more to be regretted, as these overcharged encomiums frequently occasion considerable disappointment, and cause many medicines to be neglected which were deserving of a better fate. According to that gentleman, iodine is useful, 1st, For the resolution of tumours of the thyroid gland, when they are not of a schirrous, cartilaginous, or bony nature, or when the tumour does not contain calcareous concretions.

2dly; For the restoration of suppressed catamenia, when such suppression occasions any other sanguineous evacuation, or when any irritation, situated in another viscus, causes a flow of blood thither, and turns it from its natural course.

3dly; To determine towards the uterus, the plethora necessary for the establishment of menstruation in young females, where that natural evacuation has not occurred.

4thly; To destroy any disposition to scrophulous phthisis.

5thly; To remove glandular congestions, and indurations of a scrophulous or chronically syphilitic character.

6thly; For the cure of scrophulous ophthalmia, when in a chronic state.

7thly; To hasten the cicatrization of venereal ulcers.[e]]

Mode of prescribing Iodine.

TINCTURA IODINÆ.

Tincture of Iodine.

Take of

Alcohol at 35° (.842) 1 ounce (7 dr.52.5 gr. troy.)
Iodine . . . . . 48 grains (gr. 39.36 troy.)

This tincture ought not to be prepared long beforehand, as it soon deposits crystals of iodine. It is to be feared also that the iodine may take up a portion of the hydrogen of the alcohol, and be thus converted into ioduretted hydriodic acid.

The tincture of iodine has been employed with great success in the treatment of bronchocele. It has also been used in scrofula, but not so frequently as the two following preparations.

[e] [*Archives Générales de Médecine*, Juillet, 1823.]

The tincture of iodine may be given to adults in the dose of 10 drops, three times a-day, in a little sugared water. The dose may be progressively increased to 20 drops three times a-day:—20 drops contain about a grain of iodine.[f]

[f] Besides using the tincture of iodine successfully in a few cases of scrofula, the translator once saw it signally beneficial in a case, probably of pulmonary tubercles, in which he prescribed it, according to the suggestion of Dr. Baron in his last work on Tubercles. A thin youth passed the winter and early part of the spring of 1823 in suffering from an almost unremitted succession of attacks of pulmonary excitement. His pulse rose during these exacerbations, his skin became hot, cough came on, and frequently the attack did not terminate without the expectoration of purulent matter, and the occurrence of hectic fever and of night sweats; generally, however, these exacerbations were speedily and perfectly dissipated by the moderate use of colchicum, so that the pulse fell to 72 beats in the minute, and all the other symptoms subsided. Still, early in May, the patient was thin, pale, and in other respects having the appearance of a person labouring under incipient phthisis. Under these circumstances he took ten drops of the tincture three times a-day. He almost immediately said he had not received so much benefit from any former medicine; and after continuing its use for a month he was discharged apparently well, not having had one feverish attack, and being fat, and with the countenance of health.

[Four cases of bronchocele have been lately published by Mr. Rickwood, which were cured, or relieved, by the tincture of iodine, administered as above recommended; he also states, that he has at present three additional cases under treatment, all of which are improving; the iodine he considers to be an excellent tonic in other affections.[g]

Mr. Callaway of the Borough, a surgeon of considerable talents and experience, has employed the tincture of iodine with the most happy results, in several cases of scrophulous enlargement of the glands, not only of the surface, but of the mesentery.]

LIQUOR POTASSÆ HYDRIODATIS.

Solution of Hydriodate of Potash.

Take of

Hydriodate of potass 36 grains (gr. 29.52 troy.)
Distilled water . . 1 ounce (7 dr. 52.5 gr. troy.)

In a case too of intermittent fever (a girl eight years old), in which the fever had repeatedly recurred after being suspended by cinchona, the tincture of iodine was prescribed in a small dose three times a day, and the fever did not again recur.—Tr.

g [*London Medical and Physical Journal*, August, 1823.]

This solution is still capable of dissolving iodine; and it may thus be made to form an ioduretted hydriodate of potash.

Both these preparations, which may be given in the same manner as the tincture of iodine, are, like it, used for the cure of goître and of scrofula. In this latter case tonics are usually joined with them in the treatment.

[Dr. Gairdner prefers this preparation to the tincture: he generally begins with ten drops, and gradually augments the dose to twenty, and rarely to twenty-five. By the use of this solution, or of the ointment above described, a soft bronchocele will be discussed in a month or six weeks; but those which are hard, and of old growth, require a longer period, and some cannot be altogether dispersed.

Dr. Wagner affirms that he has employed, with considerable success, an ointment of the hydriodate of potass, in the proportion of 18 grains to six drachms of lard, in a case of what he terms a *cancerous* tumour in the maxillary region: the patient was a male, aged 52 years, and the tumour could not be extirpated in consequence of his cachochymic condition. In less than a month after the commencement of the use of the

ointment, the tumour had almost entirely disappeared.

Two cases of tumours of the bronchocele kind, where considerable benefit was derived from the use of the *ointment of hydriodate of potass*, according to M. Magendie's formula and mode of application, are described by M. Gunther of Cologne, in a letter to the editor of the *Medicinisch-Chirurgische Zeitung*.[h]]

UNGUENTUM POTASSÆ HYDRIODATIS.

Ointment of Hydriodate of Potash.

Take of
Hydriodate of potash ½ gros (gr. 29.5 troy.)
Hog's lard . . . . . 1½ ounce (11 dr. 48 gr. troy.)

This ointment is to be rubbed, morning and evening, on the bronchocele or enlarged scrofulous glands. The quantity for each friction must be about half a drachm (gr. 29.5 troy). At the end of eight days it may be increased to a drachm (gr. 59 troy), and even more, according to the age of the individual, and the extent of the tumour.

[h] [*London Medical and Physical Journal*, March, 1823.]

[Dr. Gairdner recommends a dram of this ointment to be rubbed over the surface of the tumour night and morning; when the swelling, however, is painful, it is not necessary to rub in, but to follow a plan recommended by Scattigna, which consists in choosing a portion of the surface of the body where the skin is very tender and thin, and simply applying the ointment over night; for this purpose almost any part of the body which is habitually covered may be chosen; but the axilla or inner surface of the thighs close to the scrotum, is to be preferred. Where the disease is entirely local, Dr. Gairdner recommends the external use of the iodine solely.]

It sometimes happens that tumours are completely removed by this application, which the saline solutions had not been able to entirely dissipate.

[In those cases above-mentioned, where the ointment of hydriodate of potass is indicated, Dr. Ure has found an ointment composed of one ounce of hog's lard and one drachm of iodide of zinc, a powerful external application. About a drachm of this ointment should be used in friction on the swelling once or twice a day.[i]]

[i] *Dictionary of Chemistry*, 2d Edition.]

Sometimes, also, the treatment by friction is not alone sufficient; so that it is often necessary to join the two methods together. Generally the saline solutions would seem to be the most efficacious in the treatment of scrofula.

When the method by friction is used in goître, the action of the iodine is sometimes much assisted by emollient fomentations or leeches. Occasionally, after the first applications, the goître, instead of softening, becomes hard and slightly painful. Leeches commonly remove this local irritation; and then the effects of the iodine show themselves in a very marked manner.[k]

[k] Quære.—What have the leeches to do in producing this very marked effect?—Tr.

EXTRACTUM NUCIS VOMICÆ RESINOSUM.

Alcoholic Extract of the Nux Vomica.

In the year 1809, I laid before the first class of the French Institute a series of experiments which had conducted me to an unexpected result; namely, that an entire class of vegetables (the bitter strychnos) have the singular property of powerfully exciting the spinal marrow, without involving, except indirectly, the functions of the brain. I announced also, at the termination of my paper, that this property might be advantageously applied to the treatment of disease.[a]

[a] "Medicine will probably derive great advantages from the possession of a substance which will act especially on the spinal marrow; for it is well known that many very severe diseases have their seat in that part of the nervous system. The upas, however, does not exist in commerce; and should even experience show that this vegetable substance is a valuable medicine, how is it to be procured? Experiments should be instituted for the discovery of a substance with properties analogous to those of the upas."

It was by such experiments that M. Delille and myself discovered the properties of the nux vo-

The last assertion, which was then conjectural, has been for several years verified by numerous experiments made at the bedside. Some time ago Dr. Fouquier published several cases of paralysis cured by nux vomica. I had also given the remedy with like success before I knew that Dr. Fouquier was engaged in similar researches; and it gave me great pleasure to see my work preceded by the communication of so esteemed a physician.

This circumstance, however, did not lead me to relax in my exertions; and I have seen the best effects follow the employment of the alcoholic extract of the nux vomica, not only in cases of both partial and general paralysis, but also in many other states of weakness of the constitution, both general and local.

mica and of the St. Ignatius's bean, and which led us to propose the medical employment of the resin of the nux vomica. See "*An Examination of the Action of certain Vegetables on the Spinal Marrow*," read to the Institute, on the 24th of April, 1809, by M. Magendie, Doctor of Medicine, Anatomical Assistant to the Faculty of Medicine. Paris, 1809.

MODE OF PREPARING THE ALCOHOLIC EXTRACT OF THE NUX VOMICA.

Take a determinate quantity of rasped nux vomica, exhaust it by repeated macerations in alcohol of 40° (.817), and evaporate it slowly to the consistence of an extract.

Alcohol of much less strength may be used, but the product is proportionably less active.

EXTRACTUM NUCIS VOMICÆ RESINOSUM EXSICCATUM.

Dry alcoholic extract of the nux vomica.

Dissolve in water the alcoholic extract of the nux vomica, made by means of alcohol at 36° (.837); filtrate it, and evaporate on evaporating dishes, as in making the dry extract of cinchona.

PHYSIOLOGICAL PROPERTIES.

A grain (gr. 0.82 troy) of this extract, absorbed from any part of the body, or mixed with food, promptly destroys a dog of considerable size, by inducing paroxysms of tetanus, which by their continuance stop

the respiration long enough to produce complete asphyxia.

When the dose is much stronger, the animal appears to perish entirely from the action of the substance on the nervous system: as M. Ségalas has lately demonstrated. (See the *Journal de Physiologie Expérimentale*, for October, 1822.)

If an animal be touched whilst under the action of this substance, it experiences a commotion similar to that of a strong electrical shock; and this takes place every time the contact is renewed.

Dividing the spinal marrow behind the occiput, and even complete decollation, does not prevent these effects, nor even their continuance for some time. This characteristic action of the alcoholic extract of the strychnos distinguishes it from all other exciting substances at present known.

On dissection no lesion is discovered which can indicate the cause of death.

ACTION OF THE ALCOHOLIC EXTRACT OF THE NUX VOMICA ON THE HUMAN BODY WHEN IN HEALTH.

The action of the alcoholic extract of nux vomica on the healthy human body is identical with that above described; and if the

dose be sufficiently large, death speedily follows with the same symptoms. Dissection does not show any apparent lesion of structure, the traces of the asphyxia which caused or accompanied death being alone observable; as I had an opportunity of verifying in the case of a woman who died after taking this substance as a poison.

ITS ACTION ON THE UNHEALTHY BODY.

The effect is still the same on man when affected with paralysis; but what is very remarkable, it is particularly manifested in the paralysed parts: it is there that the tetanic commotions occur, as well as a creeping sensation, which announces the action of the remedy; a local perspiration also breaks out in the same parts, which is not observed in the rest of the body. In cases of hemiplegia submitted to the action of the nux vomica, the halves of the body exhibit a striking contrast; for whilst the healthy side is at rest, the other is violently agitated; tetanic shocks soon succeed, and an abundant perspiration breaks out. In one female the affected side was covered with a peculiar eruption, when the opposite afforded no trace of it: even the two sides of the tongue differ; a decidedly bitter taste being perceiv-

ed on the one side, whilst the other presents nothing similar.

If a larger dose be given, the two sides of the body participate, but unequally, in the tetanic effect; so that the patient is sometimes thrown out of bed by the violence of the paroxysm.

The alcoholic extract of the nux vomica, when given in very small doses, has not, like many other remedies, any perceptible effect immediately; and some days pass over before its advantageous or noxious properties can be appreciated.

CASES IN WHICH THE ALCOHOLIC EXTRACT OF THE NUX VOMICA MAY BE EMPLOYED.

These are, all diseases attended by debility whether it be local or general; and paralyses of all kinds, general or partial. Mr. Edwards cured a case of amaurosis with palsy of the upper eyelid by means of the nux vomica; and I have seen very excellent effects from the same remedy in marked cases of weakness of the genital organs, incontinence of urine, &c. I have also given the resin of the nux vomica in cases of sluggish digestion, and in states of extreme debility attended by an irresistible disposition to sleep.

MODE OF EXHIBITING THE RESIN OF NUX VOMICA.

This remedy is best given in the form of pills, when the practitioner wishes to produce the tetanic commotions; that is to say, when he wishes to have its sensible effect. If each pill contain a grain of the extract (gr. 0.82 troy), one or two may be given at first, and the dose be daily augmented until the desired effect be produced; the medicine must then be discontinued, to avoid accidents. It is better to give the pills in the evening, because night is the best time for observing the phenomena which we wish to produce.

It is sometimes necessary to increase the dose to from 24 to 30 grains (from gr. 19.68 to 24.6 troy) in the day, before the tetanic convulsions are produced: but generally from 4 to 6 grains (gr. 3.28 to 4.92 troy), are sufficient.

If the exhibition of the remedy have been accidentally interrupted for some days, it is necessary to recommence with the smaller doses and to increase them again gradually, as before.

When it is desirable to produce only the slow effects of the remedy, a grain (0.82

troy), or a grain and a half (gr. 1.23 troy), in the day, is sufficient; or the following tincture may be used :—

TINCTURA NUCIS VOMICÆ.

Tincture of Nux Vomica.

Take of
Alcohol of 36° (.837) 1 ounce (7 dr. 52.56 gr. troy.)
Dry extract of nux vomica, 3 grains (2.46 gr. troy.)

This tincture is to be given by drops, in mixture or in drink, whenever the alcoholic extract in substance is indicated.

STRYCHNINA.[a] STRYCHNIUM. STRYCHNIA.

Strychnine.—Strychnin.

The alcoholic extract of nux vomica, nux vomica in substance, St. Ignatius's bean,[a] and the celebrated Java poison, all owe their active effects on man and on animals to the existence, amongst their elements, of a peculiar vegetable alkali, recently discovered by MM. Pelletier and Caven-

[a] [The chemical components of the *strychnos Ignatii*, or *St. Ignatius's bean*, are as follow:—1. Fatty, butyraceous matter—2. wax—3. igasurate of strychnine—4. yellow colouring matter—5. much gum—6. bassorine—7. a little fecula and woody fibre. Those of the *strychnos nux vomica*, are similar to the above, except that the strychnine is in a less proportion, and the colouring and fatty matters in a greater. The *strychnos colubrina* is also similarly constituted to the *strychnos Ignatii*, except that it contains much more fatty and colouring matter, less strychnine, and a considerable quantity of woody fibre, in place of the bassorine and starch.—*Pelletier and Caventou.*]

tou;[b] I have proved this fact by direct experiments.[c]

MODE OF PREPARING STRYCHNINE.

Add a solution of liquid subacetate of lead to a solution of alcoholic extract of the nux vomica in water, until no more precipitate be thrown down; the foreign matters being thus separated, the strychnine remains in solution with a portion of colouring matter, and sometimes an excess of acetate of lead. Separate the lead by sulphuretted hydrogen; filtrate it, and boil with magnesia, which will unite with the acetic acid, and precipitate the strychnine. Wash the precipitate in cold water; redissolve it in alcohol, to separate the excess of magnesia; and by evaporating the alcohol, the strychnine is obtained in a state of purity. If it be still not perfectly white, it must be redissolved in acetic or hydrochloric acid, and re-precipitated by means of magnesia.

[b] The papers on this subject are in the 8th, 9th, and 10th volumes of the *Annales de Chimie et Phys.* It is supposed that in the native state the strychnine is in union with a new acid, called, by MM. Pelletier and Caventou, Igasuric acid, from the Malay name of the St. Ignatius's bean.—Tr.

[c] *Annales de Chimie et Phys.* tom. x. p. 176. 1819.—M.

Strychnine obtained by crystallization from an alcoholic solution which has been diluted by means of a small quantity of water, and left to itself, appears under the form of microscopical crystals, forming four-sided prisms, terminated by pyramids with four flattened or depressed faces. Crystallized rapidly, it is white and granular; it is insupportably bitter to the taste, and gives an after-sensation similar to that produced by certain metallic salts; it has no smell; it is not changed by exposure to the air; it is neither fusible nor volatile, for when submitted to the action of heat, it does not fuse until the moment of its decomposition and carbonization; it is decomposed by a degree of heat inferior to that which destroys most vegetable substances. Exposed to the naked fire, it swells, becomes black, and gives out an empyreumatic oil, a little water, and acetic acid, and also carbonic acid gas, and carbonated hydrogen; distilled with deut-oxide of copper, it gives out much carbonic acid, and only slight traces of azote.

It is composed then of oxygen, hydrogen, and carbon; the azote not appearing to form a part of its elements. Although strychnine has so strong a taste, it is scarcely soluble in water; 100 grammes (gr.

1544.4 troy) of water, at the temperature of 10° (50° Fah.), dissolved no more than gr. 0.015 (gr. 0.012 troy); 6667 parts of water, therefore, are required to dissolve it at this temperature: boiling water dissolves a little more than double, gr. 0.04 (gr. 0.0324 troy) being dissolved in 100 grammes (gr. 1544.4 troy) of boiling water. Strychnine then is soluble in 2500 parts of boiling water. It is remarkable that a solution of strychnine made in the cold, and containing therefore only $\frac{1}{6000}$th part of its weight, may be diluted to 100 times its volume by means of water, and still retain a very decidedly bitter taste. The principal character of strychnine, however, consists in its forming neutral salts when united with acids.

It would appear from some recent experiments by M. Pelletier, that the nux vomica contains two alkaline substances; the one strychnine, of which we have just treated, the other brucine, previously found in the *angustura spuria* by MM. Pelletier and Caventou. When, by following the process above mentioned for the separation of strychnine, care is taken to crystallize the substance several times in alcohol, it is pure and deprived of brucine; the brucine being much more soluble in alcohol, and crystal-

lizing with difficulty, remains in the alcoholic *mother waters*. The presence of brucine, however, in strychnine, is by no means a great inconvenience, as the brucine is possessed of properties similar to those of strychnine; only it is less active.

M. Henry, *Chef de la Pharmacie Centrale*, has given a new process for the extraction of strychnine. It consists in boiling the nux vomica in water, and evaporating the decoction until it has the consistence of syrup; lime is then added, which unites with the acid, and sets the strychnine at liberty; by means of alcohol it may then be separated from the lime. The strychnine contained in the alcohol is subsequently obtained by evaporation; and is rendered more pure by being redissolved in alcohol, and again submitted to crystallization.

M. Henry points out another plan for purifying strychnine, namely, combining it with nitric acid. The salt is to be afterwards crystallized, after its colour has been discharged by means of animal charcoal; finally, the strychnine may be precipitated from it by ammonia. We may observe, that at the time when M. Henry published his process, it was not known that brucine existed in the nux vomica along with strychnine; so that in the detail of this process

there is no mention made of the separation of the two alkalies: it will be readily seen, however, that whenever the strychnine has been obtained by crystallization, it will be free from brucine, or at least will contain but little of it; whilst, when obtained by precipitation, it will be much mixed with brucine, and consequently be possessed of less action on the animal economy.

It is unfortunate that the St. Ignatius's bean should be so scarce in commerce; for as this grain contains strychnine almost entirely free from brucine, as M. Pelletier has shown, it would be highly advantageous to employ it for the preparation of pure strychnine.

ACTION OF STRYCHNINE ON MAN AND ON ANIMALS.

The action of strychnine on man and on animals is exactly like that of the alcoholic extract of nux vomica; it is, however, much more active; an eighth of a grain (gr. .1025 troy) is sufficient to kill a large dog, and a quarter of a grain (gr. .205 troy) often produces very marked effects on the human body when in health.

[M. Andral, who is a good pathologist and careful observer, has lately detailed se-

veral cases of paralysis, in which strychnine or brucine was employed; the results of these cases have led him to conclude, 1st, That pure strychnine acts upon the human subject like the extract of nux vomica, but with much greater intensity. 2dly, That the action of strychnine is so violent, that it ought not to be employed, except with the greatest precaution. Its effects he found to vary in a remarkable manner, according to the idiosyncrasy of the individual; thus in one, a twelfth of a grain (gr. .0683 troy) was sufficient to produce serious symptoms, whilst in another the dose could be carried, with almost impunity, to more than a grain (than gr. 0.82 troy). 3dly, That brucine acts upon man as upon animals. Although much less active than strychnine, since it may be commenced with, without inconvenience, in the dose of half a grain (gr. 0.41 troy), it may be advantageously substituted for the alkali of the nux vomica. 4thly, That both strychnine and brucine are more or less efficacious, according to the kind of paralysis for which they may be exhibited. When employed in those cases where paralysis is connected with an inflammatory condition of the brain or spinal marrow, M. Andral thinks, but without assigning any grounds for his supposition, that they may

probably aggravate the symptoms. They are said to be more especially useful in that kind of paralysis, the cause of which cannot be referred to any injury of the nervous centres; particularly to that species to which individuals are liable who meddle with the preparations of lead; nine cases of this nature are related which were treated with one or other of these alkalies; of these, six were cured or relieved[d].]

CASES IN WHICH STRYCHNINE MAY BE EMPLOYED.

The cases which authorise the use of strychnine, are those before pointed out as benefited by the resin of the nux vomica; it would indeed be unnecessary to use strychnine if the extracts of the nux vomica were always made in the same manner, and if they were not liable to vary in strength according to the mode of preparation.

Strychnine then is generally the most proper preparation, because its properties are constant, and its action uniform.

[We are informed by M. Theophilus Cramer of Bonn, who lately published an Essay, entitled "*Strychnii vis ac efficacia*

[d] [*Journal de Physiologie*, Juillet, 1823.]

in corpus animale," that his friend M. Dieffenbach has recently administered it with considerable benefit in a case of paralysis. M. Magendie is also said to have found it singularly useful in the case of an old man who was labouring under considerable muscular debility.[e]]

MODE OF EMPLOYING STRYCHNINE.

It may be made into pills, each pill containing one-twelfth or one-eighth (gr. .0683, or .1025 troy) of a grain; and the following formula may be used:—

PILULÆ STRYCHNINÆ.

Pills of Strychnine.

Take of

Very pure strychnine 2 grains (1.64 gr. troy.)
Conserve of roses . . ½ gros (29.5 gr. troy.)

Mix accurately, and make into twenty-four very equal pills, and silver them, to prevent them sticking to each other.[f]

[e] [*Quarterly Journal of Foreign Medicine*, &c. July, 1823.]

[f] We are accustomed in England to prevent pills from sticking together by rolling them in liquorice powder, or magnesia, or flour; the old plan of gilding and silvering pills is very inconvenient, for if it be perfectly done, the pills will be effectually preserved from the action of the stomach.—Tr.

TINCTURA STRYCHNINÆ.

Tincture of Strychnine.

Take of
Alcohol at 36° (.837) . 1 ounce (℥vij. and gr. 52.56, troy.)
Strychnine . . . . . 3 grains (2.46 gr. troy.)

From six to twenty-four drops of this tincture may be administered in mixture or in drink.

I have often used the following as a stimulating mixture:—

MISTURA STRYCHNINÆ.

Mixture of Strychnine.

Take of
Distilled water 2 ounces (1 oz. 7 drs. 45 grs. troy.)
Very pure strychnine 1 grain (0.82 gr. troy.)
White sugar . . . . 2 gros. (118.0 gr. troy.)

A dessert spoonful to be taken every morning and evening.

EMETINA. EMETA.

Emetine.

In a memoir laid before the Academy of Sciences in 1817, M. Pelletier and myself established, by a series of chemical and physiological experiments, that the different species of ipecacuanha owe their emetic properties to a particular immediate principle, which M. Pelletier has called *emetine*. This substance is much more active than ipecacuanha; and as it has neither its disagreeable taste nor nauseous odour, we are of opinion that it may be advantageously used for ipecacuanha on all occasions.

PREPARATION OF COLOURED EMETINE.

Powder the ipecacuanha, and digest it in ether at 60 degrees (.720) to dissolve the fatty odorous matter. When the powder yields nothing more to the ether, exhaust it again by means of alcohol. Place the alcoholic tinctures in a water bath, and redissolve the residue in cold water. It thus loses a portion of wax and a little of the fatty matter which still remained. It is only neces-

sary further to macerate it on carbonate of magnesia, by which it loses its gallic acid, to redissolve it in alcohol, and to evaporate it to dryness.[a]

[Or digest ipecacuanha root first in ether, then in alcohol. Evaporate the alcoholic solution to dryness, redissolve in water, and drop in acetate of lead. Wash the precipitate, and then, diffusing it in water, decompose by a current of sulphuretted hydrogen gas. Sulphuret of lead falls to the bottom, and the emetine remains in solution. Dr. Ure asserts, that by this process emetine is obtained pure; this is, however, erroneous, as will be readily seen on comparing the chemical qualities common to this and the above preparation, with those exhibited by pure emetine, as detailed in the next article.]

Emetine, when thus prepared, is not quite pure, as we at first thought. But it may be used with advantage as a medicine in this

[a] [By a similar process to the above, M. Boullay has lately obtained from the roots, leaves, flowers, and seeds of the *viola odorata*, an active, alkaline, bitter, and acrid principle, similar to the emetine from ipecacuanha, and which he proposes to denominate, *Emetine of the violet*, *indigenous emetine*, or *violine*. According to M. Orfila, this substance is possessed of highly poisonous qualities.—*Journal de Pharmacie*, Janvier 1824.]

state.[b] It appears in the form of transparent scales, of a reddish brown colour. It is nearly devoid of odour. It has a bitter, but not nauseous taste. It is capable of supporting the heat of boiling water without undergoing change; is very deliquescent, soluble in water, and incrystallizable.

PHYSIOLOGICAL PROPERTIES OF EMETINE.

Emetine, when given to dogs and cats, in a dose of from half a grain to two or three grains (gr. 0.41 to 1.64 or 2.46 troy), produces vomiting, which is sometimes followed by a long sleep. In a larger dose (10 grains, for instance [gr. 8.2 troy]), it occasions, in dogs, repeated vomitings, after which the animal falls asleep, but instead of awaking in a state of health, as in the case when emetine is given in a weak dose, it usually dies in twenty-four hours. It is found, on dissection, that death is produced by violent inflammation of the substance of the lungs, and of the mucous membrane of the alimentary canal, extending from the cardia to the anus. These phenomena have the greatest analogy with those which are produced by emetic tartar, and which I described, in 1813, in a paper entitled, "*On*

[b] See the following article on *pure emetine*.—M.

the influence of emetic tartar on man and on animals."

The result is still the same if the emetine be thrown into the jugular vein, or be simply absorbed from any part of the body.

ACTION OF EMETINE ON MAN IN A STATE OF HEALTH.

Two grains (gr. 1.64 troy) of emetine, swallowed fasting, produce continued vomiting, followed by a decided disposition to sleep. Even a quarter of a grain (gr. 0.205 troy) is sometimes sufficient to produce nausea and vomiting.

ACTION OF EMETINE ON MAN IN A STATE OF DISEASE.

Emetine acts in this case exactly in the same way as it does on man in a state of health. It vomits and purges, as in the former; in addition, however, it is easy to prove that it exerts a happy influence on catarrhal affections, especially when chronic.[c]

The cases in which emetine may be em-

[c] See *Chemical and Physiological Researches on Ipecacuanha*, by MM. Magendie and Pelletier. Paris, 1817.—M.

ployed are exactly those in which ipecacuanha is indicated.

MODE OF USING EMETINE.

To produce vomiting, 4 grains (gr. 3.28 troy) may be dissolved in any vehicle, and given in divided doses, repeated at short intervals.

If the whole of so soluble a medicine be given at once, it is entirely expelled by the first vomiting, and no other action is produced.[d]

The following mixture may also be used:

MISTURA EMETINÆ VOMITORIA.

Emetic Mixture of Emetine.

Take of

Emetine	4 grains (gr. 3.28 troy.)
A light infusion of orange flowers .	2 ounces (1 oz. 7 dr. 45 gr.t.)
Syrup of orange flowers	½ an ounce (dr. 3.56 troy.)

A dessert spoonful to be given every half hour.

In chronic pulmonary catarrhs, in hooping cough, in chronic diarrhœa, the fol-

[d] This is a curious and somewhat improbable circumstance; for although a large dose of the

lowing lozenges may be advantageously employed, instead of the common ipecacuanha lozenges:—

PASTILLI EMETINÆ PECTORALES.

Pectoral Lozenges of Emetine.

Take of

Sugar	4 ounces (3 oz. 7 dr. 30 gr. troy.)
Coloured emetine	32 grains (gr. 26.24 troy.)

Form into lozenges of 9 grains (gr. 7.38 troy) each.

It is common to colour these lozenges red, to distinguish them from those of ipecacuanha. A little carmine may be used for this purpose.

powdered ipecacuanha produces scarcely more effect than a small one, and probably for the reason given by M. Magendie above, yet this is supposed to arise from the powder being a bulky and insoluble substance. The truth of this explanation is supposed to be proved by the fact, that the same exemption from an increase of effect does not follow when emetic tartar is given in a large dose; its emetic power increasing with the dose. By analogy, a similar increase of effect might be when an increased dose of emetine is given; it being in solution, and in as small a bulk as in the case of emetic tartar. But M. Magendie is not a man to speak at random.—Tr.

One of these lozenges may be given every hour: if oftener, they will excite nausea.

PASTILLI EMETINÆ VOMITORII.

Emetic Lozenges of Emetine.

Take of

Sugar . . . . 2 ounces (1 oz. 7 dr. 45 gr. troy.)
Emetine . . . 32 grains (gr. 26.24 troy.)

Form into lozenges of 18 grains (gr. 14.76 troy) each.

One of these lozenges, taken fasting, is commonly sufficient to make a child vomit;—three or four do the same thing promptly for adults.

[M. Lerminier of the Hospital *La Charité*, has frequently administered emetine in this form, and, from his observations, he asserts that ten or twenty grains of the root of ipecacuanha are adequately represented, so far as regards intensity of action, by one or two grains of emetine. The convenient and agreeable form under which emetine may be administered, entitles it to a preference over ipecacuanha in substance: added to which several spurious sorts of ipecacuanha are frequently passed off in commerce, and, consequently, considerable disappointment

occasioned in the mind of the practitioner. The employment of the active principle of emetine would of course preclude these unpleasant occurrences.[e]]

The syrup of ipecacuanha of the shops may be replaced by the following: —

SYRUPUS EMETINÆ.

Syrup of Emetine.

Take of

Simple syrup 1 pound (15 oz. 6 dr. 1 gr. troy.)
Coloured emetine 16 grains (gr. 13.12 troy.)

This syrup may be employed under the same circumstances, and in the same manner, as the syrup of ipecacuanha.

[e] [*Clinique Medicale*, &c. Par M. Andral. Paris, 1823.]

EMETINA PURIFICATA.

Pure Emetine.

EMETINE, as treated of in the preceding article, is not in a state of purity. It is to pure emetine what moist sugar is to the white and crystallized. M. Pelletier, in a work, the chemical part of which is not yet finished, shows how the active matter of the different species of ipecacuanha may be isolated. This matter is a new vegetable alkali, the principal characters of which are as follow:

PREPARATION OF PURE EMETINE.

To obtain pure emetine, it is necessary to substitute calcined magnesia for the carbonate, used in the former process;[a] a sufficient quantity of this base being added to take up the free acid which exists in the liquor, and unite with that which is combined with the emetine.

[a] See above, page 85.—M.

The emetine, thus isolated, and rendered less soluble, is precipitated in combination with the excess of magnesia. This magnesian precipitate, after being washed by means of a little very cold water, to separate the colouring matter, which is not combined with the magnesia, must be carefully dried and digested in alcohol, which dissolves the emetine. After the emetine has been separated from the alcohol by evaporation, it must be redissolved in a diluted acid, and blanched by digestion with purified animal charcoal. It must then be precipitated by a salifiable base.

The waters used to wash the magnesian precipitate still contain emetine, which may be separated by a second series of operations.

Pure emetine is white, pulverulent, and unalterable by the air; although coloured emetine is deliquescent. It is scarcely soluble in water, but is very easily dissolved in ether and in alcohol. Its taste is slightly bitter. It restores the blue of turnsol when reddened by an acid. It is dissolved by all the acids, the acidity of which it diminishes, but without entirely destroying it. It resembles veratrine, in forming evidently crystallizable saline combinations with acids. It may be precipitated from these combina-

tions by the gall-nut, like the alkalies of the different species of cinchona.

ACTION OF PURE EMETINE ON MAN AND ON ANIMALS.

This action is similar to that of coloured emetine; but it is much more energetic. Two grains (gr. 1.64 troy) are sufficient to destroy a large dog. In one case the $\frac{1}{16}$th of a grain (gr. 0.051 troy) produced vomiting in a man of 85 years of age. It is true, however, that he was easily made to vomit.

MODE OF PRESCRIBING PURE EMETINE.

For some time past I have used the following lozenges:—

PASTILLI EMETINÆ PURIFICATÆ.

Lozenges of Pure Emetine.

Take of
Sugar . . . . 4 ounces (3 oz. 7 dr. 30 gr. troy.)
Pure emetine 8 grains (gr. 6.56 troy.)
Form into lozenges of 9 grains (gr. 7.38 troy) each.

To produce vomiting, a grain (gr. 0.82 troy) of pure emetine may be given in a draught; being first dissolved in acetic or

sulphuric acid, on account of its being so little soluble in water.

The following formula may be employed:

HAUSTUS EMETINÆ PURIFICATÆ VOMITORIUS.

Emetic Draught of Pure Emetine.

Take of

Infusion of the flowers of the Tilia	3 ounces (2 oz. 7 dr. 37 gr. troy.)
Pure emetine dissolved in a sufficient quantity of nitric acid .	1 grain (gr. 0.82 troy.)
Syrup of marshmallows	1 ounce (7dr. 52.56 gr. troy.)

A dessert-spoonful to be taken every quarter of an hour until vomiting be produced.

The following syrup may also be prescribed:

SYRUPUS EMETINÆ PURIFICATÆ.

Syrup of Pure Emetine.

Take of

Simple syrup . .	1 pound (15 oz. 6 dr. 1 gr. troy.)
Pure emetine .	4 grains (gr. 3.28 troy.)

To be given by tea-spoonfuls.

CYTISINA.

Cytisine.

THIS is the name of an immediate vegetable principle, bearing some analogy with emetine. It was discovered by MM. Chevallier and Lassaigne in the seeds of the *cytisus laburnum*,[a] which are indebted to it for their emetic and purgative properties.

PREPARATION OF CYTISINE.

The seeds of the *cytisus laburnum* must be digested in hot alcohol, the liquor evaporated, the residuum dissolved in water, and the solution precipitated by the acetate of lead: the lead is separated from the filtered liquor by sulphuretted hydrogen, and the fluid again filtered and evaporated.

[a] [The following are the chemical components of those seeds:—1. A greenish fatty matter, soluble in water and alcohol; 2. A green colouring matter; 3. *Cytisine;* 4. Woody fibre; 5. Albumen; 6. Malic and phosphoric acids; 7. Malates of potass and lime.—*Chevallier and Lassaigne.*]

PROPERTIES OF CYTISINE.

Cytisine is incrystallizable, of a brownish yellow colour, and bitter and nauseous taste; it is slightly deliquescent, very soluble in water and in dilute alcohol, and insoluble in ether. The acetate of lead does not render its aqueous solution turbid, whilst the subacetate slightly precipitates it: the infusion of galls occasions a yellowish white, flocculent precipitate, and the alkalies communicate to it a greenish yellow tint; the solution of gelatine does not precipitate it.

ACTION OF CYTISINE ON THE ANIMAL ECONOMY.

Cytisine, in the dose of from 50 to 100 *milligrammes* (gr. 0.77 to 1.54 troy), acts as an emetic or purgative: at a stronger dose it gives place to serious accidents, which seem to bear some relation with those produced by emetine.

MM. Chevallier and Lassaigne have likewise discovered in the flowers of the *arnica montana* a bitter, nauseous substance, resembling cytisine, and to which this plant, without doubt, is indebted for its emetic properties.

Cytisine has not hitherto been employed in medicine.]

QUININA ET CINCHONINA.

QUINIA, QUINA, ET CINCHONIA.

Quinine and Cinchonine, or Cinchonin.

MM. Laubert, Streuss of Moscow, and Gomez of Lisbon, published, some years ago, and about the same time, very interesting works on the cinchona; but they did not at all agree with respect to the substance in which they thought that the febrifuge property resided. MM. Pelletier and Caventou, led, by their preceding researches, to believe in the existence of such a substance, endeavoured to find it; and following the same principles which had so happily led to the discovery of strychnine, emetine, &c., they obtained a substance which they recognised as that which M. Gomez had described under the name of *cinchonine*:[a] they discovered also that it was alkaline—a very important property which had escaped the Lisbon chemist.

[a] [The term *cinchonin* was, however, first applied to this substance by Dr. Duncan, jun.]

They obtained the *cinchonine* by operating on the grey cinchona, the *cinchona condaminea*[b] (they add an *e* to *cinchonin*, to make the word harmonize with the names of the other vegetable alkalies). The yellow bark (the *cinchona cordifolia*[c]) furnished an alkali, which, although it resembled the first in many points, differed in too many important ones to allow of its being confounded with it. They called it *quinine*.

The analysis of the red bark (*cinchona oblongifolia*[d]) followed. It was an interesting

[b] [The *cinchona condaminea* yields on analysis the following constituents:—1. *Cinchonine* united with Kinic acid, (the cinchonine forming 0.2 per cent. of the whole bark;) 2. Green fatty matter; 3. Red colouring matter, very sparingly soluble; 4. Red colouring matter soluble (tannin); 5. Yellow colouring matter; 6. Kinate of lime; 7. Gum; 8. Fecula; and, 9. Ligneous fibre.—*Pelletier and Caventou.*]

[c] [The *cinchona cordifolia* yielded on analysis: 1. Yellow, odorous, adipocire; 2. Yellow colouring matter; 3. Tannin, which turns iron of a green colour; 4. Red of cinchona, more abundant than in the red bark; 5. Kinate of *quinine*, with very little *cinchonine*, (the quinine, according to Pelletier and Caventou, forming 0.9 per cent of the bark, and according to Voreton 1.4;) 6. Fecula; 7. Woody fibre; and, 8. Kinate of lime.—*Ibid.*]

[d] [The *cinchona oblongifolia* consists of:—1. Adipocire; 2. Yellow colouring matter; 3. Tan-

question to determine whether this species, which is considered by many medical men as eminently febrifuge,[e] contained cinchonine or quinine, or a third variety of alkali. They did not dream, however, of obtaining, not only cinchonine, in all respects like that of the grey bark, in threefold quantity, but almost twice as much quinine as they had been able to extract from an equal quantity of yellow bark. This quinine, however, had nearly all the characters of the other, and only showed some shades of difference in its greater fusibility, and the appearance of its sulphate.

Ulterior experiments, made on large masses, have shown, indeed, that quinine and cinchonine exist simultaneously in all the

nin; 4. Red of cinchona (very abundant in this bark; 5. Kinates of *cinchonine* and *quinine*, (100 parts of the bark yielding 0.8 of cinchonine, and 1.7 of quinine;) 6. Fecula; 7. Woody fibre; 8. Kinate of lime.—*Ibid.*]

[e] This is not the common opinion; at least so says Mr. Thomson, on the authority of Zea and Mutis, in his Dispensatory. We side, however, from theory, with M. Magendie's account of the eminent qualities of the red bark. Its containing so large a quantity of both cinchonine and quinine is apparently decisive of the question. Still Mr. Thomson says, "its taste is much less bitter," &c.—Tr.

three species of bark; but the cinchonine is, relative to the quinine, in greater quantity in the grey bark; whilst, in the yellow bark, the quinine so predominates, that the presence of the cinchonine might well have escaped notice when small quantities were operated on.

PREPARATION OF CINCHONINE AND QUININE.

Boil the bark in alcohol until it loses all its bitterness; evaporate to dryness in a water bath; dissolve the alcoholic extract entirely in boiling water strongly acidulated with hydrochloric acid; add an excess of calcined magnesia, which, after boiling some minutes, will fix all the red colouring matter, and make the liquid clear. When cold, filtrate and wash the magnesian precipitate with cold water; dry it on a stove; separate all the bitterness by repeated digestions in boiling alcohol; mix the alcoholic liquors, and the cinchonine will crystallize as the fluid cools. The cinchonine, which is thus obtained, still contains a green fatty matter, which may be separated by solution in a very weak acid. If the acid be too strong it will dissolve a part of the fatty matter,

and the intended object will be thus defeated.

Quinine may be obtained from the yellow bark by a similar process to the one described above.

It has been said that both cinchonine and quinine are to be found in all the three species of bark. They may be procured by one operation, as follows:—

After having obtained directly the sulphate of quinine, by the process described below, collect the mother waters and the washings of that operation; these contain the sulphate of cinchonine. It is probable that the sulphate has been rendered incrystallizable by the small quantity of fatty matter which is contained in these liquors. Decompose these liquors by magnesia or lime. Dissolve the quinine and cinchonine which they contain by digesting the magnesian precipitate, when washed and well dried, in boiling alcohol. If the spirit be sufficiently charged, the cinchonine, which predominates, will crystallize; if it do not, further concentration is required. To purify the cinchonine which is thus obtained, it must undergo a recrystallization. For this end, dissolve it in a sufficient quantity of boiling alcohol; it will thus become very pure. The alcoholic mother waters still contain

quinine, which may be separated by evaporation.[f]

CHEMICAL PROPERTIES OF CINCHONINE.

Cinchonine is white, translucent, crystallizable in needles, and soluble only in 700 parts of cold water. The latter circumstance occasions its trifling sapidity. If it be dissolved in alcohol, or rather in an acid, its flavour is a powerful bitter, which exactly resembles that of the grey bark. Cinchonine is only dissolved in very small quantity by the fixed oils, the volatile oils, and sulphuric ether; it forms more or less soluble salts with acids. Cinchonine is volatilized at a certain temperature: the largest portion of the substance, it is true, is destroyed during the operation, but still a sensible portion escapes the decomposing action of the caloric.

[MM. Pelletier and Caventou have asserted that cinchonine consists of oxygen, hy-

[f] [M. Carzoneri has lately obtained from the *æsculus hippocastanum*, by a process analogous to the above, an alkaline principle to which he has given the name of *esculine:* this principle is supposed to contain all the febrifuge virtues for which the æsculus has been celebrated..—*Journal de Pharmacie*, Nov. 1823.)

drogen, and carbon, and that it is deficient in nitrogen. Mr. Brande, however, has lately found that this assertion is erroneous; the following being the results of two experiments which he instituted:

Carbon . . .	80.20	Carbon . .	78.4
Nitrogen . .	12.85	Nitrogen .	14.6
Hydrogen .	6.85	Hydrogen	7.5
	99.90		100.5

Several experiments were made for the purpose of detecting the presence of oxygen, but no traces of it were discoverable.[g]]

The sulphate and acetate of cinchonine are used in medicine. The first of these salts is very soluble in water; the second is much less so, but an excess of acid dissolves it with tolerable facility.

CHEMICAL PROPERTIES OF QUININE.

Quinine is white and incrystallizable; it is as little soluble in water as cinchonine; it is much more bitter, however, to the taste. Its salts also are in general more bitter; they are distinguished by a pearly aspect. Quinine is very soluble in ether, while cinchonine is very little so. This difference

[g] [*Journal of Science*, &c. No. 32.]

not only serves to distinguish these bases, but also to separate them when united.

[Quinine differs likewise from cinchonine in the proportions of its elements; whilst no oxygen can be detected in the latter, it is contained, in nearly as large a proportion as hydrogen, in the former. The following, according to Mr. Brande, are nearly its ultimate components:

Carbon	73.80
Nitrogen	13
Hydrogen	7.65
Oxygen	5.55
	100]

QUININÆ SULPHAS.

Sulphate of Quinine.

M. Henry the younger has lately made known an expeditious and cheap process for obtaining directly the sulphate of quinine. He digests, repeatedly, in hot water, acidulated by sulphuric acid (6 or 8 grammes [gr. 92.66 or gr. 123.55 troy] to each kilogramme [oz. 32.17 troy] of distilled water). He blanches the liquors by means of hot lime, and washes the precipitate to separate the excess of lime. He repeatedly digests this precipitate, when well drained,

in alcohol at 36° (.837). He then obtains, by distillation, a brown viscid matter, which becomes brittle when cold, and is very bitter. He digests it in hot water, acidulated by sulphuric acid, and the liquor, when cold, gives perfect crystals of pure sulphate of quinine. He has not succeeded so well in extracting the sulphate of cinchonine from the grey bark by this mode of preparation.

The sulphate of quinine obtained in this way, is in the form of white crystals, which are entirely soluble in water; little so, however, in cold, but more so in boiling, and especially in weakly acidulated, water.[h]

QUININÆ SUPERSULPHAS.

Acid Sulphate of Quinine.

M. Robiquet, by proceeding somewhat

[h] Dr. Paris gives the above process with some variation. He directs two pounds of the powdered bark to be boiled for half an hour in sixteen pints of distilled water, acidulated with two fluid ounces of sulphuric acid. The quantity of lime recommended is half a pound, or enough to render the solution of a dark brown, and to produce a reddish brown precipitate. He says that the two pounds yield ʒv. or ʒvi. of the sulphate; 8 grains being equivalent to an ounce of bark.—Tr.

differently, has obtained a sulphate, the characters of which are not the same as those of the preceding. His sulphate is in solid transparent prisms, of a flattened quadrangular form, well terminated, and soluble even in the cold. M. Robiquet found, by comparative trials, that this difference arises from the prismatic sulphate being acid and the other alkaline. He is certain of the stability of these characteristics; for the salts preserve them without alteration after several crystallizations, although the subsulphate lost each time a small portion of its acid. M. Robiquet found, besides, that he constantly obtained the acid sulphate, only, when, in digesting the quinine in water, he could not succeed in dissolving it without a slight excess of acid; whilst, if he made use of alcohol, as the quinine is soluble in that fluid, it is more workmanlike to add only the quantity of acid which is necessary for saturation.

At present the neutral sulphate has been obtained only in solution.

COMPARATIVE ANALYSIS OF THE TWO SULPHATES OF QUININE.

M. Robiquet has given an analysis of the two sulphates in the work just quoted; but

as he found that the subsulphate lost a portion of its acid during each crystallization, he has given the composition of this salt both after the first and third crystallization.

100 parts of acid sulphate of quinine contain	of acid . .	19.1	82.6
	of quinine	63.5	
100 parts of subsulphate, first crystallization .	of acid . .	11.3	90.3
	of quinine	79.0	
100 parts of subsulphate, third crystallization	of acid . .	10.0	99.9
	of quinine	89.9	

QUININÆ ACETAS.

Acetate of Quinine.

The characteristic of this salt is the great facility with which it crystallizes; it is sparingly soluble in the cold, even with an excess of acid. It thickens in a mass when exposed to cold.

ACTION ON ANIMALS.

As soon as these alkalies were discovered, M. Pelletier, one of the discoverers, sent to me a certain quantity that I might study their effects on animals. I soon found that neither these alkalies nor their salts were in any respect poisonous, and indeed that they had no sudden appreciable action. This gave a sufficient assurance that they might be tried on man.

ACTION ON THE HUMAN BODY BOTH IN HEALTH AND IN DISEASE.

A sufficient number of cases induced me to believe that these two alkalies possess the medical properties of the cinchonas, and, consequently, that they may be substituted on all occasions. Several physicians, amongst whom I may mention MM. Double, Villermé, and Chomel, have arrived at similar conclusions.

[In a very interesting paper by Dr. Elliotson, in a late part of the *Medico Chirurgical Transactions*,[i] the febrifuge efficacy of both simple quinine and of the sulphate is strongly exemplified. In the practice of several of his friends, also, every case of intermittent fever presently yielded to the sulphate; when in some the bark had previously failed; its febrifuge properties are likewise confirmed by Dr. Dickson of Clifton.[k]]

We know how advantageous it is in the treatment of disease to be certain of the precise dose of all active remedies; this

[i] [Vol. xii. Part 2, p. 543.]

[k] [*Edinburgh Medical and Surgical Journal*, Oct. 1823.]

advantage especially applies to the present case, because the quantity of the alkalies contained in the cinchonas varies prodigiously, according to the nature and quality of the bark which is employed. It is often also very desirable to administer this medicine in a small volume and in an agreeable form. Patients often die of malignant fevers, because they cannot swallow the necessary quantity of the bark in powder. Some throw it up after having taken it; and in others superpurgation arises, so that the powder passes through the intestinal canal without producing any effect; even in the most favourable cases it is necessary the patient's stomach should, as it were, chemically analyze the bark, with which it is filled, and extract its febrifuge principle. A process like this will be always difficult and fatiguing even for the strongest stomach. Chemistry, therefore, has done a great service to medicine, by showing how this separation may be accomplished beforehand.

MANNER OF EMPLOYING THE ALKALIES EXTRACTED FROM THE CINCHONAS.

The sulphates of quinine and cinchonine are the preparations most commonly

employed. From one to ten grains (gr. 0.82 to gr. 8.2 troy) of either of them may be given in the twenty-four hours. Some physicians have thought it necessary to carry the dose much higher than this, but in general the success has not answered their expectations; several patients, indeed, have experienced somewhat severe accidents, such as great agitation with very strong cerebral excitement. In no case have I been obliged to give more than ten grains (gr. 8.204 troy) in the twenty-four hours, and I have never found it fail in its effect.

M. Pelletier has prepared, according to my formula, a colourless and transparent syrup of cinchona, each ounce (7 dr. 52 gr. troy) of which contains two grains (gr. 1.64 troy) of quinine. I daily use this preparation with the most satisfactory results; it appears to me to exert a beneficial influence over the scrophulous affections of children.

SYRUPUS QUININÆ.

Syrup of Quinine.

Take of
Simple syrup . . 2 pounds (31 oz. 4 dr. 2 gr. troy).
Sulphate of quinine 64 grains (gr. 52.48 troy).

Six spoonfuls of this syrup are commonly sufficient to arrest the progress of intermittent fevers; I have seen even one of the pernicious kind yield to the same dose.

VINUM QUININÆ.

Wine of Quinine.

Take of

Good Madeira wine .	1 litre (oz. 32.104 troy).
Sulphate of quinine .	12 grains (gr. 9.84 troy).

This preparation may be made with Malaga wine, or even with *vin ordinaire*.

TINCTURA QUININÆ.

Tincture of Quinine.

Take of

Sulphate of quinine	6 grains (gr. 4.92 troy).
Alcohol of 34° (.847)	1 ounce (7 dr. 52.5 gr. troy).

The sulphate is to be preferred to the pure quinine in this case, because, when the tincture is made by using alkali not saturated by an acid, a precipitate is formed on adding it to aqueous liquors.

The wine of quinine may be extemporaneously prepared by putting two ounces (1 oz. 7 dr. 45 gr. troy) of the tincture to each pint bottle (lbs. 2.54 troy) of wine.

PREPARATIONS OF CINCHONINE.

Cinchonine has also been employed as a febrifuge and tonic, particularly by Dr. Chomel; but although both these properties have been observed in it, it would seem to possess them in a minor degree than the quinine; in certain cases, indeed, the febrifuge effect has been completely wanting. It is consequently to be desired that practitioners should institute fresh trials regarding the virtues of this substance, which is found in almost all the cinchonas united with quinine, and may be met with alone in that of Carthagena. In order to forward such researches, I have made the following formulæ :—

SYRUPUS CINCHONINÆ.

Syrup of Cinchonine.

Take of

Simple syrup . 1 pound (15 oz. 6 dr. 1 gr. troy).
Sulphate of cinchonine 48 grains(gr.39.36 troy).

This syrup may be employed in the same doses, and under the same circumstances, as the syrup of quinine.

VINUM CINCHONINÆ.

Wine of Cinchonine.

Take of
Madeira wine . . . . 1 litre (oz. 31.104 troy).
Sulphate of cinchonine 18 grains (gr. 14.76 troy).

Like the wine of quinine, this may be made with *vin ordinaire*.

TINCTURA CINCHONINÆ.

Tincture of Cinchonine.

Take of
Sulphate of cinchonine 9 grains (gr. 7.383 troy).
Alcohol at 34° (.847) 1 ounce (7 dr. 52.5 gr. troy).

This tincture may be used for preparing extemporaneously the wine of cinchonine, by adding two ounces (1 oz. 7 dr. 45 gr. troy) of the tincture to a pint (lbs. 2.54 troy) of Madeira wine.

VERATRINA, VERATRIA.

Veratrine.

It is again to the labours of MM. Pelletier and Caventou that we are indebted for the new alkali which we are about to consider. These indefatigable chemists having remarked, that almost all the individuals of the family of veratrum, besides having the characteristics described by botanists, possess a very acrid taste, and exercise a common action over animals, thought that it would be interesting to discover if these properties did not arise from a particular substance common to all these plants. An analysis of the seeds of the *veratum sabadilla*[a] confirmed their conjectures. They

[a] [This analysis furnished the following constituents:—1. A fatty compound, composed of oil, adipocire, and cevadic acid; 2. Wax; 3. Yellow extractive colouring matter; 4. *Veratrine*, forming with gallic acid an acid salt; 5. Gum; 6. Woody fibre. The ashes, which were in small quantity, were almost wholly composed of the carbonate and phosphate of lime, with some traces of the hydrosulphate and carbonate of po-

isolated this acrid principle, in which they recognised all the alkaline characters. They ultimately discovered it in the root of the colchicum (*colchicum autumnale*[b]), and in that of the white hellebore (*veratrum commune*[c]); and they called it *veratrine*, from the name of the family to which these vegetables belong.

tass, and silica. Meissner, however, gives the most elaborate analysis of this substance: he found it to consist of—Fixed oil 24.2; adipocire 0.43; wax 0.1; resin, soluble in ether 1.45; resin, insoluble in ether 8.43; *veratrine* 0.48; bitter extractive, with an undefined acid 5.97; sweet extractive 0.65; gum 4.82; oxygenated extractive (ultrine ?) which may be extracted by potass 24.14; woody fibre 20.56; phyteumacolle with hydrochlorate of potass, and a vegetable salt with a base of potass 1.21; oxalate of lime with bassorine 1.06; water 6.4.]

[b] [The root of the colchicum, according to MM. Pelletier and Caventou, yields on analysis:—1. A fatty matter composed of oil, adipocire, and a volatile acid; 2. Yellow extractive colouring matter; 3. Acid gallate of *veratrine*; 4. Gum; 5. Fecula, with inuline and woody fibre. It yields very few ashes.]

[c] [The root of the *veratrum album* or *commune* yields, 1. A fatty matter composed of oil, adipocire, and an acid similar to the cevadic, but incrystallizable; 2. Yellow extractive colouring matter; 3. Acid gallate of *veratrine*; 4. Gum; 5. Fecula; 6. Woody fibre. The ashes contain carbonates of potass and lime, sulphate of lime and silica.—*Pelletier and Caventou.*]

PREPARATION OF VERATRINE.

They repeatedly digested the seeds of the *veratrum sabadilla* in boiling alcohol. These tinctures, filtrated whilst almost boiling, deposited, on cooling, whitish flakes of wax. They re-digested the matter which remained dissolved, after evaporating it to the consistence of an extract, in cold water: a small quantity of fatty matter now remained on the filter. The solution was slowly evaporated, and it formed an orange yellow precipitate, which possessed the characteristics of the colouring matter found in almost all the woody vegetables. On adding a solution of acetate of lead to the liquor, which was still deeply coloured, a new and very abundant yellow precipitate was immediately formed, which was separated by means of the filter. The liquor, now nearly colourless, still contained, amongst other substances, the acetate of lead, which had been added in excess: a current of hydrosulphuric acid was used to separate the lead. The liquor was then filtrated and concentrated by evaporation, treated by magnesia, and again filtrated. The magnesian precipitate was digested in boiling alcohol. The alcoholic liquors yielded, on evapora-

tion, a pulverulent substance, which was extremely acrid, and possessed all the properties of the alkalies. This substance was at first yellowish; but, by solutions in alcohol, and subsequent precipitations, caused by pouring water into the alcoholic solutions, it was obtained in the form of a very white and perfectly inodorous powder.

[M. Meissner, who discovered the veratrine nearly at the same time as MM. Pelletier and Caventou, recommends the seeds of the *cevadilla* to be treated with absolute alcohol, the alcoholic infusion evaporated, the residuum treated with water, the liquor filtered, and the veratrine to be precipitated by the carbonate of potass: it then only remains to wash the precipitate with water.[d]]

CHEMICAL PROPERTIES OF VERATRINE.

Veratrine is scarcely at all soluble in cold water; boiling water, however, dissolves $\frac{1}{1000}$ of its weight, and becomes sensibly acrid.

It is very soluble in ether, and still more so in alcohol. It is insoluble in the alkalies, and soluble in all the vegetable acids.

[d] [*Chimie Organique de Gmelin.* P. 400.]

It saturates all the acids, and forms with them incrystallizable salts, which, on evaporation, take the appearance of gum. The sulphate alone affords rudiments of crystals when its acid is in excess.

Nitric acid combines with veratrine; but if added in excess, especially when concentrated, it does not produce superoxidation, as in the cases of morphine and strychnine; but very rapidly resolves the vegetable substance into its elements, and gives birth to a yellow detonating matter analogous to the *bitter of Welther.*

Veratrine restores the blue of turnsol paper when reddened by acids. Exposed to the action of heat, it liquefies at a temperature of 50° (122° Fah.) above zero, and has then the appearance of wax: on cooling, it forms an amber-looking mass of a translucent appearance. Distilled on the naked fire, it swells up, becomes decomposed, and produces water, much oil, &c. A voluminous, carbonaceous, mass remains, which, when incinerated, leaves only a very slightly alkaline residuum.

ACTION OF VERATRINE ON ANIMALS.

A very small quantity of acetate of veratrine[e] thrown into the nostrils of a dog, instantly provokes violent sneezing, which sometimes continues for nearly half an hour.

One or two grains (gr. 0.82 or 1.64 troy) placed in the gullet, immediately occasions copious salivation, which continues for some time.

If a small quantity be thrown into any part of the intestinal canal, and the body be opened to observe the effects, the intestine is found to become much indurated, and to relax and contract alternately for a certain time. The part of the mucous membrane which comes in contact with the veratrine is inflamed; the irritation spreads, and vomiting and purging are produced. In a much larger dose the substance induces a very great acceleration of the circulation and of respiration, which is soon followed by tetanus and death.

[e] Of all the preparations of veratrine, the acetate alone, as being one of the most active, has been used in the experiments instituted for determining the action of this substance on animals.—M.

The effects are still more rapid if one or two grains (gr. 0.82 or 1.64 troy) be thrown into the pleura, or into the tunica vaginalis. In less than ten minutes death occurs, preceded by tetanic convulsions.

The same quantity thrown into the jugular vein also induces tetanus and death, in a few seconds. Dissection shows, even in this case, that the veratrine has produced an effect on the intestinal canal; for the mucous membrane is found to be highly injected. The lung also presents signs of inflammation and of engorgement.[f]

[f] It is apparent from the above, that when a small quantity of this substance is placed in the intestinal canal, it produces only local effects, or, at least, that the effects are restricted to the canal; and that it must be given in a large dose, or be applied to parts whence absorption goes on very actively, as to the pleura and the tunica vaginalis, in order that its terrific general effects above-mentioned may be produced.—M.

It may be added to this note of the author, that the deleterious effects of an over-dose of colchicum in the human subject do not exactly accord with the account given by him. Colchicum certainly induces inflammation of the mucous membrane of the bowels, whenever it is given in too large a dose; the translator, from a large experience, thinks in all cases: but it never, probably, produces tetanic convulsions, nor any thing re-

ACTION OF VERATRINE ON MAN IN A STATE OF HEALTH AND DISEASE.

The effects of veratrine in a large dose have not been observed on man: they would,

sembling them. The translator thinks it right to give the following fatal case of gout, from an over-dose of the tincture of colchicum bulb, in elucidation of this opinion. He has also heard of other corroborative cases, where death followed a large dose of other preparations of colchicum, especially one, where a female took a tea-spoonful of the seeds. The note of the case of gout, made at the time, has been kindly furnished by the attendant practitioner.

"Mrs. ——, aged forty, after frequently suffering from gout, requested her medical man to give her the colchicum in a very severe fit.

"She took ʒiiss. of a tincture made by infusing ʒiv. of the root in ʒviij. of proof spirit for three days, the mixture being kept at nearly 100° of temperature. This was given in the morning of Dec. 5. In the evening it had produced no effect, except slight qualmishness. Calomel gr. iij. opii gr. i. was ordered at bed-time, and a purging draught for the morning. However, in the night, vomiting and purging commenced, and continued all the next day, in spite of effervescing volatile saline draughts with opium; so that, in the evening of the 6th, opii gr. i. camphor gr. iii. were given and repeated in two hours.

"On the 7th, from accident, she was not seen till three *h. m.*, when she was found in the col-

however, doubtless be the same as those which are noticed in animals.

The taste of veratrine is very acrid, but without bitterness. It excites a very copious salivation, however small the quantity may be which is put into the mouth.

Though veratrine is absolutely inodorous, it is inconvenient to smell at it too closely

lapse preceding death. The gout had previously gradually subsided. It was stated that she became faint at two o'clock *p. m.*, and not till then were her friends alarmed. By opium and spirits warmth was reinduced upon the extremities, and a feeling of greater comfort produced; but the pulse never completely recovered, although the sickness was completely subdued; so that at ten *p. m.* she fell into an apoplectic kind of sleep, which terminated in death before morning.

"It is peculiar, in this case, that Mrs. —— was delicate, and some years before had nearly suffered death from incessant vomiting attended by cold extremities; it was relieved by inducing gout on the swelled knee by mustard cataplasms. In the fatal attack the sinapism was applied, with the effect of producing great pain, but without inflammation or heat of skin.

"It should be mentioned also, that this female's mother is exceedingly susceptible of the action of colchicum, in even very small doses. The attendant practitioner begged also to add, that he only prescribed so large a dose as ʒiiss., because the tincture had only been made three days, and the formula directed it should be infused a fortnight."

when in a state of powder; for even the small quantity which is thus carried into the nostrils is often sufficient to produce violent sneezing, which may become dangerous.

A dose of a quarter of a grain (gr. 0.205 troy) rapidly induces very abundant alvine evacuations. If the dose be augmented, more or less violent vomiting is occasioned.

I have lately given it in the dose of two grains (gr. 1.64 troy) in the 24 hours, without producing too many alvine evacuations. The subject of the case was an old man, who had been struck with apoplexy some time previously. This circumstance forms an additional proof of the influence which the nervous system possesses over the mode of action of medicines.

After having cautiously tasted the mixture which contained the two grains (gr. 1.64 troy) of veratrine, I experienced, for several hours, an almost insupportably acrid sensation in the mouth and pharynx, the impression of which had not entirely disappeared on the following day. The patient felt no such inconvenience.

CASES PROPER FOR THE EXHIBITION OF VERATRINE.

As veratrine produces the same effects as the plants from which it is extracted, it may be substituted very advantageously for them; because it permits the quantity of the active substance used to be estimated, which the others do not.

Veratrine is particularly applicable in cases where it is necessary to excite quickly a strong action of the bowels. When given with this intention, it has answered very well in the case of old people, where an enormous accumulation of fæces existed in the great intestine.

ACIDUM HYDROCYANICUM, ACIDUM PRUSSICUM.

Hydrocyanic, or Prussic Acid.

In a paper laid before the Academy of Sciences in November, 1817, I made known the successful results which followed the employment of prussic acid in the treatment of diseases of the chest. Since that period this medicine has been used by a great number of medical men, not only in Europe, but in several towns of the United States of America. Every where the success has been the same; so that this formidable substance may now be considered as one of the most interesting remedies which we possess.

Scheele discovered the prussic acid in 1780; but he only obtained it mixed with a varied proportion of water. M. Gay-Lussac first procured it in a state of purity.[a]

PHYSIOLOGICAL PROPERTIES.

This acid is liquid, transparent, and colourless, at the ordinary temperature. Its

[a] *Annales de Chimie*, tom. lxvii. p. 128, and tom. xcv. p. 136.

taste is at first cooling, but soon becomes acrid and irritating. It slightly reddens the tincture of turnsol, has a very powerful, and, it may be, deleterious, odour, which is only supportable when mixed with a very large quantity of air. It is then found to be the same as the odour of bitter almonds.

CHEMICAL PROPERTIES.

Prussic acid is very volatile; in fact, it boils at 26°.5 (79.7 Fah.) under a pressure of $0^m.76$,[b] and at 10° (50 Fah.) it sustains a column of mercury of $0^m.38$; still its congelation takes place at 15° (59 Fah.). Also,

[b] $0^m.76$ probably means $\frac{76}{100}$ of a metre; if so, it is equal to 29.9 English inches, and $0^m.38 = 14.95$. With regard to the $0^m.38$ as the measure of a column of mercury, it may be useful to remark, that it is not uncommon to estimate the force of the expansion of all fluids at any temperature by the column of mercury which they will sustain. This is done by introducing into a Torricellian vacuum a small portion of the fluid to be examined, and applying heat thereto. The apparatus is a curved tube, with two pretty nearly equal legs, one of them being sealed, and the other open to the atmosphere. The force of the vapour is shown by the depression of the mercury in the sealed leg, and its elevation in the other; the difference in the height of the two columns being the measure of it.—Tr.

when a few drops are put on paper, the portion which almost immediately evaporates, produces enough cold to crystallize the rest. It is only the liquid which possesses this property.

Prussic acid is but little soluble in water; hence, when shaken with ten or twelve times its volume of that fluid, it again collects on the surface like the oils and the ethers. Alcohol easily dissolves it.

When left to itself in close vessels, it sometimes becomes decomposed in less than an hour. It rarely preserves its integrity for more than a fortnight.

MODE OF PREPARING THE PRUSSIC ACID.

Hydro-cyanic acid is obtained by digesting the crystallized deuto-cyanuret of mercury, in two-thirds of its weight of liquid and slightly fuming hydrochloric acid, in a tubulated retort, which communicates with a receiver containing fragments of chloruret of calcium and chalk, and which itself communicates with a much smaller receiver, destined to collect the product. These receivers must be surrounded by a mixture of ice and salt. After the deuto-cyanuret of mercury, and the acid have been successively put into the retort, a slight heat is to

be applied; a little ebullition soon succeeds, arising in part from the evaporation of the prussic acid, which is formed, and is condensed in the first receiver with a little hydrochloric acid and water. When the quantity of water becomes very sensible, the operation must be suspended, in order that the product already obtained may be purified; this is performed by isolating the first receiver from the retort, taking away the ice which surrounds it, and replacing the ice by water at 32 or 33 degrees (89.6 or 91.4 Fah.). Under these circumstances the hydro-cyanic acid passes alone into the smaller receiver; for the water and the hydrochloric acid, which were at first volatilized with it, are now retained in the first receiver; the water by the chloruret of calcium, and the hydrochloric acid by the lime.

[M. Gea Pessina, a pharmacien at Milan, has recommended the following process for obtaining the hydrocyanic acid from Prussian blue of a uniform strength:—

Eighteen parts of the ferruginous prussiate of potass, are to be introduced in a state of fine powder into a tubulated glass retort, to which a small globular and tubulated receiver is adapted; whence a tube issues, which is dipped into a flask contain-

ing a small quantity of distilled water. A refrigerated mixture, of nine parts of concentrated sulphuric acid and twelve of water, is then poured into the retort: the tubulure closed, and the whole left at rest for twelve hours: the globular receiver being surrounded with ice, and the neck of the retort constantly cooled with wet cloths: the materials are afterwards heated, and the heat kept up until the striæ which are observed in the neck of the retort during the operation become more rare, and until a blue matter is ready to pass into the receiver. The fire is then to be removed: the whole allowed to cool, and the contents poured into a proper vessel. According to M. Pessina, the hydro-cyanic acid thus obtained has a strong and penetrating odour. Its s. g. is from 0.898 to 0.900 at the temperature of 13° or 14° Reaumur, (62° or 64° Fah.), and it possesses every property of the pure prussic acid.[c]]

ACTION ON ANIMALS.

One drop of pure prussic acid placed in the throat of the most vigorous dog makes

[c] [*Giorn. di Fisica*, August, 1822; and *Journal de Pharmacie*, 1823, p. 16.]

it fall stone dead, after two or three deep and hurried inspirations.

The effects of placing a small quantity of the acid in the eye are similar and almost as sudden.

A drop of acid mixed with a few drops of alcohol, when injected into the jugular vein, kills the animal instantly, as if he had been struck by lightning.

Scarcely any traces of irritability can be found, a few moments after death, in the muscles of animals thus poisoned by prussic acid.

ACTION ON MAN IN A STATE OF HEALTH AND IN DISEASE.

Pure prussic acid produces the same effects on man as on animals. Even the vapour of it must be cautiously avoided; for, if breathed, it produces considerable pain in the chest, and a feeling of oppression, which often remains for several hours.

[We are told by Professor Orfila, that a professor of Vienna having prepared a pure and concentrated prussic acid, spread a certain quantity of it on his naked arm, and died a short time afterwards.]

When properly diluted, however, it has the effect of calming the increased irritability

which resides in certain organs when in a state of disease.

Even when given in proper doses, if the intervals be too short, it will produce headache; and a species of vertigo, which goes off in a few minutes.

CASES IN WHICH IT MAY BE PRESCRIBED.

Properly diluted prussic acid may be given with success in all cases of augmented irritability of the pulmonary organs. Hence it is proper in the treatment of nervous and chronic coughs, of asthma, of hooping-cough, and in the palliative treatment of consumptions. Nay, numerous observations would seem to show that it will cure this latter disease when not beyond its first degree. In England it has been used with success for that hectic cough which is sympathetic of an affection of another organ, and in dyspepsia. In Italy it has been found to calm the too great irritability of the uterus, even in cases of cancer, and to moderate the activity of the heart in almost all sthenic diseases.

MODE OF PRESCRIBING IT.

The medical properties of prussic acid, prepared according to Scheele's method,

are not sufficiently determinate, on account of the arbitrary nature of the process. It is better, then, to use M. Gay-Lussac's acid, when properly diluted by adding six times its volume, or 8.5 times its weight of distilled water. A mixture is formed, which I call *medicinal prussic acid.*

I commonly use the following forms:—

MISTURA ACIDI HYDROCYANICI.

Mixture of Prussic Acid.

(*Mélange pectoral.* MAGENDIE.)

Take of
Medicinal prussic acid 1 gros (gr. 59.07 troy).
Distilled water . 1 pound (15 oz. 6 dr. 1 gr. troy).
Pure sugar . . . 1½ ounce (11 dr. 10 gr. troy).

Take a dessert-spoonful every morning and evening at bed-time. The dose may be gradually increased to six or eight spoonfuls in the twenty-four hours.

It is necessary to shake the mixture every time it is used, lest great inconvenience arise from the acid being accumulated on the surface.

POTIO ACIDI HYDROCYANICI.

Potion of Hydrocyanic Acid.

(*Potion Pectorale.* MAGENDIE.)

Take of
Infusion of ground ivy 2 ounces (1 oz. 7 dr. 45 gr. troy.)
Medicinal prussic acid 15 drops.
Syrup of marshmallows 1 ounce (dr. 7.52 troy.)

A dessert-spoonful to be taken every nine hours, always shaking the bottle.

SYRUPUS ACIDI HYDROCYANICI.

Hydrocyanic Syrup.

Take of
Clarified syrup . 1 pound (15 oz. 6 dr. 1 gr. troy.)
Medicinal prussic acid 1 gros (gr. 59.07 troy.)

This syrup may be added to common pectoral mixtures, and be used as other syrups are.[e]

[e] In this country Scheele's method of preparing prussic acid is used almost exclusively, and forms the preparation which is obtained from Apothecaries Hall and other places. We shall, therefore, give this process below. The dose of this preparation is from two to eight minims given in distilled water, or in almond emulsion. The translator's doses, however, are regulated by a different rule. He thinks that the advantageous

[LOTIO ACIDI HYDROCYANICI.

Hydrocyanic Lotion.

Take of Hydrocyanic acid . . . f. ʒiv.
Rectified spirit of wine f. ʒj.
Distilled water . . . . . f. ʒxss.

This lotion has been used with the utmost benefit by Mr. A. T. Thomson in impeti-

effects of prussic acid, as well as of other powerful remedies, as digitalis, can only be obtained by increasing the dose to the required amount, let that be what it may. But he dare not, with such views, entrust the rate of increase to the patient's discretion: he, therefore, gives nearly every dose himself, regulating the increase and the interval by the effect produced. He makes these observations here, because he is sure that powerful and valuable remedies like these have fallen into disuse, on account of the insufficient or evil effects which have followed a less methodical or cautious exhibition of them.

Scheele's Process, as given by Mr. Thomson, p. 23.—"Mix two ounces of prussian blue with six ounces of red precipitate of mercury, and add six ounces of water: boil the mixture for some minutes, constantly agitating it, when the blue colour will disappear, and the mass assume a yellowish grey hue. Pour the whole on a filter, and wash the residuum with a little hot water, which is to be added to the filtered liquor. Pour this upon an ounce and a half of clean iron filings, and add three drachms of strong sulphuric acid. Shake this mixture well, and after the powder subsides, pour the fluid into a retort, and distil

go: it completely allayed the distressing and intolerable itching and tingling with which the subjects of this severe affection are tormented, in two cases, where other external applications and the internal use of anodynes had been of no avail; the discharge was diminished by it and rendered milder: alterative doses of mercury, combined with sarsaparilla, formed the internal treatment.[f] Mr. Thomson has also found this ointment useful, in combination with small doses of oxymuriate of mercury, in *acne rosacea*, and several other cutaneous diseases.]

one-fourth part of it over into a well-luted receiver. This is the hydro-cyanic acid, containing an admixture of a little sulphuric acid, which is readily separated by means of barytic water. La Planche recommends $\frac{1}{6}$ only to be distilled over, and this to be rectified by means of a gentle fire over $\frac{1}{200}$ of carbonate of lime, drawing off afterwards, by means of a gentle fire, $\frac{3}{4}$ only of the whole, thus treated by a second distillation. The acid is obtained of a uniform strength by this method."

Other practitioners again prefer *laurel water*, made by distilling two drachms of fresh leaves chopped with four ounces of water, recommitting the distilled water twice afterwards on the same quantity of fresh leaves, and making, ultimately, four ounces of the menstruum; of which, from xxx minims to f. ʒj. every six hours, may be given until a sedative effect is produced.—Paris's *Pharmacologia*, vol. ii. p. 23.

[f] [*London Med. and Phys. Journal*, Feb. 1822.]

REMARKS ON PRUSSIC ACID.

It is not without reason that we have objected to the employment of *Scheele's prussic acid:* in fact, this acid is never constant in the proportion of the real acid and the water which it contains, if Scheele's process be followed in the making of it: this is owing to the difficulty which exists in uniting the same circumstances in each operation. If, in order to avoid this inconvenience, we wish to prepare the acid called *Scheele's*, with the pure acid of M. Gay-Lussac, by diluting the latter acid with water, what quantity must we add to it? M. Robiquet (*Journal de Pharmacie*, 1818) proposes to employ two parts of water to one of the pure acid. The acid of Scheele, thus prepared, is twice as strong as the acid which I have recommended, and is consequently attended with greater inconveniences in its employment. These inconveniences are made still greater by the incorrect manner in which M. Robiquet's process is detailed in the *Codex de Paris*. In this formulary it is recommended, quoting at the same time M. Robiquet's *Mémoire*, to dilute the prussic acid with an equal quantity of water. After describing this process, the same work gives the form for a syrup in

which the prussic acid, thus prepared, enters in the proportion of one part to nine of simple syrup. The syrup, so prepared, can only be administered by drops.[g] Should, unfortunately, an ounce (7 dr. gr. 52.56 troy) be mixed in a potion, it would produce death.

Notwithstanding what we have just said regarding the strength of the *prussic acid of Scheele*, prepared according to the *Codex*, and the process of M. Robiquet, the majority of physicians represent it as much weaker than my *medicinal prussic acid*, and sometimes order it in the proportion of more than *a gros* (gr. 59.97 troy) in a potion of four ounces (3 oz. 7 dr. 30 gr. troy) to be taken by spoonfuls. The *pharmaciens* of Paris are in general so much accustomed to see the *prussic acid of Scheele* enter in a large dose into medical prescriptions, that, in order to avoid accidents, they prepare this acid by diluting the prussic acid of Gay-Lussac with *forty parts* of water. This perfectly arbitrary quantity of water, permits them, at least, to fulfil, without danger, the orders which they receive, when, from the high dose of the acid, they observe that it is not my *medicinal acid* which the physician could have meant in his prescription.

[g] Several serious accidents have followed the employment of this syrup of the new Codex.—M.

SOLANINA. SOLANA.

Solanine.

This alkali has been very lately discovered by M. Desfosses, apothecary at Besançon, in two species of the family of *solanum*, namely, in the nightshade (*solanum nigrum*), and the bitter-sweet (*solanum dulcamara*). It exists in both these plants; but whilst it is evidently contained in the leaves of the latter, those of the nightshade afford no traces of it.

PREPARATION OF SOLANINE.

It is found most abundantly in the berries of the nightshade, where it exists in the state of a malate. In order to obtain it, digest the filtrated juice of these berries in ammonia; a greyish precipitate is formed, which, when washed on a filter and digested in boiling alcohol, gives, by evaporation, the salifiable base in a state of sufficient purity, if perfectly ripe berries have been operated on; but if the berries have been green, the solanine is mixed with a certain quantity

of *chlorophylle*,[a] which cannot be separated without much difficulty.

PROPERTIES OF SOLANINE.

Perfectly pure solanine is in the form of a white, opaque, and sometimes pearly, powder.

It is inodorous; its taste is slightly bitter and nauseous; and its bitterness is developed by solution in acids, especially in acetic acid. Its salts are incrystallizable, the solutions giving by evaporation a gummy transparent mass, which may be easily powdered.

Solanine is insoluble in cold water, and hot water only dissolves $\frac{1}{8000}$th part. Alcohol dissolves a small quantity.

Its alkaline properties are slightly manifested by its action on turmeric. It, however, restores the blue of turnsol paper when reddened by acids. It unites with acids even in the cold, and perfectly neutral solutions may be obtained if care be used. Like all other vegetable alkalies, it is saturated by a very small quantity of acid.

[a] [This term is applied to the colouring principle of the green parts of plants, especially of the leaves.]

ACTION ON ANIMALS.

From two to four grains (gr. 1.64 to gr. 3.28 troy) introduced into the stomach of a dog or cat, excites violent vomiting, which is soon followed by a sleep of several hours. Even eight grains (gr. 6 56 troy) were insufficient to kill a young cat. After vomiting violently, the animal slept soundly for more than thirty-six hours.

ACT ON ON MAN.

A very small quantity of solanine produces great irritation in the throat. It has a slightly bitter, nauseous flavour in the mouth; which is much more intense, however, if the substance be dissolved in a little acetic acid. The acetate is the only salt which has been tried on man: a quarter of a grain (gr. .205 troy) produces nausea, but no disposition to sleep.

It appears then that solanine, like opium, produces vomiting and sleep; but whilst its emetic properties seem to be more apparent than those of opium, its narcotic ones are evidently much less powerful.

CASES IN WHICH SOLANINE MAY BE USED.

It has not yet been tried in cases of disease, but it may be used wherever the extract of nightshade, or that of dulcamara, is indicated.

ATROPINA. ATROPIA.

Atropine.

This substance was discovered by Brandes, in the *atropa belladonna*,[a] and it is in this salifiable base he considers that all the medical and deleterious properties of the belladonna reside.

PREPARATION OF ATROPINE.

In order to obtain this principle, M. Brandes boiled two pounds of the dried leaves of the *atropa belladonna* in a sufficient

[a] [The *atropa belladonna* yields on analysis the following constituents :—Wax 0.7 ; resinous chlorophylle 5.84 ; acid malate of *atropine* 1.51 ; gum 8.03 ; fecula 1.25 ; woody fibre 13.7 ; phyteumacolle 6.9 ; a matter analogous to osmazôme, with malate of *atropine*, oxalate, hydrochlorate, and sulphate of potass 16.05 ; soluble albumen 4.7 ; hard albumen 6 ; ammoniacal salts and acetates, malate of *atropine*, oxalate, malate, sulphate, hydrochlorate, and nitrate of potass ; oxalate, malate (?) and phosphate of lime, and malate and phosphate of magnesia 7.47 ; water 25.8 ; loss 2.05. The ashes contain oxide of copper.—*Brandes and Vauquelin.*]

quantity of water, pressed out the decoction, and boiled the leaves again in water. The decoctions were mixed, and some sulphuric acid was added in order to throw down the albumen and similar bodies: the solution was thus rendered thinner, and passed more readily through the filter. The decoction was next supersaturated with potass; by which he obtained a precipitate, weighing, after having been washed with pure water and dried, 89 grains. It consisted of small crystals, from which, by solution in acids, and precipitation by alkalies, atropine was obtained in a state of purity.[b]

Or, atropine may be obtained by digesting the decoction of the herb of the *atropa belladonna* with magnesia; boiling the precipitate in alcohol and filtering; the atropine crystallizes, on cooling, in needles or colourless translucent and shining prisms.[c]

PROPERTIES OF ATROPINE.

Atropine, according to M. Brandes, is white, almost insoluble in water, and much more soluble in hot than in cold alcohol,

[b] [Ure's *Chemical Dictionary*, art. *Atropia.*]

[c] [*Chimie Organique*, par Leopold Gmelin: edition de Virey. p. 398.]

and insoluble in ether and the oils. It forms with acids neutral crystallizable salts.

ACTION OF ATROPINE ON THE ANIMAL ECONOMY.

When M. Brandes was experimenting on this alkali, he was obliged to desist, in consequence of the violent headaches, pains in the back, and giddiness, with frequent nausea, which the vapour of atropine occasioned: it had, indeed, so injurious an effect upon his health, that he has entirely abstained from any further experiments, and no one has hitherto repeated them. He once tasted a small quantity of the sulphate of atropine; the taste was not bitter, but merely saline: there soon followed, however, violent headache, shaking in the limbs, alternate sensations of heat and cold, oppression of the chest, difficulty in breathing, and diminished circulation of the blood. The violence of these symptoms ceased in half an hour. Even the vapour of the various salts of atropine produces vertigo. When exposed for a long time to the vapours from a solution of nitrate, phosphate, or sulphate of atropine, the pupil of the eye becomes dilated. This occurred frequently to M. Brandes; and when he tasted the salt of

atropine, the dilatation followed to so great a degree, that it persisted for twelve hours, and was not influenced by the different shades of light.[d]

M. Brandes has also succeeded in extracting from the seeds of the *Datura stramonium*,[e] and from the *Hyoscyamus niger*,[f]

[d] [*Schweigger's Journal*, 28. 1; *Repert. de Buchner*, ix. 71; and *Ure's Dictionary of Chemistry*, 1823.]

[e] [The seeds yielded the following constituents to that gentleman:—Fixed oil 13.85; thick fatty oil 0.8; fatty butyraceous body, with resinous chlorophylle 1.4; wax 1.4; resin insoluble in ether 9.9; yellowish red extractive matter 0.6; malate of *daturine* 1; incrystallizable sugar, with a salt with a base of *daturine* 0.8; gummy extractive matter 6; gum, with different salts 7.9; bassorine, with alumina and phosphate of lime 3.4; woody fibre 22; phyteumacolle 4.55; albumen 1.9; a matter analogous to ulmine, called by M. Brandes *glutenoine* 5.5; malate of *daturine*, malate and acetate of potass, and malate of lime 0.6; a membraneous secretion, containing silica 1.35; water 15.1; loss 1.95.]

[f] [The seeds of the *hyoscyamus niger* furnished to M. Brandes:—Fixed oil, readily soluble in spirit of wine 19.6; fixed oil, difficultly soluble in spirit of wine 4.6; fatty substance analogous to cetine 1.4; malate of *hyoscyamine*, with malates of lime and magnesia, and an ammoniacal salt 6.3; incrystallizable sugar, a trace; gum 1.2; bassorine 2.4; fecula 1.5; woody fibre 26; phyteumacolle 3.4; soluble albumen 0.8; hard albu-

two alkaline principles of a similar nature to the above, to which he has given the names of DATURINE and HYOSCYAMINE; he has, however, favoured us with but a very imperfect account of these principles. The experiments merit a repetition; but the examination of these bases, as they contain the whole of the poisonous matter of the plants whence they are extracted, requires very considerable circumspection. Even the vapour, as has been shown in the case of atropine, is exceedingly prejudicial.

men 3.7; malate, sulphate (?), and phosphate of potass 0.4; malate of lime 0.4; malate of magnesia 0.2; phosphates of lime and magnesia 2.4; water 24.1; excess 1.4. The ashes contained—carbonate, phosphate, sulphate (?), and hydrochlorate of potass; carbonate and much phosphate of lime; much silica, manganese, and iron, and a very little copper.]

DELPHININA, vel DELPHINA. DELPHIA.

Delphinine, or *Delphine*.

This alkali was discovered, in 1819, by MM. Feneulle and Lassaigne, in the seeds of the stavesacre (*delphinium staphisagria*);[a] the name of *delphine* being taken from del-

[a] [These gentlemen found in the seeds the following constituents:—1. Volatile oil, a trace; 2. A yellowish fixed oil; 3. A brown bitter principle, not precipitable by the acetate of lead; 4. A yellow bitter principle, not precipitable by the acetate of lead; 6. Malate of *delphine*; 6. Incrystallizable sugar; 7. Gum; 8. Woody fibre; 9. Animal matter, insoluble in spirit of wine, precipitable by acetate of lead and infusion of galls; 10. Albumen; 11. Salts, with a base of potass and lime.

M. Brandes has also given us the following analysis:—Fixed oil, very soluble in spirit of wine 14.4; fixed oil, sparingly soluble in spirit of wine 4.7; fatty matter, analogous to cetine 1.4; *delphine* 8.1; gum, with traces of phosphate of lime, and of a vegetable salt, with a base of lime 3.15; fecula 2.4; woody fibre 17.2; phyteumacolle, with malate, acetate, sulphate, and hydrochlorate of potass, and a salt with a base of lime 30.67; vegetable albumen 0.5; concrete albumen 3.2; sulphate of lime, with phosphate of magnesia 3.62; water 10; excess 1.49.]

phinium, because it is probable that the acrid nature of the plants of this family is owing to the above principle. The other species of delphinium, however, have not yet been examined.

PREPARATION OF DELPHININE.

Boil a portion of the seeds of delphinium, cleared of their coverings, and reduced to a fine paste, in a little distilled water; pass the decoction through a linen cloth, and filtrate it. Add very pure magnesia, and boil for some minutes. Filtrate again; wash the residue carefully, and digest in highly rectified alcohol. On evaporating the alcoholic tincture, delphinine is obtained in the form of a white powder, which affords some points of crystallization.

This is the most simple mode of obtaining delphinine. If a large quantity be required, the following is a preferable method, on account of the time and patience necessary to decorticate the seeds.

Submit the uncleaned grain, when well bruised, to the action of weak sulphuric acid. Precipitate the liquor by ammonia, and redissolve in alcohol the delphinine which is still slightly coloured. To purify it, draw off the alcohol by distillation; dis-

solve the residuum in hydrochloric acid, and boil it with magnesia. Alcohol will now dissolve the deposit in a state of perfect purity.

PROPERTIES OF DELPHININE.

Pure delphinine is in the form of a white powder, which is crystalline when moist, but soon becomes opaque on exposure to the air. It is inodorous, and has a very bitter and afterwards acrid taste.

Water dissolves so small a quantity of it, that it can only be discovered by the slight bitterness it communicates.

Alcohol and ether dissolve it very readily. The alcoholic solution acts powerfully in turning the syrup of violets green, and restores the blue of turnsol paper when reddened by acids.

Delphinine forms with the sulphuric, nitric, hydrochloric, oxalic, acetic, and other acids, very soluble neutral salts, the taste of which is extremely acrid and bitter. Alkalies precipitate it in the form of a white jelly.

[ACTION OF DELPHININE ON ANIMALS.

From the recent experiments of Orfila with this substance, it appears to prove fatal to

dogs in the small dose of six grains (gr. 4.92 troy): this effect is more speedily induced when the delphinine is dissolved in weak acetic acid; the animal in this case dies in the space of from forty to fifty minutes.

It seems to exert its action more especially on the nervous system. It likewise produces local irritation, giving rise to inflammation, when death has not immediately followed: inflammation, however, is not the necessary result of its noxious action on the stomach.[b]]

CASES IN WHICH DELPHININE MAY BE PRESCRIBED.

Delphinine has not yet been used as a medicine; but if the stavesacre have any medical virtue, we may presume that it resides in the alkali above described. Delphinine should, therefore, be given where the stavesacre is indicated: when the salts of this base should be employed on account of their solubility.

[b] [*Nouveau Journal de Médecine.* Vol. x. No. 38.]

[PICROTOXINA, PICROTOXIA, PICROTOXA.

Picrotoxine.

This substance, which was discovered by Boullay, is the bitter and poisonous principle of the *cocculus indicus*, the fruit of the *menispermum cocculus*.[a]

PREPARATION OF PICROTOXINE.

In order to obtain the picrotoxine the berries are boiled in water, and the solution evaporated to the consistence of an extract; it is then digested in the heat with $\frac{1}{20}$th of its weight of barytes, or pure magnesia: this compound is exhausted with hot absolute alcohol, the alcoholic solution evaporated to dryness; the residuum redissolved in

[a] [The fruit of the *menispermum cocculus* yields, on analysis—1. Fixed oil; 2. Adipocire; 3. Yellow extractive colouring matter; 4. *Picrotoxine;* 5. Woody fibre; 6. Albumen; 7. Menispermic acid. The ashes contain sulphate and hydrochlorate of potass, phosphate of lime, silica, and iron.] —*Boullay.*

alcohol, and the solution digested with animal charcoal to deprive it of colour; it is next filtered and slowly evaporated, and the picrotoxine is obtained, on cooling, crystallized in quadrilateral, white, and transparent, prisms.

Or, to the filtered decoction of these berries add acetate of lead whilst any precipitate falls. Filter and evaporate the liquid cautiously to the consistence of an extract. Dissolve in alcohol of 0.817, and evaporate the solution to dryness. By repeating the solutions and evaporations, a substance is finally obtained equally soluble in water and alcohol. The colouring matter may be removed by agitating it with a little water. Crystals of pure picrotoxine now fall, which may be washed with a little alcohol.[b]

PROPERTIES OF PICROTOXINE.

Picrotoxine is inodorous, and of a very bitter taste; it restores to blue, turnsol reddened by an acid; it is sparingly, if at all, soluble in water, but very soluble in ether and alcohol. It combines with the greater part of the acids, forming salts, the taste of which is very bitter, and which are sparingly soluble in water.

[b] [Ure's *Dictionary of Chemistry*, Art. *Picrotoxia*, and Boullay, *Annal. de Chimie*, 80, 209.]

ACTION OF PICROTOXINE ON THE ANIMAL ECONOMY.

Ten grains (gr. 8.20 troy) of picrotoxine, incorporated with crumb of bread, were given to a young middle-sized dog. At the end of twenty-five minutes, convulsions occurred, and, subsequently, staggering, which continued for the space of a quarter of an hour. The animal fell upon his side, experienced violent convulsive motions, and death took place at the end of forty-five minutes. On dissection, the stomach, filled with aliment, exhibited very marked signs of inflammation, for about an inch in extent, around the cardiac orifice; the mucous membrane was red, but without any softening. A similar dose of the crystallized acetate of picrotoxine, well dried, exhibited in the same manner to a dog of nearly equal strength, occasioned some indisposition and tremor; but at the expiration of three hours the animal did not appear to suffer any inconvenience.[e]

M. Orfila affirms that picrotoxine acts upon the animal economy like camphor, but much more actively.

[e] [*Journal de Pharmacie.* Janvier, 1819.]

CASES IN WHICH IT MIGHT BE EMPLOYED.

Picrotoxine has not as yet been used medicinally; but wherever the *cocculus indicus* is indicated, it may be advantageously exhibited: the berries are not, however, used in medicine for internal administration.]

Gentianine, Gentianin.

THE discovery of this alkali was attended by a circumstance so curious as to deserve to be related.

M. Henry, *Chef de la Pharmacie Centrale*, and M. Caventou,[a] were both occupied in analyzing gentian at the same time, without being aware of the coincidence. Their results were so identical that it almost seemed as if they had acted in concert; they, therefore, agreed to publish them conjointly.[b]

[a] [According to these gentlemen the *gentiana lutea* contains—1. A very fugacious odorous principle; 2. A yellow crystalline bitter principle, [*gentianine*]; 3. A matter identical with birdlime; 4. A fixed oil; 5. A greenish substance; 6. A free organic acid; 7. Incrystallizable sugar; 8. Gum; 9. A yellow colouring matter; 10. Woody fibre. Schrader discovered a resinous and narcotic principle in it; M. Planche likewise asserts, that he found the latter.]

[b] This fact is doubly remarkable: first, because it proves how perfect the means of analyzing vegetables have lately become; and, secondly, because it shows the change which the progress of

PREPARATION OF GENTIANINE.

Digest powdered gentian in cold ether. A greenish yellow tincture is obtained at the end of forty-eight hours. If this tincture be filtrated, and the liquor sufficiently concentrated by exposure to heat in an open vessel, it forms, on cooling, a yellow crystalline mass, which possesses strongly the taste and odour of gentian.

Digest this mass in alcohol until it ceases to give a lemon colour. Add the washings together, and expose them to a slight heat; the yellow crystalline mass re-appears, which, towards the end of the evaporation, becomes solid. This mass is very bitter. Re digest in weak alcohol, and all will be redissolved, except a certain quantity of oily matter.

This last alcoholic solution, besides the bitter principle of the gentian, contains its odorous matter, and also an acid substance.

By evaporating this liquor to dryness, dissolving the matter in water, adding a little well-washed calcined magnesia to it, and by

science has made in those who follow scientific pursuits. One hundred years ago, such a coincidence would have produced a violent quarrel, whilst now it only induces a feeling of joy in those who find their discoveries confirmed by others.—M.

boiling and evaporation in a water bath, the greatest part of the odorous matter of the gentian may be driven off. The bitter acid is also taken up by the magnesia, and the yellow bitter principle remains partly free, and partly combined with the magnesia, to which it gives a fine yellow colour. The greater part of the bitter principle may then be obtained pure and isolated by boiling the magnesia in ether, and evaporating the solution. If it be desirable to separate still more of the bitter principle which the ether has failed to take from the magnesia, it may be done by digestion in enough oxalic acid to make the liquor acidulous. The acid unites with the magnesia, and the bitter principle, which is left free, may be obtained by the means indicated above.

PROPERTIES OF GENTIANINE.

Gentianine is yellow, inodorous, and possesses very strongly the aromatic bitterness of gentian; more decidedly so, however, when it is dissolved in an acid.

It is very soluble in ether and in alcohol, and may be separated from them by spontaneous evaporation in the form of very small, yellow, needle-like, crystals. It is much less soluble in cold water, which it

renders, however, very bitter. Boiling water has more action on it.

Its colour is much deepened by the diluted alkalies, which dissolve rather more of it than water does.

Acids weaken its yellow colour very notably. Its solutions in the sulphuric and phosphoric acids are even almost colourless. Those, with the other weaker acids, however, such as the acetic, are yellowish. Concentrated sulphuric acid carbonizes it, and destroys its bitterness.

Gentianine, exposed in a glass tube to the heat of boiling mercury, is partly decomposed and partly sublimed in the form of small yellow crystalline needles.

Gentianine does not sensibly change the colour of turnsol, either when blue or when reddened by acids. It appears to be neutral.

ACTION OF GENTIANINE ON ANIMALS AND ON MAN.

It would seem, from some trials which I have made, that gentianine has no poisonous quality. Several grains thrown into the veins produced no apparent effect. I have myself swallowed two grains (gr. 1.64 troy) dissolved in alcohol: the only inconvenience

which I experienced was an extreme bitterness, and a slight sensation of heat in the stomach.

MODE OF PRESCRIBING GENTIANINE.

Apparently the tincture ought to be used the most frequently. It may be prepared after the following formula :—

TINCTURA GENTIANINÆ.

Tincture of Gentianine.

Take of
Alcohol at 24° (.903) 1 ounce (7 dr. gr. 52.5 troy).
Gentianine . . . . . 5 grains (gr. 4.1 troy).

This tincture may be used for the elixir of gentian, and in similar circumstances.

SYRUPUS GENTIANINÆ.

Syrup of Gentianine.

Take of
Syrup of sugar . 1 pound (15 oz. 6 dr. 1 gr. troy).
Gentianine . . 16 grains (gr. 13.12 troy).

This syrup is one of the best bitters that can be prescribed in scrofulous affections.

LUPULINA.

Lupuline.

THE existence of this substance in the hop[a] has lately been remarked by M. Ives of New York. It had been described in

[a] [MM. Payen and Chevallier found the cones of the French hop to consist of the following substances:—1. Water; 2. An essential oil; 3. Superacetate of ammonia; 4. Carbonic acid; 5. A white vegetable matter, soluble in boiling water, (which when precipitated on cooling does not redissolve in that fluid); 6. Malate of lime; 7. Albumen; 8. Gum; 9. Malic acid; 10. Resin; 11. A peculiar green matter, the bitter principle of the hop; 12. A fatty matter; 13. Chlorophylle; 14. Acetates of lime and ammonia; 15. Nitrate, muriate, and sulphate of potass; 16. Subcarbonate of potass; 17. Carbonate and phosphate of lime; 18. Traces of phosphate of magnesia; 19. Sulphur; 20. Oxide of iron; and, 21. Silica. The Belgic and English hop, subjected to similar trials, yielded the same principles, but in different proportions. The French contained more essential oil than the Belgic, and less than the English. Hops, soon after picking, yield, *cæteris paribus*, more essential oil, and less resin than the old; a circumstance which induced MM. Payen and Chevallier to think that the oil is capable of being resinified.—*Journal de Pharmacie*, Juin, 1822.]

France by M. Planche, and more recently by MM. Chevallier and Payen, under the name of *matière jaune du houblon.*

It presents itself under the form of small, shining, yellowish, grains, which cover the base of the scales of the hop.

It is of a golden colour, pulverulent, and of an aromatic odour.

When submitted to analysis, it is found to be chiefly composed of resin, volatile oil in small quantity, and a bitter principle. It is to this latter principle that the name of *lupuline* ought, it would seem, to be reserved. It has a very bitter taste, and is soluble in water, alcohol, and ether, to which it communicates its bitterness.

ACTION ON MAN AND ON ANIMALS.

M. Ives esteems it at once aromatic, tonic, and narcotic. On this subject I can say nothing with certainty. I have tried, at different times, both the lupuline in substance, and its different preparations, on animals; but I have never observed that it is a narcotic, although this property is one which is the most strikingly displayed in experiments on animals.

Mode of Employing Lupuline.

PULVIS LUPULINÆ.

Powder of Lupuline.

Take of

Lupuline . . . . . 1 part.
White sugar, powdered . . . . . 2 parts.

First powder the lupuline in a porcelain mortar, and afterwards add by degrees the sugar: mix them accurately.

PILULÆ LUPULINÆ.

Pills of Lupuline.

Bruise it strongly, and divide into pills.

This substance becomes converted into a ductile mass, which renders it unnecessary to add any excipient.

TINCTURA LUPULINÆ.

Tincture of Lupuline.

Take of

Bruised Lupuline . . . . .1 ounce (7 dr. 52.56 gr troy).
Alcohol at 36° (.837) . . 2 ounces (1 oz. 7 dr. 45 gr. troy).

Digest for six days in a close vessel; strain, press strongly, filter, and add a quantity of alcohol at 36° (.837), so as to make three ounces (2 oz. 7 dr. 37.6 gr. troy) of tincture.

[Mr. Nicholas Mill affirms, that from forty to sixty minims of the saturated tincture of lupuline act as an anodyne, and have a powerful effect in allaying great nervous irritation; whilst that stupidity which often accompanies the use of opium is never induced by this medicine.[b]]

EXTRACTUM LUPULINÆ.

Extract of Lupuline.

This extract may be prepared, either with the aqueous infusion when it is bitter and aromatic, or with the decoction when it is equally bitter, but less aromatic, and retains some resin.

SYRUPUS LUPULINÆ.

Syrup of Lupuline.

Take of

Alcoholic tincture of lupuline	1 part.
Simple syrup	7 parts.

The doses of these preparations are not yet precisely established; but, as the lupuline contains no poisonous property, practitioners may easily determine them.

[b] [*Annals of Philosophy*, January, 1824.]

BRUCINA. BRUCIA.

Brucine.

This organic salifiable base was discovered, in 1819, by MM. Pelletier and Caventou, in the bark of the false angustura (*brucea antidysenterica*).[a] M. Pelletier has since found it joined with strychnine in the nux vomica.

MODE OF PREPARING BRUCINE.

Brucine is extracted from the bark of the false angustura by a process similar to that pointed out for the extraction of strychnine, with this difference, that in this case the *magnesian precipitate* should be much less washed, because the solubility of brucine in water is greater than that of strychnine. The brucine is afterwards obtained by evaporating the alcoholic liquors which have been used for treating the magnesian precipitate. It is, however, in a resinous form, on account of its not being yet sufficiently pure to crystallize.

[a] [According to these gentlemen the bark contains: 1. A fatty substance; 2. A yellow colouring matter; 3. Gallate of *brucine*; 4. Traces of sugar; 5. Gum; and, 6. Woody fibre.]

In order to purify it, it must be combined with oxalic acid, and the oxalate treated by a mixture of alcohol at 40° (.817), and of ether at 60° (.742.) The colouring matter will thus be dissolved, and the oxalate of brucine remain under the form of a white powder. Decompose this oxalate by magnesia, and add alcohol to take up the brucine. By suffering the alcoholic solution to evaporate in the open air, the brucine may be obtained crystallized: if it be evaporated by the aid of heat, the brucine will be obtained fused, but not less pure.

PROPERTIES OF BRUCINE.

Brucine has a very intensely bitter taste; it is but slightly soluble in water, although more so than strychnine. When it is procured regularly crystallized, it presents itself under the form of oblique prisms, with parallelogramical bases. It dissolves at a temperature nearly equal to that of boiling water, and on cooling concretes like wax. It unites with acids, forming with them neutral salts, the majority of which are capable of being regularly crystallized. When placed in contact with concentrated nitric acid, it acquires a most intensely crimson colour, which, when the substance is warmed, changes to yellow. If in this state a solution of the proto-hydrochlorate of tin

be poured upon it, a most beautiful violet-coloured precipitate is formed; this property appertains solely to brucine.[b]

ACTION OF BRUCINE ON THE ANIMAL ECONOMY.

The action of brucine on the animal economy is similar to that produced by strychnine, but it is less energetic. Its intensity has appeared to us in some experiments to be to that of pure strychnine[c] as 1 to 12. It required four grains (gr. 3.281 troy) of brucine to kill a rabbit. A tolerably strong dog, after having taken four grains, experienced some strong attacks of tetanus, but recovered. Brucine might then be substi-

[b] Strychnine, extracted from the nux vomica, when treated by the same means, sometimes assumes a violet tint. Under such circumstances we may feel assured that it retains brucine; for the strychnine from St. Ignatius's bean, and even that from the nux vomica, when perfectly purified, does not produce the *violet colour* with the proto-hydrochlorate of tin.—M.

[c] Dr. Andral, jun. has lately made some fresh comparative experiments on brucine and strychnine; and he has arrived at this result, that six grains of brucine are required to produce the effects of one grain of impure, and of a quarter of a grain of pure, strychnine.

The difference of action would therefore appear to be greater than what we had at first estimated. M.—[Vide *Strychnine*.]

tuted for strychnine, and it would have the advantage of producing similar effects without being attended by the inconvenience of being so very powerful.

MODE OF ADMINISTRATION.

Brucine, like strychnine, may be administered in pills or in tincture, gradually increasing the dose. For medical use the brucine extracted from the bark of the false angustura should be adopted; that which is obtained from the nux vomica is too apt to remain mixed with a certain quantity of strychnine, which increases its activity and prevents us from calculating its effects.

CASES IN WHICH IT MIGHT BE EMPLOYED.

As brucine possesses the properties of strychnine, but in a weak degree, it may be administered in the dose of one, two, and even three grains (gr. 0.82, 1.64, or 2.46 troy), without fear of accident, under the same circumstances in which the preparations of nux vomica are indicated. It is even probable that the dose might be carried much higher, but it is better to use the remedy with a wise caution.

It is for experience to decide whether this new substance should be preserved as a medicine or rejected.

POSOLOGICAL TABLE.

ATROPINE. Dose not determined.

BRUCINE. From one to three grains.

CINCHONINE. From eight to twenty grains.

Syrup of Cinchonine—from one to two tablespoonsful.

Wine of Cinchonine—from four to twenty-four ounces or more in the twenty-four hours.

Tincture of—from two drachms to six.

DATURINE. Dose not determined.

DELPHINE. Dose not determined.

EMETINE. From a quarter of a grain to four grains or more.

Mixture of Emetine—a dessert spoonful every hour until vomiting is induced.

Pectoral Lozenges of Emetine—one every hour, or otherwise.

Emetic Lozenges of Emetine—three or four.

Syrup of Emetine—from ℥ss. to ℥j. or more.

EMETINE PURIFIED—from one sixteenth of a grain to two grains.

Pectoral Lozenges of Pure Emetine—one every hour.

Emetic Mixture of pure Emetine—a dessert spoonful every quarter of an hour until vomiting is induced.

Syrup of Pure Emetine—from two to four teaspoonsful.

GENTIANINE—from two grains to four or more.

Tincture of Gentianine—from ʒss. to ʒij. or more.

Syrup of Gentianine—from ʒj. to ʒiij.

HYDRO-CYANIC ACID [*Medicinal Acid of Magendie*]—from a quarter of a drop to two drops.

Mixture of Hydro-cyanic acid—a dessert spoonful.

Syrup of Hydro-cyanic acid—from ʒj. to ʒij.

HYOSCYAMINE. Dose not determined.

IODINE. From gr. j. to gr. iij.

Hydriodate of Potass. Ditto.

Ioduretted Hydriodate of Potass. Ditto.

Tincture of Iodine—from 10 to 20 drops.

Solution of Hydriodate of Potass. Ditto.

LUPULINE, *Preparations of*—Doses not yet established.

MORPHINE—from $\frac{1}{8}$th to $\frac{1}{4}$th of a grain, or more.

Sulphate of Morphine—from $\frac{1}{4}$th of a grain to a grain.

Acetate of Morphine. Ditto.

Syrup of Acetate of Morphine—two to four tea-spoonfuls.

Syrup of Sulphate of Morphine. Ditto.

Anodyne drops—from 6 to 24 drops.

Solution of Acetate of Morphine. Ditto.

NARCOTINE. Dose not yet established.

NUX VOMICA.

Alcoholic Extract of Nux vomica—gr. ss. to gr. v.

Tincture of Nux vomica—gtt. 5 to 30.

OPIUM.

Extract of Opium deprived of Narcotine—from gr. ss. to gr. ij.

Extract of Opium deprived of Morphine—from gr. ij. to gr. vi.

PICROTOXINE. Dose not yet established.

QUININE. From v. to x. grains.

Sulphate of Quinine—from j. to xxiv. grains in the 24 hours.

Syrup of Sulphate of Quinine—from one to two table-spoonfuls.

Wine of Quinine—same as *Wine of Cinchonine.*

Tincture of Quinine—from ʒij. to ʒvj.

STRYCHNINE—from $\frac{1}{12}$ to $\frac{1}{8}$ of a grain.

Pills of Strychnine—one or two.

Tincture of Strychnine—from 6 to 24 drops.

Mixture of Strychnine—a dessert spoonful, or f. ʒiv. to ʒj.

SOLANINE. Dose not yet established.

VERATRINE. From $\frac{1}{8}$ to $\frac{1}{2}$ a grain.

TABLES,

Showing the Proportion of the active Ingredients in the various compound Medicines of the FORMULARY.*

CINCHONINE.

Syrup of Cinchonine contains one grain Fr. (gr. .82 troy) of the sulphate of cinchonine in ʒii. and 49 grains (ʒii. gr. 18 troy).

Wine of Cinchonine contains one grain Fr. of the sulphate in one ounce and six drachms (ʒi. 5 dr. 47 gr. troy).

Tincture of Cinchonine contains one grain Fr. of the sulphate, in sixty-five grains (gr. 63.17 troy).

* The proportion between the weights and the measures of the various fluid preparations may be in some degree appreciated, by a reference to the following Table: in which the first column shows the weight, and the second the number of drops, in a measured drachm of several active fluids, under circumstances as nearly similar as possible, as ascertained by Mr. Shuttleworth.

	Grains.	*Drops.*
Distilled water	60	60
Fowler's arsenical solution	60¾	60
White wine	58¾	94
Ipecacuanha wine	59¾	84
Antimonial wine	59¾	84
Rectified spirits of wine	51½	151½
Proof spirit	55½	140
Laudanum	59½	134
Tincture of digitalis	58	144

EMETINE.

Emetic Mixture of Emetine contains one grain Fr. of emetine in five drachms (4 dr. 55 gr. troy).

Pectoral Lozenges of Emetine contain one grain Fr. of emetine in one drachm (gr. 59.07 troy).

Emetic Lozenges of Emetine contain one grain Fr. of emetine in 37 grains (gr. 30.35 troy).

Syrup of Emetine contains one grain Fr. of emetine in each ounce (7 dr. 52.58 gr. troy).

PURE EMETINE.

Lozenges of pure Emetine contain one grain Fr. of pure emetine in each half ounce (3 dr. 56.28 gr. troy).

Syrup of pure Emetine contains one grain Fr. of pure emetine in four ounces (3 oz. 7 dr. 30.24 gr. troy).

GENTIANINE.

Tincture of Gentianine contains one grain Fr. of gentianine in one drachm and forty-nine grains (℥i. gr. 39.6 troy).

Syrup of Gentianine contains one grain Fr. of gentianine in about an ounce (7 dr. 52.5 gr. troy).

HYDRO-CYANIC ACID.

Mixture of Hydro-cyanic Acid contains one grain Fr. of M. Magendie's *medicinal prussic acid* in one drachm and sixty-eight grains (℥i. 55 gr. troy).

Pectoral Mixture of Hydro-cyanic Acid contains one grain of the *medicinal acid* in one drachm and forty-five grains (gr. 95.98 troy).

Hydro-cyanic Syrup contains one grain Fr. of the acid in one drachm and fifty-seven grains (℥i. gr. 46 troy).

Hydro-cyanic Lotion contains one fluid drachm of Scheele's acid in f. ℥iii.

IODINE.

Tincture of Iodine contains one grain Fr. of iodine in about 13 gr. Fr. (gr. 10.66 troy), or about thirty drops.*

Solution of Hydriodate of Potass contains one grain Fr. of the hydriodate in about seventeen drops of the liquid.

Ointment of Hydriodate of Potass contains one grain Fr. of the hydriodate in 24 grains (gr. 19.68 troy).

LUPULINE.

Powder of Lupuline contains one part of lupuline in three.

Tincture of Lupuline is made with one part of lupuline to three of alcohol.

Syrup of Lupuline is formed of one part of the alcoholic tincture to seven of simple syrup; and consequently contains one part of the lupuline in thirty-two of the syrup.

MORPHINE.

Syrup of Acetate of Morphine contains one grain Fr. of the acetate in ℥iv. (3 oz. 7 dr. 30 gr. troy).

Syrup of Sulphate of Morphine contains one grain Fr. of the sulphate in four ounces Fr.

Anodyne Drops contain one grain Fr. of the acetate of morphine in about 42 gr. (gr. 34.45 troy).

Solution of Acetate of Morphine contains one grain troy of the acetate in ℥i. troy.

* M. Magendie says 20 drops.

NUX VOMICA.

Tincture of Nux vomica contains one grain Fr. of the alcoholic extract in two drachms and forty-nine grains (ʒii. gr. 38 troy).

QUININE.

Syrup of Sulphate of Quinine contains one grain Fr. of the sulphate in five drachms (4 dr. 55.3 gr. troy).

Wine of Quinine contains one grain of the sulphate in two ounces and five drachms (2 oz. 4 dr. 30 gr. troy).

Tincture of Quinine contains one grain Fr. of the sulphate in one drachm and 25 grains (gr. 79.57 troy).

STRYCHNINE.

Pills of Strychnine contain one grain Fr. of strychnine in thirty-six grains (gr. 29.5 troy).

Tincture of Strychnine contains one grain Fr. of strychnine in ʒii. gr. 49 (ʒii. 38 gr. troy).

APPENDIX.

[*From Syder's Examinations.*]

PREPARATIONS AND COMPOUNDS.

ACIDS.

DILUTE ACETIC ACID.—Take of vinegar a gallon; let the dilute acetic acid distil in a sand bath from a glass retort into a glass and cooled receiver, then, having thrown away the first pint, keep the six pints next distilled.

BENZOIC ACID.—Take of benzoin a pound; put the benzoin into a glass vessel placed in sand, and a heat of three hundred degrees being applied, and increased gradually, sublime until nothing more ascends; compress what is sublimed, involved in blotting paper, that it may be separated from the oily part; then sublime again, the heat not being raised above the four hundredth degree.

CITRIC ACID.—Take of the juice of lemons a pint, of prepared chalk an ounce, or a quantity that may be sufficient to saturate the juice; of diluted sulphuric acid, nine fluid ounces; add the chalk gradually to the lemon juice made hot, and mix; then pour off the liquor. Wash the citrate of lime which remains with warm water, frequently renewed; then dry it. Then pour upon the dried powder the diluted sulphuric acid, and boil for the sixth part of an hour (*ten minutes*). Express the liquor strongly through linen, and filter it through paper. Consume the filtered liquor with a gentle heat, so that when it cools crystals may be formed. That they may be pure, dissolve

the crystals again, and a third time in water, and as often strain, boil down, and set aside.

Muriatic acid.—Take of dried muriate of soda, two pounds; of sulphuric acid (*by weight*) twenty ounces; of distilled water, a pint and a half: first mix the acid with half a pint of the water, in a glass retort, and to this, when it has become cool, add the muriate of soda. Pour what is remaining of the water into a receiver, then, the retort being applied, let the muriatic acid pass over into this water, distilled from a sand bath, gradually increasing the heat until the retort becomes red.

The specific weight (*gravity*) of muriatic acid is to the specific gravity of distilled water, as 1.160 to 1.000.

One hundred and twenty-four grains of the crystals of the subcarbonate of soda are saturated by a hundred grains of this acid.

Nitric acid.—Take of dried nitrate of potass, of sulphuric acid, of each (by weight), two pounds; mix them in a glass retort; then let the nitric acid distil in a sand bath until a red vapour is produced. Then, an ounce of dried nitrate of potass being added to it, let the acid distil again in the same manner.

The specific weight of nitric acid is to the specific weight of distilled water, as 1.500 to 1.000.

Two hundred and twelve grains of the crystals of subcarbonate of soda will be saturated by a hundred grains of this acid.

Diluted nitric acid.—Take of nitric acid, a fluid ounce; of distilled water, nine fluid ounces: mix.

Diluted sulphuric acid.—Take of sulphuric acid, a fluid ounce and a half; of distilled water, fourteen fluid ounces and a half: add the acid to the water gradually; then mix.

Tartaric acid.—Take of the super-tartrate of potass, two pounds and a half; of boiling distilled water, three gallons; of prepared chalk, a pound; of sulphuric acid, a pound. Boil the super-tartrate of potass with two gallons of the distilled water, and add the prepared chalk gradually until bubbles are no longer excited: set aside that the Tartrate of Lime may subside; pour off the liquor, and wash the tartrate of lime frequently with distilled water, until it becomes tasteless; then pour upon it the sulphuric acid diluted with a gallon of boiling distilled water, and

set it aside for twenty-four hours, shaking it occasionally, strain the liquor, and evaporate it in a water bath, that crystals may be formed.

ALKALIES AND THEIR SALTS.

SUBCARBONATE OF AMMONIA.—Take of the muriate of ammonia, a pound; of dried prepared chalk, a pound and a half; rub them separately to a powder, then mix and sublime, gradually increasing the heat until the retort becomes red.

LIQUOR OF AMMONIA.—Take of muriate of ammonia, eight ounces; of fresh lime, six ounces; of water, four pints; pour upon the lime a pint of the water, then cover the vessel, and set it aside for an hour, next add the muriate of ammonia and the remaining water, first made hot, and cover the vessel again; strain the liquor after it has become cold; then let twelve fluid ounces of the liquor of ammonia distill into a receiver, the heat of which does not exceed the fiftieth degree.

The specific weight of the liquor of ammonia, is to the weight of distilled water, as 0.960 to 1.000.

LIQUOR OF ACETATE OF AMMONIA.—Take of the subcarbonate of ammonia, two ounces; of dilute acetic acid, four pints, or a quantity that may be sufficient; add the acid to the subcarbonate of ammonia until bubbles be no longer excited, and mix.

LIQUOR OF SUBCARBONATE OF AMMONIA.—Take of the subcarbonate of ammonia, four ounces; of distilled water, a pint; dissolve the subcarbonate of ammonia in the water, and filter through paper.

LIQUOR OF POTASS.—Take of the subcarbonate of potass, a pound; of fresh lime, half a pound; of boiling distilled water, a gallon: dissolve the potass in two pints of the water; add what is left of the water to the lime. Mix together the heated liquors; then set aside in a covered vessel, and, after it shall have cooled, strain through cotton cloth.

If any diluted acid, dropped into it, excite bubbles, it will be necessary to add more lime, and to strain it again.

A pint of this liquor ought to weigh sixteen ounces.

LIQUOR OF SUBCARBONATE OF POTASS.—Take of the subcarbonate of potass, a pound; of distilled water, twelve fluid ounces: dissolve the subcarbonate of potass in the water, and filter through paper.

POTASS WITH LIME.—Take of the liquor of potass, three pints; of fresh lime, a pound; boil down the liquor of potass to a pint, then add the lime slaked by the affusion of water, and diligently mix.

FUSED POTASS.—Take of the liquor of potass, a gallon; consume the water in a clean iron vessel upon the fire, until the ebullition having ceased, the potass is melted: pour off this upon an iron plate into convenient forms.

ACETATE OF POTASS.—Take of the subcarbonate of potass, a pound; of the strong acetic acid, two pints; of boiling distilled water two pints; add the acid, first mixed with the water, to the subcarbonate of potass, until bubbles are no longer excited, and strain. Consume the liquor first in a water-bath until the ebullition shall have ceased. Next expose it to a gradually increasing heat, and consume it again until a pellicle swims upon its surface; dry the pellicle taken off upon blotting paper. Let the liquor be consumed again, and frequently, and the pellicle taken off and dried in the same manner.

CARBONATE OF POTASS.—Take of the liquor of sub-carbonate of potass, a gallon; transmit carbonic acid through the liquor of the sub-carbonate of potass in a proper vessel to a perfect saturation, and strain. Let the strained liquor be evaporated that crystals may be formed, taking care that the heat does not exceed the hundred and twentieth degree. Having poured off the liquor, dry these (*the crystals*) upon blotting paper.

Carbonic acid is obtained with facility from white marble and diluted sulphuric acid.

SUB-CARBONATE OF POTASS.—Take of impure potass, powdered, three pounds; of boiling water, three pints and a half; dissolve the potass in the water, and strain; then pour it off into a clean iron vessel and consume the water with a mild fire, that the liquor may thicken; then the fire being removed, stir it constantly with an iron spatula (*or rod*) until the salt forms into small grains.

Sub-carbonate of potass may be prepared in the same manner from tartar, which shall have been first burnt, until it be of an ash colour.

SULPHATE OF POTASS.—Take of the salt which remains after the distillation of nitric acid, two pounds; of boiling water, two gallons; mix that the salt may be dissolved; then add of the sub-carbonate of potass what may be sufficient to saturate the acid, then boil until a pellicle swims upon it, and when you shall have strained it, set it aside that crystals may be formed. Having poured off the liquor, dry these upon bibulous paper (*Blotting paper*).

SUPER-SULPHATE OF POTASS.—Take of the salt which remains after the distillation of nitric acid, two pounds; of boiling water, four pints; mix that the salt may be dissolved, and strain: next, boil it to one half, and set it by, that crystals may be formed. Having poured off the liquor, dry these (*the crystals*) upon blotting paper.

TARTRATE OF POTASS.—Take of the sub-carbonate of potass, sixteen ounces; of the super-tartrate of potass, three pounds; of boiling water, a gallon; dissolve the sub-carbonate of potass in the water; then add the super-tartrate of potass rubbed into a powder, until bubbles are no longer excited. Filter the liquor through paper; next, boil until a pellicle swims upon it, and set aside that crystals may be formed. Having poured off the liquor, dry these (*the crystals*) upon blotting paper.

CARBONATE OF SODA.—Take of the sub-carbonate of soda, a pound; of distilled water, three pints; dissolve the sub-carbonate of soda in the distilled water. Then transmit carbonic acid through the liquor in a proper vessel to a perfect saturation, and set it aside that crystals may be formed. Dry the crystals folded and compressed in blotting paper. Consume the remaining liquor, taking care the heat does not exceed the hundred and twentieth degree, that crystals may be again produced. Dry and compress these in the same manner.

SUB-CARBONATE OF SODA.—Take of impure soda rubbed into powder, a pound; of boiling distilled water, four pints; boil the soda in the water for half an hour, and strain. Let this evaporate to two pints, and be set aside that crystals may be formed; throw away the remaining liquor.

DRIED SUB-CARBONATE OF SODA.—Take of the sub-carbonate of soda, a pound; apply a boiling heat to the sub-carbonate of soda in a clean iron vessel, until it be perfectly dried, and stir it continually together with an iron spatula (*or rod*). Finally, rub it to a powder.

Sulphate of soda.—Take of the salt which remains after the distillation of muriatic acid, two pounds; of boiling water, two pints and a half; dissolve the salt in the water, then add gradually of the sub-carbonate of soda what may be sufficient to saturate the acid. Boil down until a pellicle appears, and when you have strained it, set it aside, that crystals may be formed. Having poured off the water, dry these upon blotting paper.

Tartarized soda.—Take of the sub-carbonate of soda, twenty ounces; of super-tartrate of potass powdered, two pounds; of boiling water, ten pints; dissolve the sub-carbonate of soda in the water, and add gradually the super-tartrate of potass. Filter the liquor through paper; then boil it until a pellicle swims upon it, and set aside that crystals may be formed. Having poured off the water, dry these upon blotting paper.

EARTHS AND THEIR SALTS.

Dried alum.—Let alum dissolve in an earthen vessel over the fire, then let the fire be increased until the ebullition shall have ceased.

Compound liquor of alum.—Take of alum, of the sulphate of zinc, of each half an ounce; of boiling water, two pints; dissolve the alum and the sulphate of zinc together in the water: next, filter the liquor through paper.

Lime.—Take of white marble, a pound; bruise it into pieces and burn it in a crucible with a fierce fire for an hour, or until the carbonic acid shall be completely expelled, so that dilute acetic acid on being added excites no bubbles.

Lime from shells.—In the same manner lime may also be made from shells.

Liquor of lime.—Take of lime, half a pound; of boiling distilled water, twelve pints; pour the water upon the lime, and shake them together; then cover the vessel directly and set it by for three hours; then preserve the liquor with the remaining lime in stopped glass vessels, and when it is to be used, take from the clear liquor.

Muriate of Lime.—Take of the salt which remains after the sublimation of the sub-carbonate of ammonia, two

pounds; of water, a pint. Mix and filter through paper; let the liquor evaporate until the salt be dried. Keep this in a vessel accurately stopped.

LIQUOR OF MURIATE OF LIME.—Take of the muriate of lime, two ounces; of distilled water, three fluid ounces. Dissolve the muriate of lime in the water, then filter it through paper.

PREPARED CHALK.—Take of chalk, a pound; add a little water to the chalk, and rub it that it may be made a subtil powder. Cast this into a large vessel filled with water; then shake it, and, a short time having intervened, transmit the supernatant water as yet turbid into another vessel, and set it by that the powder may subside; finally, having poured off the water, dry the powder.

MAGNESIA.—Take of the sub-carbonate of magnesia, four ounces; burn it in a fierce heat for two hours, or until dilute acetic acid dropped in excite no bubbles.

SUBCARBONATE OF MAGNESIA.—Take of the sulphate of magnesia, a pound; of the subcarbonate of potass, nine ounces: of water, three gallons. Dissolve separately the subcarbonate of potass in three pints of water; the sulphate of magnesia in five pints of the water, and strain; next add the remaining water to the liquor of the sulphate of magnesia, and boil; and mix to it whilst it is boiling, the former liquor, continually stirring with a spatula, then strain it through cloth: finally, wash the powder frequently by the affusion of boiling water, and dry it upon blotting paper in a heat of two hundred degrees.

METALS AND THEIR SALTS.

PREPARATIONS OF ANTIMONY.

PRECIPITATED SULPHURET OF ANTIMONY.—Take of sulphuret of antimony powdered, two pounds; of the liquor of potass, four pints; of distilled water, three pints; of diluted sulphuric acid, a quantity that may be sufficient. Mix the sulphuret of antimony, the liquor of potass, and the water together, and boil with a slow fire for three hours, stirring it continually, adding from time to time distilled water so that it may always fill the same measure.

Strain the liquor immediately through double cloth, and, as yet hot, drop into it gradually of diluted sulphuric acid a quantity that may be sufficient to precipitate the powder, then wash the sulphate of potass with hot water, dry the precipitated sulphuret of antimony, and rub it into a very fine powder.

TARTARIZED ANTIMONY.—Take of the glass of antimony reduced to a very subtil powder, supertartrate of potass powdered, each a pound; of boiling distilled water, a gallon; mix accurately the glass of antimony with the supertartrate of potass, and throw them gradually into the boiling distilled water, continually stirring it with a spatula; boil for a quarter of an hour, and set it by. Strain the liquor when cold, and boil down the strained liquor that crystals may be formed.

WINE OF TARTARIZED ANTIMONY.—Take of tartarized antimony, a scruple; of boiling distilled water, eight fluid ounces; of rectified spirit, two fluid ounces. Dissolve the tartarized antimony in the boiling distilled water, then, having strained the liquor, add the spirit.

ANTIMONIAL POWDER.—Take of sulphuret of antimony powdered a pound; of hartshorn shavings, two pounds. Mix and cast them into a wide crucible, heated to whiteness, and continually stir them until a visible vapour shall no longer ascend. Rub what remains into a powder and put it into a proper crucible; then expose it to a fire, and increase it gradually that it may be white, for two hours. Rub the residue, that a very fine powder may be formed.

PREPARATION OF SILVER.

NITRATE OF SILVER.—Take of silver, an ounce; of nitric acid, a fluid ounce; of distilled water, two fluid ounces. Mix the nitric acid with the water, and dissolve the silver in these in a sand bath. Next gradually increase the heat that the nitrate of silver may be dried. Dissolve this in a crucible by a mild fire, until, the water being expelled, ebullition shall cease; then pour it off directly into proper forms.

PREPARATIONS OF ARSENIC.

SUBLIMED WHITE ARSENIC.—Reduce white arsenic into a powder, then cast it into a crucible, and, having applied it to the fire, sublime into another crucible placed upon the former one.

ARSENICAL LIQUOR.—Take of sublimed white arsenic rubbed into a very fine powder, subcarbonate of potass from tartar, of each sixty-four grains; of compound spirit of lavender, four fluid drachms; of distilled water, a pint. Boil the white arsenic and the subcarbonate of potass with the water in a glass vessel until all the arsenic shall be dissolved; to the liquor cooled add the compound spirit of lavender. Finally add thereto, of distilled water, as much as may be sufficient to accurately fill the measure of a pint.

PREPARATION OF BISMUTH.

SUB-NITRATE OF BISMUTH.—Take of Bismuth, an ounce; of nitric acid, a fluid ounce; of distilled water, three pints; mix six fluid drachms of distilled water with the nitric acid, and dissolve the bismuth in this, then strain. Add what is remaining of the water to the strained liquor, and set it by that the powder may subside. Next, having poured off the super-natant liquor, wash the sub-nitrate of bismuth with distilled water, and dry it with a mild heat, folded in blotting paper.

PREPARATIONS FROM COPPER.

AMMONIATED COPPER.—Take of the sulphate of copper, half an ounce; of the subcarbonate of ammonia six drachms. Rub them together in a glass mortar until ebullition shall have ceased; next, dry the ammoniated copper with a mild heat, folded in blotting paper.

Liquor of ammoniated copper.—Take of ammoniated copper, a drachm; of distilled water, a pint; dissolve the ammoniated copper in the water, and filter through paper.

PREPARATIONS FROM IRON.

Ammoniated iron.—Take of the subcarbonate of iron; of muriatic acid; of the muriate of ammonia, each a pound; pour upon the subcarbonate of iron the muriatic acid, and set aside until bubbles be no longer excited. Strain the liquor through paper, and boil down the strained (*liquor*) until all moisture be consumed; mix diligently what remains with the muriate of ammonia, then, having applied a fierce heat, sublime immediately; finally, rub it into a powder.

Subcarbonate of iron.—Take of the sulphate of iron, eight ounces; of the subcarbonate of soda, six ounces; of boiling water, a gallon; dissolve the sulphate of iron, and the subcarbonate of soda, separately, in four pints of the water; then mix the liquors together and set aside that the powder may subside, then, having poured off the supernatant liquor, wash the subcarbonate of iron in warm water, and dry it with a mild heat, folded in blotting paper.

Sulphate of iron.—Take of iron, of sulphuric acid, each (by weight) eight ounces; of water, four pints. Mix the sulphuric acid with the water in a glass vessel, and add the iron to these; then, when bubbles shall have ceased to go forth, filter the liquor through paper, and consume it over the fire so that as it cools crystals may be formed. Having poured off the liquor, dry these upon blotting paper.

Tartarized iron.—Take of iron, a pound; of supertartrate of potass powdered, two pounds; of distilled water, five pints, or as much as may be necessary. Rub the iron and super-tartrate of potass together, and expose them to the air for twenty days with a pint of water in an open glass vessel, shaking them every day, adding from time to time distilled water that they may be always moist. Then boil for a quarter of an hour in four pints of distilled water, and strain. Consume the liquor in a water-

bath until the tartarized iron be completely dried. Rub this into powder, and keep it in a well-stopped vessel.

LIQUOR OF ALKALINE IRON.—Take of iron two drachms and a half; of nitric acid, two fluid ounces; of distilled water, six fluid ounces; of the liquor of the subcarbonate of potass, six fluid ounces; pour upon the iron, the acid and water mixed together: then, when bubbles shall have ceased to go forth, pour off the liquor, as yet acid. Add this gradually and at intervals to the liquor of subcarbonate of potass, occasionally shaking it until it becoming of a brownish red colour, bubbles be no longer excited. Finally, set aside for six hours, and pour off the liquor.

TINCTURE OF AMMONIATED IRON.—Take of ammoniated iron, four ounces; of proof spirit, a pint; macerate and strain.

TINCTURE OF MURIATE OF IRON.—Take of the subcarbonate of iron, half a pound; of muriatic acid, a pint; of rectified spirit, three pints; pour the acid upon the subcarbonate of iron, in a glass vessel, and shake it from time to time for three days. Set it aside that the dregs (if there be any) may subside; then pour off the liquor, and add to it the spirit.

WINE OF IRON.—Take of iron, a drachm; of supertartrate of potass powdered, six drachms; of distilled water, two pints, or as much as may be sufficient; of proof spirit, twenty fluid ounces; rub the iron and the super-tartrate of potass together, and expose it to the air for six weeks in an open glass vessel with a fluid ounce of water, stirring it every day with a spatula, adding distilled water occasionally that it may be at all times moist. Then dry it with a mild heat, rub it into powder, and mix it with thirty fluid ounces of distilled water. Strain the liquor, and when strained add the spirit.

PREPARATIONS FROM QUICKSILVER.

MERCURY WITH CHALK.—Take of purified mercury by weight, three ounces: of prepared chalk, five ounces; rub them together until globules be no longer conspicuous.

NITRIC OXIDE OF MERCURY.—Take of purified mercury, by weight, three pounds; of nitric acid, by weight, a pound and a half; of distilled water, two pints; mix in a glass vessel, and boil until the mercury be dissolved, and, the water being consumed, a white material remains. Rub this into powder, and cast it into another vessel which is not so deep, then apply to it a gentle fire, and raise it gradually until a red vapour shall have ceased to go forth.

GREY OXIDE OF MERCURY.—Take of the submuriate of mercury, an ounce; of the liquor of lime, a gallon; boil the submuriate of mercury in the liquor of lime, continually stirring it until the grey oxide of mercury subsides. Wash this in distilled water, next dry it.

RED OXIDE OF MERCURY.—Take of purified mercury, *by weight*, a pound; put the mercury into a tall glass vessel to which there is a narrow mouth, and a broad neck, apply to this open vessel a heat of six hundred degrees, until the mercury shall form into red scales; then rub it into a very fine powder.

OXYMURIATE OF MERCURY.—Take of purified mercury, *by weight*, two pounds; of sulphuric acid, *by weight*, thirty ounces; of dried muriate of soda, four pounds; boil the mercury with the sulphuric acid in a glass vessel, until the sulphate of mercury shall be dried, triturate this, when it shall have cooled, with the muriate of soda in an earthen mortar; then sublime from a glass cucurbit, with a heat gradually increased.

LIQUOR OF OXYMURIATE OF MERCURY.—Take of oxymuriate of mercury, eight grains; of distilled water, fifteen fluid ounces; of rectified spirit, a fluid ounce; dissolve the oxymuriate of mercury in the distilled water, and add to it the spirit.

WHITE PRECIPITATED MERCURY.—Take of the oxymuriate of mercury, half a pound; of the muriate of ammonia, four ounces; of the liquor of the subcarbonate of potass, half a pint; of distilled water, four pints; first dissolve the muriate of ammonia, next the oxymuriate of mercury in the distilled water, and add to these the liquor of the subcarbonate of potass. Wash the precipitated powder, until it shall become tasteless, then dry it.

PURIFIED MERCURY.—Pour the mercury into an iron retort, and, having applied a fire, let the purified mercury distil.

SUBMURIATE OF MERCURY.—Take of purified mercury, *by weight*, four pounds; of sulphuric acid, *by weight*, thirty ounces; of the muriate of soda, a pound and a half; of the muriate of ammonia, eight ounces; boil two pounds of the mercury with the sulphuric acid in a glass vessel, until the sulphate of mercury shall be dried; when it has cooled triturate this with two pounds of mercury, in an earthen mortar, that they may be well mixed. Then add the muriate of soda, and rub them together until globules be no longer conspicuous; then sublime. Triturate the sublimate into a very fine powder, transmit it through a sieve, and mix it diligently with the muriate of ammonia, first dissolved in a gallon of boiling distilled water. Set it by that the powder may subside. Pour off the liquor and wash the powder frequently in boiling distilled water, until having dropped in liquor of ammonia nothing shall be precipitated. Finally, let it be made a very fine powder in the same manner in which we have ordered chalk to be prepared.

BLACK SULPHURET OF MERCURY.—Take of purified mercury, *by weight*, a pound; of sublimed sulphur, a pound; rub them together until globules be no longer visible.

RED SULPHURET OF MERCURY.—Take of purified mercury, by weight, forty ounces; of sublimed sulphur, eight ounces; mix the mercury with the sulphur dissolved over the fire, and as soon as the mass swells, remove the vessel from the fire, and cover it strongly lest it should inflame; then rub it into a powder and sublime.

PREPARATIONS FROM LEAD.

ACETATE OF LEAD.—Take of the subcarbonate of lead, a pound; of strong acetic acid, a pint; of boiling distilled water, a pint and half; mix the acid with the water; add gradually to these the subcarbonate of lead, and boil until the acid be saturated; then filter it through paper, and, the water being consumed until a pellicle floats, set it by that crystals may be formed. Having poured off the liquor, dry these (*the crystals*) upon blotting paper.

LIQUOR OF SUBACETATE OF LEAD.—Take of semi-vitreous oxide of lead, two pounds; of dilute acetic acid, a gallon; mix and boil down to six pints, continually stirring it; then set aside, that the dregs may subside and strain.

DILUTED LIQUOR OF THE SUBACETATE OF LEAD.—Take of the liquor of subacetate of lead, a fluid drachm; of distilled water, a pint; of proof spirit, a fluid drachm; mix.

PREPARATIONS FROM ZINC.

PREPARED CALAMINE.—Burn the calamine, then triturate it; next, let it be made a very fine powder in the same manner in which we directed chalk to be prepared.

OXIDE OF ZINC.—Take of the sulphate of zinc, a pound; of the liquor of ammonia, a pint, or a quantity that may be sufficient; of distilled water, a pint; dissolve the sulphate of zinc in the distilled water, and add of the liquor of ammonia as much as may be sufficient, that the oxide of zinc may be completely precipitated. Having poured off the liquor, wash the powder in distilled water frequently, and dry it in a sand bath.

SULPHATE OF ZINC.—Take of small pieces of zinc, four ounces; of sulphuric acid, *by weight*, six ounces; of distilled water, four pints; mix them in a glass vessel, and, effervescence being finished, filter the liquor through paper; then boil it down until a pellicle floats, and set it by that crystals may be formed.

PREPARATIONS FROM SULPHUR.

SULPHURATED OIL.—Take of washed sulphur, two ounces; of the oil of olive, a pint; throw the sulphur gradually to the oil heated in a large iron vessel, and stir it continually with a spatula, until united.

SULPHURET OF POTASS.—Take of washed sulphur, an ounce; of the subcarbonate of potass, two ounces; rub them together, and place them upon the fire in a close crucible until they shall have combined.

WASHED SULPHUR.—Take of sublimed sulphur, a pound; pour upon it boiling water, that the acid, if there be any, may be completely washed away, then dry it.

PRECIPITATED SULPHUR.—Take of sublimed sulphur, a pound; of fresh lime, two pounds; of water, four gallons; boil the sulphur and the lime together in the water; then strain the liquor through paper, and drop into it as much muriatic acid as may be sufficient to throw down the sulphur. Finally, wash this frequently by pouring water upon it until it shall be made tasteless.

VEGETABLES.

VEGETABLES are to be gathered from places and soils, where they grow spontaneously in a dry season, (*when they are*) neither wet with showers nor dew; they are to be collected annually, and those which shall have been kept longer, to be thrown away.

Roots, for the most part, are to be dug up before the stalks or leaves shoot forth.

Barks ought to be collected in that season, when they are most easily to be separated from the wood.

Leaves are to be gathered after the flowers shall have blown (*expanded*) and before the seeds are ripened.

Flowers are to be plucked when lately unfolded.

Seeds are to be collected as soon as they are ripe (*when just ripe*) and before they begin to fall from the plant. They ought to be preserved in their proper seed vessels.

PREPARATION OF VEGETABLES.

VEGETABLES, soon after they shall have been gathered, those excepted which are to be used fresh, ought to be thinly spread out, and dried as quickly as possible with a heat so mild that their colour may not be changed; then preserved in places, or proper vessels, excluded from the access of light and moisture.

Bury those roots which we have ordered to be kept fresh in dry sand. Cut the SQUILL ROOT, before drying it, transversely into thin slices.

Set by pulpy fruits if they be unripe, or ripe and dry, in a moist place that they may soften; then express the pulp through a hair sieve; afterwards boil it with a mild fire, frequently stirring it; finally, consume the water in a water-bath until the pulp becomes of a proper consistence.

Pour upon the bruised pods of cassia boiling water, that the pulp may be washed out; express through a coarse hair sieve, and then consume with a water-bath until the pulp acquires a proper consistence.

Press out the pulp or juice of ripe and fresh fruits through a sieve, no boiling water being employed.

GUM-RESINS.

Separate opium very diligently from extraneous things, especially from those which adhere to its surface. Let opium be kept SOFT, that it may be fit to form pills; and HARD, which shall have been so dried in a water-bath, that it may be rubbed into powder.

Those gum-resins are to be considered best, which shall have been selected in such a state that there may be no necessity for purification.

But if they appear to be impure, boil them in water until they become soft, and with a press, press them through a canvass hempen cloth; then set aside that the resinous part may subside. Having poured off the supernatant liquor, consume it in a water-bath, adding the resinous part towards the end, that it may mix intimately with the gummy part.

Those gum-resins which are easily melted, may be purified by putting them into an ox's bladder, and keeping them in boiling water until they become so soft that they may be separated from their impurities by pressing through a hempen cloth.

Dissolve the BALSAM OF STORAX in rectified spirit, and strain it; then, with a mild heat, let the spirit distil until it be formed into a proper consistence.

EXPRESSED OILS.

OIL OF ALMONDS.—Macerate either sweet or bitter almonds in cold water for twelve hours, and bruise them; then, without applying any heat, express the oil.

LINSEED OIL.—Bruise the linseed; then, without applying heat, express the oil.

CASTOR OIL.—Bruise the seeds of the ricinus, the husks being taken off; then, without applying heat, express the oil.

DISTILLED OILS.

OILS OF ANISEED—CHAMOMILE—CARRAWAY—JUNIPER—LAVENDER—PEPPERMINT—SPEARMINT—MARJORAM—PIMENTA—PENNYROYAL—ROSEMARY.—The seeds of anise and carraway; the flowers of chamomile and lavender; the berries of juniper and pimenta; the tops of rosemary, and the fresh herbs of the rest are to be employed.

Put any of these into an alembic, and add of water as much as will cover it; then let the oil distil into a large cooled vessel.

The water which distils out with the oils of carraway, peppermint, spearmint, pimenta and pennyroyal, is to be kept for use.

OIL OF AMBER.—Place amber in an alembic, that the acid liquor, the oil, and the salt impregnated with oil, may distil in a sand bath, with a heat gradually increased. Then let the oil be distilled again, and a third time.

RECTIFIED OIL OF TURPENTINE.—Take of oil of turpentine, a pint; of water, four pints; let the oil distil.

DISTILLED WATERS.

DISTILLED WATER.—Take ten gallons of water, first let four pints distil, which having thrown away, let four gallons distil. Keep the distilled water in a glass bottle.

To each gallon of the following waters, add five fluid ounces of proof spirit, that they may be preserved pure :—

Dill water.—Take of bruised dill-seeds, a pound; pour to these as much water, that after distillation there may remain what may be sufficient to prevent empyreuma. Let a gallon distil.

Carraway water.—Take of bruised seeds of carraway, a pound; pour to these so much water that after distillation there may remain a sufficient quantity to prevent empyreuma. Let a gallon distil.

Cinnamon water.—Take of bruised cinnamon bark, a pound, *or* of the oil of cinnamon, five scruples *by weight;* pour to the oil or bark, macerated in water for twenty-four hours, so much water that after distillation there shall remain a sufficiency to prevent empyreuma. Let a gallon distil.

Fennel water.—Take of the bruised seeds of the fennel, a pound; pour to these so much water that after distillation there shall remain what may be sufficient to prevent empyreuma. Let a gallon distil.

Peppermint water.—Take of peppermint, dried,* a pound and a half; *or*, of oil of peppermint, three drachms *by weight*; pour to the herb, or the oil, so much water that after distillation there shall remain what may be sufficient to prevent empyreuma. Let a gallon distil.

Spearmint water.—Take of dried spearmint, a* pound and a half; *or*, of the oil of spearmint, three drachms *by weight;* pour to the herb, or to the oil, so much water that after distillation there may remain what may be sufficient to prevent empyreuma. Let a gallon distil.

Water of pimenta.—Take of the berries of pimenta bruised, half a pound; of water, a pint; macerate the berries for twenty-four hours in the water; then add so much water that after distillation there may remain what may be sufficient to prevent empyreuma. Let a gallon distil.

Pennyroyal water.—Take of pennyroyal dried,* a pound and a half; or, of oil of pennyroyal, three drachms by weight; pour to the herbs, or to the oil, so much water that after distillation there may remain what may be sufficient to prevent empyreuma. Let a gallon distil.

* When fresh herbs are employed, they are to be used in double proportions.

Rose water.—Take of the petals of the damask rose (*hundred leaved rose*), eight pounds; pour to these so much water that after distillation there may remain what may be sufficient to prevent empyreuma. Let a gallon distil.

INFUSIONS.

Infusion of chamomile.—Take of chamomile flowers, two drachms; of boiling water, half a pint; macerate for ten minutes, in a vessel lightly covered, and strain.

Compound infusion of horse-radish.—Take of fresh horse-radish root, sliced, of mustard seeds, bruised, of each an ounce; of compound spirit of horse-radish, a fluid ounce; of boiling water a pint; macerate the root in the water for two hours, in a vessel lightly covered, and strain; then add the compound spirit of horse-radish.

Compound infusion of orange-peel.—Take of dried orange-peel, two drachms; of fresh lemon-peel, a drachm; of cloves bruised, half a drachm; of boiling water, half a pint; macerate for ten minutes in a vessel lightly covered, and strain.

Infusion of calumba.—Take of calumba, sliced, two drachms; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

Infusion of cloves.—Take of cloves, bruised, a drachm; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

Infusion of cascarilla.—Take of cascarilla bark, bruised, half an ounce; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

Compound infusion of catechu.—Take of extract of catechu, two drachms and a half; of cinnamon bark, bruised, half a drachm; of boiling water, half a pint; macerate for an hour in a vessel lightly covered, and strain.

Infusion of bark.—Take of the lance-leaved cinchona bark, bruised, half an ounce; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

Infusion of cusparia.—Take of cusparia bark, bruised, two drachms; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

INFUSION OF DIGITALIS.—Take of the dried leaves of digitalis (leaves of purple fox-glove), a drachm; of spirit of cinnamon, half a fluid ounce; of boiling water, half a pint; macerate for four hours in a vessel lightly covered, and strain; then add the spirit.

COMPOUND INFUSION OF GENTIAN.—Take of gentian-root sliced, of orange-peel dried, of each a drachm; of fresh lemon-peel, two drachms; of boiling water, twelve fluid ounces; macerate for an hour in a vessel lightly covered, and strain.

COMPOUND INFUSION OF LINSEED.—Take of linseed, bruised, an ounce; of liquorice root, sliced, half an ounce; of boiling water, two pints; macerate for four hours, by the fire, in a vessel lightly covered, and strain.

INFUSION OF QUASSIA.—Take of quassia wood, sliced, a scruple; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

INFUSION OF RHUBARB.—Take of rhubarb root, sliced, a drachm; of boiling water, half a pint; macerate for two hours in a vessel lightly covered, and strain.

COMPOUND INFUSION OF ROSES.—Take of French rose petals, dried, half an ounce; of diluted sulphuric acid, three fluid drachms; of purified sugar, an ounce and a half; of boiling water, two pints and a half; pour the water upon the rose petals in a glass vessel; then mix in the acid, and macerate for half an hour; finally, strain the liquor, and add to it the sugar.

COMPOUND INFUSION OF SENNA.—Take of senna-leaves, an ounce and a half; of ginger-root, sliced, a drachm; of boiling water, a pint; macerate for an hour in a vessel lightly covered, and strain the liquor.

INFUSION OF SIMAROUBA.—Take of simarouba bark, bruised, half a drachm; of boiling water, a pint; macerate for two hours in a vessel lightly covered, and strain.

INFUSION OF TOBACCO.—Take of tobacco-leaves, a drachm; of boiling water, a pint; macerate for an hour in a vessel lightly covered, and strain.

MUCILAGES.

MUCILAGE OF ACACIA.—Take of acacia gum, four ounces; of boiling water, half a pint; rub the gum with the water dropped into it gradually, until it shall form a mucilage.

MUCILAGE OF STARCH.—Take of starch, three drachms; of water, a pint; rub the starch with the water gradually dropped into it, until it shall form into a mucilage.

DECOCTIONS.

COMPOUND DECOCTION OF ALOES.—Take of extract of liquorice, half an ounce; of subcarbonate of potass, two scruples; of extract of spiked aloes, in powder, of myrrh bruised, of saffron, each a drachm; of compound tincture of cardamoms, four fluid ounces; of water, a pint; boil down the liquorice, subcarbonate of potass, aloes, myrrh, and saffron, with the water to twelve fluid ounces, and strain; then add the compound tincture of cardamoms.

DECOCTION OF BARK.—Take of the lance-leaved cinchona bark bruised, an ounce; of water, a pint; boil for ten minutes in a vessel lightly covered, and strain the liquor as yet hot.

DECOCTION OF QUINCE SEEDS.—Take of quince seeds, two drachms; of water, a pint; boil with a gentle fire for ten minutes, then strain.

DECOCTION OF BITTER-SWEET (*woody nightshade*).—Take of bitter-sweet stalks, sliced, an ounce: of water, a pint and a half; boil down to a pint, and strain.

DECOCTION OF BARLEY.—Take of barley seeds (*pearl barley*), two ounces; of water, four pints and a half; first wash away any extraneous substances adhering to them with cold water; then, having poured half a pint of water upon them, boil the seeds a short time. This water being thrown away, pour what is remaining, made boiling hot, upon the barley, then boil down to two pints, and strain.

COMPOUND DECOCTION OF BARLEY.—Take of decoction of barley, two pints; of figs, sliced, two ounces; of liquorice root, sliced and bruised, half an ounce; of raisins, stoned, two ounces; of water, a pint; boil down to two pints, and strain.

DECOCTION OF LIVERWORT (*Iceland moss*).—Take of liverwort, an ounce; of water, a pint and a half, boil down to a pint, and strain.

Compound decoction of mallow.—Take of mallow dried, an ounce; of chamomile flowers, half an ounce: of water, a pint; boil for fifteen minutes, and strain.

Decoction of poppies.—Take of poppy heads, sliced, four ounces; of water, four pints; boil for fifteen minutes, and strain.

Decoction of oak bark.—Take of oak bark, an ounce; of water, two pints; boil down to one pint and strain.

Decoction of sarsaparilla.—Take of sarsaparilla root, sliced, four ounces; of boiling water, four pints; macerate for four hours in a vessel lightly covered, by the fire; then take out the sarsaparilla root and bruise it, when bruised, return it to the liquor and macerate it again in a similar manner for two hours; then boil down to two pints, and strain.

Compound decoction of sarsaparilla.—Take of the decoction of sarsaparilla, boiling, four pints; of sassafras root, sliced, of guaiacum wood shavings, of liquorice root, bruised, each an ounce; of the bark of the mezereon root, three drachms: boil down for fifteen minutes, and strain.

Decoction of senega.—Take of senega root, an ounce; of water, two pints; boil down to a pint, and strain.

Decoction of elm (*bark*).—Take of elm bark bruised, four pints; of water, four pints; boil down to two pints, and strain.

Decoction of white hellebore.—Take of white hellebore root bruised, an ounce; of water, two pints; of rectified spirit, two fluid ounces; boil down the white hellebore root in the water to a pint, and strain; then, after it shall have become cold, add the spirit.

EXTRACTS.

In preparing all the extracts, consume the moisture in a plate as speedily as possible by a water bath until they shall be of a proper consistence to form pills, and towards the end (*of the evaporation*) continually stir them with a spatula.

Sprinkle upon all the softer extracts a little rectified spirit.

EXTRACT OF ACONITE.—Take of fresh aconite leaves, a pound; bruise them in a stone mortar, sprinkling them with a little water; then express the juice, and evaporate it *without straining* until it becomes of a proper consistence.

PURIFIED EXTRACT OF ALOES.—Take of extract of aloes in powder, a pound; of boiling water, a gallon; macerate for three days in a gentle heat; then strain, and set it by that the dregs may subside, pour off the clear liquor and evaporate until it shall acquire a proper consistence.

EXTRACT OF CHAMOMILE.—Take of chamomile flowers dried, a pound; of water, a gallon; boil down to four pints, and strain the liquor as yet hot; finally evaporate it until it shall acquire a proper consistence.

EXTRACT OF BELLADONNA (*deadly night-shade leaves*).—Take of fresh belladonna leaves, a pound; bruise them in a stone mortar, sprinkling them with a little water; then express the juice, and evaporate it uncleared, until it shall acquire a proper consistence.

EXTRACT OF BARK.—Take of lance-leaved cinchona bark bruised, a pound; of water, a gallon; boil down to six pints, and strain the liquor as yet hot. In the same manner boil down four times in the like measure of water, and strain. Finally, evaporate all the liquors mixed together, until they shall acquire a proper consistence.

This extract ought to be kept SOFT, that it may be fit to form pills, and HARD, that it may be rubbed into powder.

RESINOUS EXTRACT OF BARK.—Take of lance-leaved cinchona bark bruised, two pounds; rectified spirit, a gallon; macerate for four days, and strain. Let the tincture distil in a water bath, until it (*the extract*) shall acquire a proper consistence.

EXTRACT OF COLOCYNTH.—Take of colocynth pulp, a pound; of water, a gallon; boil down to four pints, and strain the liquor as yet hot; finally evaporate it, until it shall acquire a proper consistence.

COMPOUND EXTRACT OF COLOCYNTH.—Take of the pulp of colocynth sliced, six ounces; of extract of spiked aloes powdered, twelve ounces; of gum resin of scammony in powder, four ounces; of cardamom seeds in powder, an ounce; of hard soap, three ounces; of proof spirit, a gal-

lon; macerate the colocynth pulp in the spirit, in a gentle heat for four days, strain the liquor and add to it the aloes, scammony, and soap, then evaporate the spirit, until it has acquired a proper consistence, and mix with it the cardamom seeds, towards the end (*before the evaporation is finished*).

EXTRACT OF HEMLOCK.—Take of fresh hemlock, a pound; bruise it in a stone mortar, sprinkling it with a little water; then express the juice, and evaporate it without clearing it, until it shall acquire a proper consistence.

EXTRACT OF ELATERIUM (*wild cucumbers*).—Slice the ripe fruit of elaterium, express the juice gently, and strain it through a fine hair sieve into a glass vessel; then set it by for some hours, until the thicker part has subsided. Having thrown away the thinner supernatant part, dry the thicker part with a mild heat.

EXTRACT OF GENTIAN.—Take of gentian root sliced, a pound; of boiling water, a gallon; macerate for twenty-four hours; then boil down to four pints, and strain the liquor as yet hot; finally, evaporate it, until it shall acquire a proper consistence.

EXTRACT OF LIQUORICE.—Take of liquorice root sliced, a pound; of boiling water, a gallon; macerate for twenty-four hours; then boil down to four pints, and strain the liquor as yet hot; finally, evaporate it, until it shall acquire a proper consistence.

EXTRACT OF LOGWOOD.—Take of logwood powdered, a pound; of boiling water, a gallon; macerate for twenty-four hours; then boil down to four pints, and strain the liquor whilst hot; finally, evaporate it until it shall acquire a proper consistence.

EXTRACT OF HOPS.—Take of the strobiles of the hop, four ounces; of boiling water, a gallon; boil down to four pints, and strain the liquor as yet hot; finally, evaporate it until it shall acquire a proper consistence.

EXTRACT OF HENBANE.—Take of fresh henbane leaves, a pound; bruise them in a stone mortar, sprinkled with a little water: then express the juice, and evaporate it uncleansed, until it shall acquire a proper consistence.

EXTRACT OF JALAP.—Take of jalap root powdered, a pound; of rectified spirit, four pints; of water, a gallon: macerate the jalap root in the spirit for four days, and pour off the tincture: boil down the residue with the

water, to two pints: then strain the tincture and the decoction separately, and let the decoction be evaporated, and the tincture distilled, until each shall become thick. Lastly, mix the extract with the resin, and evaporate it, until it shall acquire a proper consistence.

Let this extract be kept SOFT that it may be fit to form pills, and HARD that it may be rubbed into powder.

EXTRACT OF LETTUCE.—Take of fresh lettuce leaves, a pound: bruise them in a stone mortar, a little water being sprinkled upon them: then express the juice, and evaporate it unstrained, until it shall acquire a proper consistence.

EXTRACT OF OPIUM.—Take of opium sliced, sixteen ounces: of water, a gallon: add a little of the water to the opium, and macerate for twelve hours, that it may become soft: then, having gradually dropped in the remaining water, rub them until they are well mixed: and set aside that the dregs may subside: then strain the liquor, and evaporate it until it shall acquire a proper consistence.

EXTRACT OF POPPY.—Take of poppy capsules deprived of their seeds bruised, a pound: of boiling water, a gallon: macerate for twenty-four hours: then boil down to four pints, and strain the liquor, as yet hot. Lastly, evaporate it until it shall acquire a proper consistence.

EXTRACT OF RHUBARB.—Take of the root of rhubarb powdered, a pound: of proof spirit, a pint; of water, seven pints: macerate for four days with a gentle heat: then strain, and set it by that the dregs may subside. Pour off the liquor, and evaporate it when strained, until it acquires a proper consistence.

EXTRACT OF SARSAPARILLA.—Take of the root of sarsaparilla sliced, a pound: of boiling water, a gallon, macerate for twenty-four hours: then boil down to four pints, and strain the liquor, as yet hot: lastly, evaporate it until it shall acquire a proper consistence.

EXTRACT OF THORN APPLE.—Take of the seeds of thorn apple, a pound; of boiling water, a gallon; macerate for four hours in a vessel lightly covered by the fire-side; then take out the seeds, and bruise them in a stone mortar, return them when bruised into the liquor: then boil down to four pints and strain the liquor whilst hot. Lastly, evaporate it until it shall acquire a proper consistence.

EXTRACT OF DANDELION.—Take of the fresh root of dandelion bruised, a pound: of boiling water, a gallon: macerate for twenty-four hours: then boil down to four pints, and strain the liquor whilst hot; lastly, evaporate it until it shall acquire a proper consistence.

MIXTURES.

MIXTURE OF (GUM) AMMONIAC.—Take of *(gum)* ammoniac, two drachms: of water, half a pint: rub the ammoniac with the water gradually dropped into it until they are intimately mixed.

MIXTURE OF ALMONDS.—Take of the confection of almonds, two ounces: of distilled water, a pint: add the water gradually to the confection of almonds, whilst rubbing them, until they are mixed: then strain.

MIXTURE OF ASSAFŒTIDA.—Take of assafœtida, two drachms: of water, half a pint: rub the assafœtida with the water gradually dropped in until they are very well mixed.

MIXTURE OF CAMPHOR.—Take of camphor, half a drachm; of rectified spirit, ten minims; of water, a pint; rub the camphor first with the spirit, then with the water, gradually dropped in, and strain.

MIXTURE OF BURNT HARTSHORN.—Take of burnt hartshorn, two ounces; of gum arabic, an ounce; of water, three pints; boil down to two pints, continually stirring it, then strain.

MIXTURE OF CHALK.—Take of prepared chalk, half an ounce; of refined sugar, three drachms: of gum arabic powdered, half an ounce; of water, a pint; mix.

COMPOUND MIXTURE OF IRON.—Take of myrrh, in powder, a drachm; of subcarbonate of potass, twenty-five grains; of rose water, seven ounces and a half; of sulphate of iron, in powder, a scruple; of spirit of nutmeg, half a fluid ounce; of refined sugar, a drachm; rub together the myrrh with the spirit of nutmeg, and the subcarbonate of potass; and to these, whilst rubbing, add first the rose water with the sugar, and then the sulphate of iron. Put the mixture immediately into a proper glass vessel, and stop it.

MIXTURE OF GUAIACUM.—Take of the gum resin of guaiacum, a drachm and a half; of refined sugar, two drachms; of mucilage of gum arabic, two fluid drachms; of the water of cinnamon, eight fluid ounces; rub the guaiacum with the sugar, then with the mucilage, and to these, whilst rubbing, add gradually the water of cinnamon.

MIXTURE OF MUSK.—Take of musk, of acacia gum powdered, of refined sugar, of each a drachm; of rose water, six fluid ounces: rub the musk with the sugar, then with the gum, dropping in gradually the rose water.

SPIRITS.

ALCOHOL.—Take of rectified spirit, a gallon: of subcarbonate of potass, three pounds: throw a pound of the subcarbonate of potass, previously heated to the three hundredth degree, to the spirit, and macerate for twenty-four hours, frequently stirring them: then, having poured off the spirit, add to it what is remaining of the subcarbonate of potass heated to the same degree: lastly, with a water-bath, let the alcohol distil, which is to be preserved in a stopped vessel.

The specific weight of alcohol is to the specific weight of distilled water, as .815 to 1.000.

SPIRIT OF AMMONIA.—Take of proof spirit, three pints: of muriate of ammonia, four ounces: of subcarbonate of potass, six ounces: mix, and with a gentle fire, let a pint and a half distil into a cooled receiver.

AROMATIC SPIRIT OF AMMONIA.—Take of cinnamon bark bruised, of cloves bruised, of each two drachms: of lemon peel, four ounces: of subcarbonate of potass, half a pound: of muriate of ammonia, five ounces: of rectified spirit, four pints: of water, a gallon: mix, and let six pints distil.

FŒTID SPIRIT OF AMMONIA.—Take of the spirit of ammonia, two pints: of assafœtida, two ounces: macerate for twelve hours: then, with a gentle fire, let a pint and a half distil into a cooled receiver.

SUCCINATED SPIRIT OF AMMONIA.—Take of mastich, three drachms: of rectified spirit, nine fluid drachms: of

the oil of lavender, fourteen minims: of the oil of amber, four minims: of the solution of ammonia, ten fluid ounces: macerate the mastich in the spirit that it may be dissolved: and pour off the clear tincture: lastly, add the other ingredients, and shake the whole together.

SPIRIT OF ANISEED.—Take of the seeds of anise, bruised, half a pound: of proof spirit, a gallon: of water what may be sufficient to prevent empyreuma: macerate for twenty-four hours: then, with a gentle fire, let a gallon distil.

COMPOUND SPIRIT OF HORSERADISH.—Take of the fresh root of horseradish sliced, of dried orange-peel, of each a pound: of nutmegs bruised, half an ounce: of proof spirit, a gallon: of water, what may be sufficient to prevent empyreuma: macerate for twenty-four hours: then, with a gentle fire, let one gallon distil.

SPIRIT OF CAMPHOR.—Take of camphor, four ounces: of rectified spirit, two pints: mix, that the camphor may be dissolved.

SPIRIT OF CARRAWAY.—Take of the seeds of carraway bruised, a pound and a half: of proof spirit, a gallon: of water, a sufficient quantity to prevent empyreuma: macerate for twenty-four hours: then, with a gentle fire, let one gallon distil.

SPIRIT OF CINNAMON.—Take of oil of cinnamon, *by weight*, five scruples: of rectified spirit, four pints and a half: add the spirit to the oil, and pour thereon so much water that, after the distillation, there may remain what may be sufficient to prevent empyreuma: then, with a gentle fire, let a gallon distil.

AMMONIATED SPIRIT OF MEADOW SAFFRON.—Take of the seeds of meadow saffron, bruised, two ounces: of aromatic spirit of ammonia, a pint: macerate for fourteen days, and strain.

COMPOUND SPIRIT OF JUNIPER.—Take of the berries of juniper bruised, a pound: of the seeds of carraway, bruised, of the seeds of fennel, bruised, of each an ounce and a half: of proof spirit, a gallon: of water, what may be sufficient to prevent empyreuma: macerate for twenty-four hours; then, with a gentle fire, let a gallon distil.

SPIRIT OF LAVENDER.—Take of the flowers of fresh lavender, two pounds: of rectified spirit, a gallon: of water, what may be sufficient to prevent empyreuma: macerate

for twenty-four hours; then, with a gentle fire, let a gallon distil.

COMPOUND SPIRIT OF LAVENDER.—Take of spirit of lavender, three pints: of spirit of rosemary, a pint: of cinnamon bark, bruised, of nutmegs, bruised, of each half an ounce: of red saunders wood, sliced, an ounce: macerate for fourteen days, and strain.

SPIRIT OF PEPPERMINT.—Take of the oil of peppermint, *by weight*, six scruples and a half: of rectified spirit, four pints and a half: add the spirit to the oil, and pour thereon so much water, that, after distillation, there may remain what may be sufficient to prevent empyreuma; then, with a gentle fire, let a gallon distil.

SPIRIT OF SPEARMINT.—Take of the oil of spearmint, *by weight*, six scruples and a half: of rectified spirit, four pints and a half: add the spirit to the oil, and pour thereon so much water, that, after distillation, there may remain what may be sufficient to prevent empyreuma; then, with a gentle fire, let a gallon distil.

SPIRIT OF NUTMEG.—Take of nutmegs, bruised, two ounces: of proof spirit, a gallon: of water, what may be sufficient to prevent empyreuma: macerate for twenty-four hours; then, with a gentle fire, let a gallon distil.

SPIRIT OF PIMENTA.—Take of the berries of pimenta, bruised, two ounces: of proof spirit, a gallon: of water, what may be sufficient to prevent empyreuma: macerate for twenty-four hours; then, with a gentle fire, let a gallon distil.

SPIRIT OF PENNYROYAL.—Take of oil of pennyroyal, *by weight*, seven scruples: of rectified spirit, four pints and a half: add the spirit to the oil, and pour thereon so much water, that, after distillation, there may remain a sufficient quantity to prevent empyreuma; then, with a gentle fire, let a gallon distil.

SPIRIT OF ROSEMARY.—Take of the oil of rosemary, *by weight*, an ounce: of rectified spirit, a gallon: add the spirit to the oil, and pour thereon so much water, that, after distillation, there may remain what may be sufficient to prevent empyreuma; then, with a gentle fire, let a gallon distil.

TINCTURES.

All tinctures ought to be prepared in stopped glass vessels, and to be frequently shaken whilst macerating.

Tincture of aloes.—Take of extract of spiked aloe, in powder, half an ounce: of extract of liquorice, an ounce and a half: of water, a pint: of rectified spirit, four fluid ounces: macerate for fourteen days, and strain.

Compound tincture of aloes.—Take of extract of spiked aloe, in powder, of saffron, of each three ounces: of tincture of myrrh, two pints: macerate for fourteen days, and strain.

Tincture of assafœtida.—Take of assafœtida, four ounces: of rectified spirit, two pints: macerate for fourteen days, and strain.

Tincture of orange peel.—Take of fresh orange peel, three ounces: of proof spirit, two pints: macerate for fourteen days, and strain.

Compound tincture of benzoin.—Take of benzoin, three ounces: of balsam of storax strained, two ounces: of balsam of tolu, an ounce: of extract of spiked aloe, half an ounce: of rectified spirit, two pints: macerate for fourteen days, and strain.

Tincture of calumba.—Take of calumba sliced, two ounces and a half: of proof spirit, two pints: macerate for fourteen days, and strain.

Compound tincture of camphor.—Take of camphor, two scruples: of hard opium, in powder, of benzoic acid, each a drachm: of proof spirit, two pints: macerate for fourteen days, and strain.

Tincture of blistering fly.—Take of blistering flies bruised, three drachms: of proof spirit, two pints: macerate for fourteen days, and strain.

Tincture of capsicum.—Take of capsicum berries, an ounce: of proof spirit, two pints: macerate for fourteen days, and strain.

Tincture of cardamom.—Take of cardamom seeds bruised, three ounces: of proof spirit, two pints: macerate for fourteen days, and strain.

Compound tincture of cardamom.—Take of cardamom seeds, of carraway seeds, of cochineal, of each bruised, two drachms: of cinnamon bark bruised, half an ounce:

of raisins, stoned, four ounces; of proof spirit, two pints; macerate for fourteen days, and strain.

TINCTURE OF CASCARILLA.—Take of cascarilla bark in powder, four ounces; proof spirit, two pints; macerate for fourteen days, and strain.

TINCTURE OF CASTOR.—Take of castor, in powder, two ounces: of rectified spirit, two pints: macerate for seven days, and strain.

TINCTURE OF CATECHU.—Take of extract of catechu, three ounces: of cinnamon bark bruised, two ounces: of proof spirit, two pints: macerate for fourteen days, and strain.

TINCTURE OF CINCHONA.—Take of the bark of the lance-leaved cinchona in powder, seven ounces: proof spirit, two pints, macerate for fourteen days, and strain.

AMMONIATED TINCTURE OF BARK.—Take of the bark of the lance-leaved cinchona in powder, four ounces: of aromatic spirit of ammonia, two pints: macerate for ten days, and strain.

COMPOUND TINCTURE OF CINCHONA.—Take of the bark of the lance-leaved cinchona in powder, two ounces: of orange peel dried, an ounce and a half: of serpentary root bruised, three drachms: of saffron, a drachm: of cochineal in powder, two scruples: of proof spirit, twenty fluid ounces: macerate for fourteen days, and strain.

TINCTURE OE CINNAMON.——Take of cinnamon bark bruised, three ounces: of proof spirit, two pints: macerate for fourteen days, and strain.

COMPOUND TINCTURE OF CINNAMON.—Take of cinnamon bark bruised, six drachms: of cardamom seeds bruised, three drachms: of long pepper in powder, of ginger root sliced, each two drachms: of proof spirit, two pints: macerate for fourteen days, and strain.

TINCTURE OF DIGITALIS.—Take of foxglove leaves dried, four ounces: of proof spirit, two pints: macerate for fourteen hours, and strain.

COMPOUND TINCTURE OF GENTIAN.——Take of gentian root, sliced, two ounces: of orange peel dried, an ounce: of cardamom seeds bruised, half an ounce: of proof spirit, two pints: macerate for fourteen days, and strain.

TINCTURE OF GUAIACUM.—Take of gum-resin of guaiacum, in powder, half a pound: of rectified spirit, two pints: macerate for fourteen days, and strain.

Ammoniated tincture of guaiacum.—Take of the gum-resin of guaiacum in powder, four ounces; of aromatic spirit of ammonia, a pint and half; macerate for fourteen days, and strain.

Tincture of black hellebore.—Take of black hellebore root sliced, four ounces; of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of hops.—Take of hops, five ounces; of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of henbane.—Take of henbane leaves dried, four ounces; of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of jalap.—Take of jalap root in powder, eight ounces: of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of kino.—Take of kino in powder, three ounces; of rectified spirit, two pints; macerate for fourteen days, and strain.

Tincture of myrrh.—Take of myrrh bruised, four ounces: of rectified spirit, three pints; macerate for fourteen days, and strain.

Tincture of opium.—Take of hard opium, in powder, two ounces and a half: of proof spirit, two pints: macerate for fourteen days, and strain.

Tincture of rhubarb.—Take of rhubarb root sliced, two ounces; of cardamom seeds bruised, an ounce and a half; of saffron, two drachms; of proof spirit, two pints; macerate for fourteen days, and strain.

Compound tincture of rhubarb.—Take of rhubarb root sliced, two ounces; of liquorice root bruised, half an ounce; of ginger root sliced, of saffron, each two drachms; of proof spirit, a pint; of water, twelve fluid ounces; macerate for fourteen days, and strain.

Tincture of squills.—Take of squill root fresh dried, four ounces: of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of senna.—Take of senna leaves, three ounces: of carraway seeds bruised, three drachms: of cardamom seeds bruised, a drachm; of raisins stoned, four ounces; of proof spirit, two pints; macerate for fourteen days, and strain.

Tincture of serpentary.—Take of serpentary root, three ounces: of proof spirit, three pints: macerate for fourteen days, and strain.

TINCTURE OF VALERIAN.—Take of Valerian root, four ounces: of proof spirit, two pints: macerate for fourteen days, and strain.

AMMONIATED TINCTURE OF VALERIAN.—Take of Valerian root, four ounces: of aromatic spirit of ammonia, two pints: macerate for fourteen days, and strain.

TINCTURE OF GINGER.—Take of ginger root, sliced, two ounces: of rectified spirits, two pints: macerate for fourteen days, and strain.

PREPARATIONS OF ÆTHER.

SULPHURIC ÆTHER.—Take of rectified spirit, of sulphuric acid, of each, *by weight*, a pound and a half: pour the spirit into a glass retort, and add the acid gradually to it, shaking them frequently until they are mixed, and taking care that the heat does not exceed the hundred and twentieth degree; then place them cautiously in sand, previously heated to the two hundredth degree, that the liquor may boil as quickly as possible, and the æther pass over into a tubulated receiver, to which another receiver shall be fitted, kept cold by ice or water. Let the liquor distil until a heavier part shall begin to pass over and to be seen under the æther at the bottom of the receiver. To the liquor which remains in the retort pour twelve ounces of rectified spirit, that the æther may distil in a similar manner.

RECTIFIED ÆTHER.—Take of sulphuric æther, fourteen fluid ounces: of fused potass, half an ounce: of distilled water, eleven fluid ounces: first dissolve the potass in two ounces of the water, and add to it the æther, constantly shaking them until they are mixed: then at a heat of about the hundred and twentieth degree, let twelve fluid ounces of æther distil from a large retort into a cooled receiver: shake together the distilled æther, with nine fluid ounces of the water, and set them aside that the water may subside. Lastly, pour off the supernatant rectified æther, and keep it in a well stopped vessel.

ÆTHEREAL OIL.—After the distillation of sulphuric æther, having decreased the heat, let the liquor distil again until

a black froth swells up: then remove the retort directly from the fire: add water to the liquor which remains in the retort, that the oily part may float upon its surface. Take off this, and add to it as much as may be sufficient, of lime water, to saturate the acid which is present, and shake them together: finally, take off the separated ethereal oil.

AROMATIC SPIRIT OF ÆTHER.—Take of cinnamon bark, bruised, three drachms: of seeds of cardamom, in powder, a drachm and a half: of the fruit of long pepper, powdered, of the root of ginger, sliced, of each a drachm: of spirit of sulphuric æther, a pint: macerate for fourteen days in a stopped glass vessel, and strain.

SPIRIT OF NITRIC ÆTHER.—Take of rectified spirit, two pints: of nitric acid, *by weight*, three ounces: add the acid to the spirit gradually, and mix them, taking care that the heat does not exceed the hundred and twentieth degree: then, with a mild heat, distil twenty-four fluid ounces.

SPIRIT OF SULPHURIC ÆTHER.—Take of rectified æther, half a pint: of rectified spirit, a pint: mix.

COMPOUND SPIRIT OF SULPHURIC ÆTHER.—Take of spirit of sulphuric æther, a pint; of æthereal oil, two fluid drachms: mix.

WINES.

WINE OF ALOES.—Take of extract of spiked aloes, eight ounces: of canella bark, two ounces: of proof spirit, of distilled water, of each four pints: rub the aloe into a powder with white sand, cleansed from all impurities: rub the bark of canella also into a powder, and to these, mixed together, pour the spirit and the water: macerate for fourteen days, stirring it frequently, and strain.

WINE OF MEADOW SAFFRON.—Take of the root of meadow-saffron, fresh, sliced, a pound: of proof spirit, four fluid ounces: of distilled water, eight fluid ounces: macerate for fourteen days, and strain.

WINE OF IPECACUANHA.—Take of the root of ipecacuanha, bruised, two ounces: of proof spirit, twelve fluid

ounces: of distilled water, twenty fluid ounces: macerate for fourteen days, and strain.

WINE OF OPIUM.—Take of extract of opium, an ounce: of cinnamon bark, bruised, of cloves, bruised, of each a drachm: of proof spirit, six fluid ounces: of distilled water, ten fluid ounces: macerate for eight days, and strain.

WINE OF (WHITE) HELLEBORE.—Take of the root of *white* hellebore, sliced, eight ounces: of proof spirit, a pint: of distilled water, a pint and a half: macerate for fourteen days, and strain.

VINEGARS.

VINEGAR OF MEADOW SAFFRON.—Take of the fresh root of meadow-saffron, sliced, an ounce; of dilute acetic acid, a pint; of proof spirit, a fluid ounce: macerate the root of the meadow-saffron with the dilute acetic acid, in a covered glass vessel for three days, then express and set it by, that the dregs may subside: lastly, add the spirit to the strained liquor.

VINEGAR OF SQUILL.—Take of the fresh root of the squill, dried, a pound: of dilute acetic acid, six pints: of proof spirit, half a pint: macerate the root of squill with the acid by a gentle heat, in a closed glass vessel, for twenty-four hours: then express and set it by, that the dregs may subside: lastly, add the spirit to the strained liquor.

PREPARATIONS OF HONEY.

CLARIFIED HONEY.—Dissolve the honey with a water-bath, then take off the scum.

HONEY OF BORAX.—Take of subborate of soda in powder, a drachm: of clarified honey, an ounce: mix.

HONEY OF ROSES.—Take of the petals of the French rose *(red rose)* dried, four ounces: of boiling water,

three pints: of clarified honey, five pounds: macerate the petals of the rose in the water for six hours, and strain: then add the honey to the strained liquor, and, with a water-bath, boil them down until they acquire a proper consistence.

Simple oxymel.—Take of clarified honey, two pounds: of dilute acetic acid, one pint: boil down in a glass vessel with a gentle fire to a proper consistence.

Oxymel of squill.—Take of clarified honey, three pounds: of vinegar of squills, two pints: boil down in a glass vessel with a gentle fire to a proper consistence.

SYRUPS.

Syrups are to be kept in a place where the heat never exceeds the fifty-fifth degree.

Syrup of marshmallow.—Take of the fresh root of marshmallow, bruised, half a pound: purified sugar, two pounds: water, four pints: boil down the water with the root to one half, and express the liquor when cool. Set it by for twenty-four hours that the dregs may subside: then pour off the liquor, and, the sugar being added, boil down to a proper consistence.

Syrup of oranges (the peel).—Take of fresh peel of oranges, two ounces: of boiling water, a pint: of refined sugar, three pounds: macerate the peel in the water for twelve hours in a vessel lightly covered: then pour off the liquor, and add the sugar to it.

Syrup of saffron.—Take of saffron, an ounce: of boiling water, a pint: of purified sugar, two pounds and a half: macerate the saffron in the water for twelve hours in a vessel lightly covered: then strain the liquor, and add the sugar.

Syrup of lemons.—Take of the juice of lemons strained, a pint: of purified sugar, two pounds: dissolve the sugar in the juice of lemons in the same manner which is directed for simple syrup.

Syrup of mulberries.—Take of the juice of mulberries strained, a pint: of refined sugar, two pounds: dis-

solve the sugar in the juice of mulberries, in the same manner which is directed for simple syrup.

SYRUP OF POPPY (WHITE).—Take of capsules of (*white*) poppy dried and bruised, having taken out the seeds, fourteen ounces: of purified sugar, two pounds: of boiling water, two gallons and a half: macerate the capsules in the water for twenty-four hours, then with a water-bath boil down to one gallon, and express it strongly. Boil down the strained liquor again to two pints, and strain it as yet hot. Set it by for twelve hours, that the dregs may subside: then boil down the clear liquor to a pint, and add the sugar, in the same manner which is directed for simple syrup.

SYRUP OF BUCKTHORN.—Take of the fresh juice of the berries of buckthorn, four pints: of ginger root, sliced, of the berries of pimenta in powder, of each half an ounce: of purified sugar, three pounds and a half: set by the juice for three days that the dregs may subside, and strain: add the ginger root and pimenta berries to a pint of the strained juice: then macerate in a gentle heat for four hours, and strain: boil down what is remaining to a pint and a half: mix the liquors: and add the sugar in the same manner which is directed for simple syrup.

SYRUP OF RED POPPY.—Take of the fresh petals of the red poppy, a pound: of boiling water, a pint and two fluid ounces: of purified sugar, two pounds and a half: add the petals of the red poppy gradually to the water heated with a water bath, frequently stirring them: then, having removed the vessel, macerate for twelve hours: then express the liquor, and set it by that the dregs may subside: lastly, add the sugar in the same manner which is directed for simple syrup.

SYRUP OF ROSES.—Take of the petals of the damask rose, dried, seven ounces: of purified sugar, six pounds: of boiling water, four pints: macerate the petals of the rose in the water for twelve hours, and strain: evaporate the strained liquor in a water bath to two pints and a half: then add the sugar in the same manner which is directed for simple syrup.

SYRUP OF SARSAPARILLA.—Take of the root of sarsaparilla, sliced, a pound: of boiling water, a gallon: of purified sugar, a pound: macerate the root in the water for twenty-four hours: then boil down to four pints, and strain the li-

quor as yet hot: then add the sugar and evaporate to a proper consistence.

Syrup of senna.—Take of senna leaves, two ounces: of the seeds of fennel, bruised, an ounce: of manna, three ounces: of purified sugar, a pound: of boiling water, a pint: macerate the leaves of senna and the seeds of fennel in the water for an hour, with a gentle heat. Strain the liquor, and mix with it the manna and the sugar: then boil down to a proper consistence.

Simple syrup.—Take of purified sugar two pounds and a half: of water, a pint: dissolve the sugar in the water, in a water-bath: then set it aside for twenty-four hours: then take off the scum, and pour off the pure liquor from the dregs, if there be any.

Syrup of tolu.—Take of balsam of tolu, an ounce; of boiling water, a pint: of purified sugar, two pounds: boil the balsam in the water for half an hour in a covered vessel, stirring them often, and strain the liquor when it has become cold: then add the sugar, in the same manner which is directed for simple syrup.

Syrup of ginger.—Take of root of ginger sliced, two ounces: of boiling water, a pint: of purified sugar, two pounds: macerate the root of ginger in the water for four hours, and strain; then add the sugar in the same manner which is directed for simple syrup.

CONFECTIONS.

If confections kept long, should become hard, they are to be moistened with water, that their proper consistence may be restored.

Confection of almonds.—Take of sweet almonds, an ounce; of acacia gum, powdered, a drachm; of purified sugar, half an ounce; the almonds being first macerated in water and their external coat taken off, bruise the whole together, until they shall be incorporated.

Aromatic confection.—Take of the cinnamon bark, of nutmegs, of each two ounces; of cloves, an ounce; of the seeds of cardamom, half an ounce; of saffron dried, two ounces; of prepared shells, sixteen ounces; of puri-

fied sugar, powdered, two pounds; of water, a pint; rub the dry ingredients together into a very fine powder; then add the water gradually, and mix, until they shall be incorporated.

CONFECTION OF ORANGE PEEL.—Take of the outer fresh rind of oranges, separated by rasping, a pound; of purified sugar, three pounds; bruise the rind with a wooden pestle in a stone mortar; then, having added the sugar, bruise them again until they shall be incorporated.

CONFECTION OF CASSIA.—Take of the fresh pulp of cassia, half a pound; of manna, two ounces; of the pulp of tamarind, an ounce; of syrup of roses, half a pint; bruise the manna, then dissolve it in the syrup with a water-bath; then mix in the pulps, and evaporate till it shall be of a proper consistence.

CONFECTION OF OPIUM.—Take of hard opium, powdered, six drachms; of the fruit of long pepper, an ounce; of the root of ginger, two ounces; of the seeds of carraway, three ounces; of tragacanth, powdered, two drachms; of syrup, a pint; rub the opium with the syrup heated, then add the rest of the ingredients powdered, and mix.

CONFECTION OF BLACK PEPPER.—Take of black pepper, of the root of elecampane, of each a pound; of the seeds of fennel, three pounds; of honey, of purified sugar, of each two pounds; rub together the dry ingredients, into a very fine powder; then, having added the honey, pound them until they shall be incorporated.

CONFECTION OF THE DOG ROSE.—Take of the pulp of dog rose, a pound; of purified sugar, powdered, twenty ounces; expose the pulp to a gentle heat in a water-bath; then add the sugar gradually, and rub them together until they shall be incorporated.

CONFECTION OF THE FRENCH ROSE (RED ROSE).—Take of the petals of the French rose, before they unfold, and without their claws, a pound; of purified sugar, three pounds; bruise the petals in a stone mortar, then, having added the sugar, bruise them again until they shall be incorporated.

CONFECTION OF RUE.—Take of the leaves of rue, dried, of the seeds of carraway; of the berries of bay, of each an ounce and a half; of sagapenum, half an ounce; of the fruit of black pepper, two drachms; of clarified honey, sixteen ounces; rub together the dry (*ingredients*) to a

very fine powder; then, having added the honey, mix the whole (*together*).

CONFECTION OF SCAMMONY.—Take of the gum-resin of scammony, powdered, an ounce and a half; of cloves, bruised, of the root of ginger, in powder, of each six drachms; of the oil of carraway, half a fluid drachm; of the syrup of roses, a sufficient quantity; rub together the dry (*ingredients*) into a very fine powder; then, the syrup being dropped in, next, having added the oil of carraway, mix the whole (*together*).

CONFECTION OF SENNA.—Take of the leaves of senna, eight ounces; of figs, a pound; of the pulp of tamarind, of the pulp of cassia, of the pulp of prunes, of each half a pound; of the seeds of coriander, four ounces; of the root of liquorice, three ounces; of purified sugar, two pounds and a half; rub the leaves of senna with the seeds of coriander, and separate ten ounces of the mixed powder by a sieve. Boil down the residue with the figs and the root of liquorice, in four pints of water, to one half; then express and strain it. Evaporate the strained liquor with a water-bath until the whole is reduced to a pint and a half; then, having added the sugar, let a syrup be made; lastly, rub the pulps with the syrup gradually added, and having thrown in the sifted powder, mix the whole (*together*).

POWDERS.

COMPOUND POWDER OF ALOES.—Take of extract of spiked aloe, an ounce and a half: of gum-resin of guaiacum, an ounce: of compound powder of cinnamon, half an ounce: rub the extract of aloe and the gum-resin of guaicum separately into powder: then mix them with the compound powder of cinnamon.

COMPOUND POWDER OF CINNAMON.—Take of cinnamon bark, two ounces: of the seeds of cardamom, an ounce and a half: of the root of ginger, an ounce: of the fruit of long pepper, half an ounce: rub them together that they may be made a very fine powder.

COMPOUND POWDER OF CONTRAJERVA.—Take of the root

of contrajerva, powdered, five ounces: of prepared shells, a pound and a half: mix.

Powder of burnt (hart's) horn with opium.—Take of hard opium, powdered, a drachm: of hartshorn, burnt and prepared, an ounce: of cochineal, powdered, a drachm: mix.

Compound powder of chalk.—Take of prepared chalk, half a pound: of the cinnamon bark, four ounces: of the root of tormentil, of the gum of acacia, of each three ounces: of the fruit of long pepper, half an ounce: rub them separately into a very fine powder: then mix.

Compound powder of chalk with opium.—Take of compound powder of chalk, six ounces and a half: of hard opium, powdered, four scruples, mix.

Compound powder of ipecacuanha.—Take of the root of ipecacuanha, powdered, of hard opium, powdered, of each a drachm: sulphate of potass, powdered, an ounce: mix.

Compound powder of kino.—Take of kino, fifteen drachms: of the bark of cinnamon, half an ounce: of hard opium, a drachm: rub them separately into a very fine powder: then mix.

Compound powder of scammony.—Take of the gum-resin of scammony, of the hard extract of jalap, of each two ounces: of the root of ginger, half an ounce: rub them separately into a very fine powder: then mix.

Compound powder of senna.—Take of the leaves of senna, of supertartrate of potass, of each two ounces: of the gum-resin of scammony, half an ounce: of the root of ginger, two drachms: rub the gum-resin of scammony separately, and the rest together, into a very fine powder: then mix.

Compound powder of tragacanth.—Take of tragacanth, powdered, of gum acacia, powdered, of starch, of each an ounce and a half: of purified sugar, three ounces: rub the starch and the sugar together, into a powder: then, having added the tragacanth and gum of acacia, mix the whole (*together*).

PILLS.

Compound pills of aloes.—Take of extract of spiked aloe, powdered, an ounce: of extract of gentian (root),

half an ounce: of oil of carraway, forty minims: of simple syrup, what may be sufficient: bruise them together, until the mass appears incorporated (*or in one body*).

PILLS OF ALOES WITH MYRRH.—Take of extract of spiked aloe, two ounces: of saffron, of myrrh, of each an ounce: of simple syrup, what may be sufficient: rub the extract and the myrrh separately into a powder: then beat the whole (*together*) until they shall be a uniform mass.

COMPOUND PILLS OF GAMBOGE.—Take of gamboge, powdered, a drachm: of extract of spiked aloe, powdered, a drachm and a half: of ginger, powdered, half a drachm: of soap, two drachms: mix the powders together: then, having added the soap, bruise the whole together until they shall be a uniform mass.

COMPOUND PILLS OF IRON.—Take of myrrh, powdered, two drachms: of subcarbonate of soda, of sulphate of iron, of sugar, of each a drachm: rub the myrrh with the subcarbonate of soda, the sulphate of iron being added: rub them again, then bruise the whole together until they shall be a uniform mass.

COMPOUND PILLS OF GALBANUM.—Take of the gum-resin of galbanum, an ounce: of myrrh, of sagapenum, of each an ounce and a half: of the gum-resin of assafœtida, half an ounce: of simple syrup, a sufficient quantity: beat them together until they shall be a uniform mass.

MERCURIAL PILLS.—Take of purified mercury, *by weight*, two drachms: of confection of the French rose, three drachms: of the root of liquorice, in powder, a drachm: rub the mercury with the confection, until globules are no longer visible: then, the liquorice root being added, beat the whole together until they shall be a uniform mass.

COMPOUND PILLS OF THE SUBMURIATE OF MERCURY.—Take of submuriate of mercury, of precipitated sulphuret of antimony, of each two drachms: of the gum-resin of guaiacum powdered, half an ounce: of rectified spirit, half a drachm: rub the submuriate of mercury first with the precipitated sulphuret of antimony, then with the gum-resin of guaiacum, and add the spirit, that it may be made of a proper consistence.

PILLS OF SOAP WITH OPIUM.—Take of hard opium in powder, half an ounce; hard soap, two ounces; beat them together, until they shall be of a uniform mass.

COMPOUND PILLS OF SQUILL.—Take of fresh root of squill

dried and powdered, a drachm: of the root of ginger in powder, of hard soap, of each three drachms: of ammoniacum powdered, two drachms: mix the powders together; then beat them with the soap, and add a sufficient quantity of simple syrup, that it may be formed of a proper consistence.

PREPARATIONS FROM ANIMALS.

PREPARED LARD.—Cut the lard into small pieces: then melt it over a gentle fire, and press it through linen.

BURNT HARTSHORN.—Burn pieces of hartshorn in an open fire until they become thoroughly white: then powder, and prepare them in the same manner which is directed for chalk.

PREPARED SUET.—Cut the suet into small pieces: melt it over a gentle fire, and press it through linen.

BURNT SPONGE.—Cut the sponge into small pieces, and bruise it, that it may be separated from any adherent substances: then burn it in a close iron vessel until it becomes black and friable: lastly, rub it into a very fine powder.

PREPARED OYSTER-SHELLS.—Wash the shells, previously freed from all impurities, with boiling water: then prepare them in the same manner as directed concerning chalk.

PLASTERS.

PLASTER OF AMMONIACUM.—Take of purified ammoniacum, five ounces: of dilute acetic acid, half a pint: dissolve the ammoniacum in the acid: then, by a water-bath, evaporate the liquor in an iron vessel, constantly stirring it, until it shall be made of a proper consistence.

PLASTER OF AMMONIACUM WITH MERCURY.—Take of purified ammoniacum, a pound: of purified mercury, *by weight*, three ounces: of sulphurated oil, a fluid drachm: rub the mercury with the sulphurated oil until the globules are no longer to be seen: then add the ammoniacum

gradually, previously dissolved, and mix the whole together.

PLASTER OF SPANISH FLY.—Take of Spanish fly rubbed into a very fine powder, a pound: plaster of wax, a pound and a half: of prepared lard, half a pound: to the plaster and the lard dissolved, and removed from the fire, just before they become solid, sprinkle the Spanish fly, and mix the whole.

PLASTER OF WAX.—Take of yellow wax, of prepared suet, of each three pounds: of yellow resin, a pound: melt them together, and strain.

CUMIN PLASTER.—Take of the seeds of cumin, of the seeds of carraway, of the berries of bay, of each three ounces: of burgundy pitch, three pounds: of yellow wax, three ounces: of olive oil, of water, of each an ounce and a half: to the pitch and wax melted together, add the dry materials rubbed to powder, the olive oil, and the water: then boil down to a proper consistence.

COMPOUND PLASTER OF GALBANUM.—Take of the gum-resin of purified galbanum, eight ounces: of plaster of lead, three pounds: of common turpentine, ten drachms: of resin of the spruce fir, powdered, three ounces: to the gum-resin of galbanum and the turpentine melted together, add first the resin of the spruce fir, and then the plaster of lead melted with a slow fire, and mix the whole.

MERCURIAL PLASTER.—Take of purified mercury, *by weight*, three ounces: of sulphurated oil, a fluid drachm: of plaster of lead, a pound: rub the mercury with the sulphurated oil until the globules are no longer to be seen: then add gradually the melted plaster of lead, and mix the whole.

PLASTER OF OPIUM.—Take of hard opium, powdered, half an ounce: of resin of the spruce fir, in powder, three ounces: of plaster of lead, a pound: of water, half a pint: to the melted plaster add the resin of the spruce fir, the opium, and the water: and boil down with a slow fire until the whole unite into the consistence of a plaster.

COMPOUND PLASTER OF PITCH.—Take of burgundy pitch, two pounds: of resin of the spruce fir, a pound: of yellow resin, of yellow wax, of each four ounces: of expressed oil of nutmegs, an ounce: of olive oil, of water, of each two fluid ounces: to the pitch, resin, and the wax dissolved together, add first the resin of the spruce fir, and then the

oil of nutmeg, the olive oil, and the water. Lastly, mix the whole, and boil down to a proper consistence.

PLASTER OF LEAD.—Take of semi-vitreous oxide of lead in very fine powder, five pounds: of olive oil, a gallon: of water, two pints: boil them together over a slow fire, constantly stirring them, until the oil and oxide of lead unite into the consistence of a plaster: but it will be necessary to add a little boiling water, if that which was at first employed shall have been consumed before the end of the boiling.

PLASTER OF RESIN.—Take of yellow resin, half a pound: of plaster of lead, three pounds: to the plaster of lead melted with a slow fire, add the resin powdered, and mix.

PLASTER OF SOAP.—Take of hard soap sliced, half a pound: of plaster of lead, three pounds: mix the soap with the melted plaster; then boil them down to a proper consistence.

CERATES.

CERATE OF CALAMINE.—Take of prepared calamine, of yellow wax, of each half a pound: of olive oil, a pint: mix the oil with the melted wax; then remove them from the fire, and when the mixture begins to thicken, add the calamine, and stir it constantly, until it shall become cold.

CERATE OF THE SPANISH FLY.—Take of the Spanish fly, in very fine powder, a drachm: of cerate of spermaceti, six drachms: to the cerate softened by the fire, add the Spanish fly, and mix.

CERATE OF SPERMACETI.—Take of spermaceti, half an ounce: of white wax, two ounces: of olive oil, four fluid ounces: add the oil to the spermaceti and wax melted together, and stir them with a wooden spatula until they are become cold.

CERATE OF ACETATE OF LEAD.—Take of acetate of lead in powder, two drachms: of white wax, two ounces: of olive oil, half a pint: dissolve the wax in seven fluid ounces of the oil, then add gradually the acetate of lead rubbed separately with the remaining oil, stirring them with a wooden spatula until they are united.

Compound cerate of lead.—Take of the liquor of sub-acetate of lead, two fluid ounces and a half: of yellow wax, four ounces: of olive oil, nine fluid ounces: of camphor, half a drachm: mix the melted wax with eight fluid ounces of the oil: then remove it from the fire, and when it begins to thicken, add the liquor of sub-acetate of lead gradually to it, and constantly stir them with a wooden spatula, until they become cold. Lastly, mix the camphor with these, dissolved in the remaining oil.

Cerate of resin.—Take of yellow resin, of yellow wax, of each a pound: of olive oil, a pint: melt the resin and wax together over a slow fire: then add the oil, and strain the cerate through linen whilst it is hot.

Cerate of savine.—Take of the fresh leaves of savine, bruised, a pound: of yellow wax, half a pound: of prepared lard, two pounds: boil the leaves of savine in the wax and lard melted together, then express through linen.

Cerate of soap.—Take of hard soap, eight ounces: of yellow wax, ten ounces: of semi-vitreous oxide of lead, powdered, a pound: of olive oil, a pint: of vinegar, a gallon: boil the vinegar with the oxide of lead over a slow fire, constantly stirring them, until they shall be in a uniform mass: then add the soap, and boil again in a similar manner, until the moisture is completely evaporated: lastly, mix these with the wax previously dissolved in the oil.

Simple cerate.—Take of olive oil, four fluid ounces: of yellow wax, four ounces: add the oil to the wax melted, and mix.

OINTMENTS.

Ointment of the blistering fly. Take of the Spanish flies in very fine powder, two ounces: of distilled water, eight fluid ounces: of resin cerate, eight ounces: boil down the water with the Spanfsh flies to one half, and strain. Mix the cerate with the strained liquor, then evaporate it to a proper consistence.

Spermaceti ointment.—Take of spermaceti, six drachms: of white wax, two drachms: of olive oil, three fluid ounces: having melted them together over a gentle

fire, stir them constantly until they shall have become cold.

Compound ointment of elemi.—Take of elemi, a pound: of common turpentine, ten ounces: of prepared suet, two pounds: of olive oil, two fluid ounces: melt together the elemi with the suet, then take them from the fire, and to these immediately mix the turpentine and the oil, then express through linen.

Strong mercurial ointment.—Take of purified mercury, two pounds: of prepared lard, twenty-three ounces: of prepared suet, an ounce: first rub the mercury with the suet and a little of the lard, until globules are no longer to be seen; then add what is remaining of the lard, and mix.

Mild mercurial ointment.—Take of strong mercurial ointment, a pound: of prepared lard, two pounds: mix.

Ointment of nitrate of mercury.—Take of purified mercury, an ounce: of nitric acid, eleven fluid drachms: of prepared lard, six ounces: of olive oil, four fluid ounces: first dissolve the mercury in the acid, then mix the liquor whilst hot with the lard and oil melted together.

Ointment of nitric oxide of mercury.—Take of nitric oxide of mercury, an ounce: of white wax, two ounces: of prepared lard, six ounces: add the nitric oxide of mercury rubbed into a very fine powder to the wax and the lard melted together, and mix.

Ointment of white precipitated mercury.—Take of white precipitated mercury, a drachm: of prepared lard, an ounce and a half: to the lard, melted over a slow fire, add the precipitated mercury, and mix.

Ointment of black pitch.—Take of black pitch, of yellow wax, of yellow resin, each nine ounces: of olive oil, a pint; melt them together, and express through linen.

Ointment of liquid pitch.—Take of liquid pitch (*tar*), of prepared suet, each a pound: melt them together, and strain through linen.

Elder flower ointment.—Take of elder flowers, of prepared lard, each two pounds: boil the elder flowers in the lard until they become crisp: then strain through linen.

Ointment of sulphur.—Take of sublimed sulphur, three ounces: of prepared lard, half a pound: mix.

Compound ointment of sulphur.—Take of sublimed sulphur, half a pound; of the root of white hellebore in powder, two ounces; of nitrate of potass, a drachm; of soft soap, half a pound; of prepared lard, a pound and half; mix.

Ointment of white hellebore.—Take of the root of white hellebore in powder, two ounces; of prepared lard, eight ounces; of oil of lemons, twenty minims; mix.

Ointment of zinc.—Take of oxide of zinc, an ounce; of prepared lard, six ounces; mix.

LINIMENTS.

Liniment of verdigris.—Take of verdigris powdered, an ounce; of vinegar, seven fluid ounces; of clarified honey, fourteen ounces; dissolve the verdigris in the vinegar, and strain the solution through linen; then, having dropped in the honey gradually, boil down to a proper consistence.

Strong liniment of ammonia.—Take of liquor of ammonia, a fluid ounce; of olive oil, two fluid ounces; shake them together until they are mixed.

Liniment of subcarbonate of ammonia.—Take of solution of subcarbonate of ammonia, a fluid ounce; of olive oil, three fluid ounces: shake them together until they are mixed.

Liniment of camphor.—Take of camphor, half an ounce; of olive oil, two fluid ounces: dissolve the camphor in the oil.

Compound liniment of camphor.—Take of camphor, two ounces: of liquor of ammonia, six fluid ounces: of spirit of lavender, a pint: mix the liquor of ammonia with the spirit in a glass retort, then let a pint distil with a slow fire. Lastly, dissolve the camphor in this.

Liniment of mercury.—Take of strong mercurial ointment, of prepared lard, each four ounces: of camphor, an ounce: of rectified spirit, fifteen minims: of liquor of ammonia, four fluid ounces. Rub the camphor, first with the spirit, then with the mercurial ointment and the lard:

lastly, having dropped in gradually the liquor of ammonia, mix the whole.

Compound liniment of soap.—Take of hard soap, three ounces: of camphor, an ounce: of spirit of rosemary, a pint. Dissolve the camphor in the spirit, then add the soap, and macerate in a sand-bath, until it is dissolved.

Liniment of turpentine.—Take of cerate of resin, a pound: of oil of turpentine, half a pint: add the oil of turpentine to the melted cerate, and mix.

CATAPLASMS.

Cataplasm of yest.—Take of flour, a pound: of the yest of ale, half a pint: mix, and apply a gentle heat until it begins to swell.

Cataplasm of mustard.—Take of the seeds of mustard, of linseed, each, powdered, half a pound: of boiling vinegar, as much as may be sufficient: mix, that it may be of the consistence of a cataplasm.

TABLE

SHOWING IN WHAT PROPORTION OPIUM, AND CERTAIN PREPARATIONS OF ANTIMONY, ARSENIC, AND MERCURY, ARE CONTAINED IN SOME COMPOUND MEDICINES.

CONFECTIO OPII (*Confection of Opium*) contains one grain of opium in about thirty-six grains.

HYDRARGYRUM CUM CRETA (*Mercury with chalk*) contains one grain of mercury in about three grains.

LINIMENTUM HYDRARGYRI (*Mercurial liniment*) contains one drachm of mercury in about six drachms.

LIQUOR ARSENICALIS (*Arsenical solution*) contains one grain of sublimed white arsenic in two fluid drachms.

LIQUOR HYDRARGYRI OXYMURIATIS (*Solution of oxymuriate of mercury*) contains a grain of oxymuriate of mercury in two fluid ounces.

PILULÆ HYDRARGYRI (*Mercurial pills*) contain one grain of mercury in three grains.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ (*Compound pills of submuriate of mercury*) contain one grain of submuriate of mercury in about four grains.

PILULÆ SAPONIS CUM OPIO (*Soap pills with opium*) contain one grain of opium in five grains.

PULVIS CORNU USTI CUM OPIO (*Powder of calcined hartshorn with opium*) contains one grain of opium in ten grains.

PULVIS CRETÆ COMPOSITUS CUM OPIO (*Compound powder of chalk with opium*) contains one grain of opium in two scruples.

PULVIS IPECACUANHÆ COMPOSITUS (*Compound powder of ipecacuanha*) contains one grain of opium in ten grains.

PULVIS KINO COMPOSITUS (*Compound powder of kino*) contains one grain of opium in one scruple.

VINUM ANTIMONII TARTARIZATI (*Wine of tartarized antimony*) contains one grain of tartarized antimony in four fluid drachms.

UNGUENTUM HYDRARGYRI FORTIUS (*Strong mercurial ointment*) contains one drachm of mercury in two drachms.

UNGUENTUM HYDRARGYRI MITIUS (*Mild mercurial ointment*) contains one drachm of mercury in six drachms.

[*End of Extract from Syder's Examinations.*]

APPENDIX, No. II.

ON POISONS.

Different plans have been adopted by authors, in the arrangement of Poisons, each following some system peculiar to himself; that pursued by Orfila is the most scientific; but we shall deviate from his system, and class them according to the three kingdoms: Mineral, Vegetable, and Animal.

MINERAL POISONS.

CORROSIVE METALLIC SALTS.

The symptoms which follow an over-dose of the more corrosive metals, are very similar in the different metallic salts. The urgency of the symptoms will necessarily depend on the quantity taken—the form, whether solid or fluid—the state of the stomach at the time, and other occasional circumstances. We shall relate the general operations of this class of poisons, and then the particular poisons, and their peculiarities.

When a person has taken a sufficient quantity of any substance to produce deleterious effects upon the constitution, it is said to be an over-dose, or in other words to act as a poison.

General Symptoms.

If arsenic or corrosive sublimate be swallowed, it occasions sickness and uneasiness about the stomach, violent retchings, sense of heat about the mouth and fauces, with a disagreeable taste; the pain in the stomach then becomes

very distressing, and blood is sometimes ejected; the bowels soon become affected, and a discharge of offensive matter takes place, frequently mixed with blood, and accompanied with considerable griping and tenesmus. The countenance becomes anxious; the breathing difficult; thirst excessive; skin hot; and pain at the stomach and bowels much increased, particularly upon pressure: then cold sweats alternating with flushes of heat, cold extremities, faintness, convulsions, and the most distressing symptoms; which are soon followed by death, relieving the patient from an exquisite state of misery. The pulse is usually small, quick, and irregular, but at other times is scarcely affected; and is therefore not to be depended on.

ARSENICAL PREPARATIONS.

OXYD OF ARSENIC, OR ARSENIOUS ACID (*Arsenici Oxydum.*)

This mineral and all the preparations obtained from it, are highly poisonous, even in very small quantities; from which circumstance, it is of the greatest consequence its effects should be watched, when administered for the cure of any disease; and whenever any distressing symptoms make their appearance, it should be immediately discontinued. The same observation will apply to all poisons, particularly the more active minerals; i. e. when any unpleasant symptoms, peculiar to the poison at that time employed, show themselves, it should be suspended for a time.

The oxyds and sulphurets of arsenic, and arseniates, possess poisonous qualities in different degrees, and will all destroy life if the dose be at all considerable. Fly water is commonly a solution of this mineral.

Symptoms.

For these we will refer the reader to the head of *Corrosive Metallic Salts*. They are generally very distressing, and it is a poison, the operation of which is very energetic in the majority of instances; cases have, however, occur-

red, where patients have been destroyed without the production of any distressing symptoms, where very large quantities have been taken. One symptom peculiar to this poison is a copious flow of saliva, not having the mercurial fœtor: the evacuations are often green.

Treatment.

Unless our attention is directed to the patient early, there will be little chance of success. As we possess no antidote to this poison, our object is to expel it immediately from the stomach by emetics, should it not have excited vomiting, which it scarcely ever fails of doing. Milk, white of eggs, and mucilaginous drinks should be taken freely, to encourage the vomiting and cleanse out the stomach. Emollient clysters are also to be given, to remove any of the arsenic which may have escaped into the intestines. It is useless losing time in administering chemical salts, under the idea of neutralizing the effects of the poisons; we have no substance possessed of that power. Sulphurets of potass and soda, lime water, and alkalies, have all been used without success. Inflammatory symptoms must be combated by the usual antiphlogistic means.

The *external application* of arsenic will give rise to all the above symptoms, and destroy life.

Tests.

1. A solution of arsenic is changed yellow by the addition of water saturated with sulphuretted hydrogen.

2. With sulphate of copper and caustic potass or ammonia it forms a beautiful green precipitate of *Arseniate of Copper*.

3. By adding to it a small quantity of liquor ammoniæ and a solution of nitrate of silver, you will produce a beautiful yellow precipitate of *Arseniate of Silver*.

4. The above results will not, however, enable you to speak decisively as to the presence of this mineral. It is necessary to reduce some to its metallic state, before we can swear to its existence in any fluid. If any should be rejected solid from the stomach, mix it with some potass and charcoal, then submit the mixture to the heat of a can-

dle or spirit lamp, in a glass tube, and the metallic arsenic will be sublimed, and condense itself on the upper part of the tube, in cubic crystals. This is a property possessed by no other metal. If there should not be any powder in the matter vomited, or in the contents of the stomach, (supposing the patient dead,) the precipitate obtained in Test 2, or 3, may be submitted to the same process, and a similar result will follow.

MERCURIAL PREPARATIONS.

CORROSIVE SUBLIMATE (*Hydrargyri Oxymurias*).

Symptoms.

In addition to the general symptoms enumerated above, we may notice that the pain of the stomach and abdomen is generally violent in the extreme; the bowels are speedily deranged, and the evacuations bloody: salivation, with the peculiar mercurial fœtor, is another well-marked symptom, and one early in its appearance; for it may be remarked here, that of all the preparations of mercury, none affects the salivary glands in so short a time as this.

Treatment.

White of eggs and milk, immediately; the former decomposes corrosive sublimate, and throws down an insoluble salt, comparatively mild in its operation. Barley water and linseed tea, or any other mucilaginous fluid, to be taken freely to wash out the stomach effectually. The bowels are next to be attended to; give saline purgatives by the mouth, with emollient clysters. The inflammation must not be overlooked, but treated by leeches, blisters, &c.; and, when the patient rallies somewhat, by venesection. General bleeding will not be proper immediately on the appearance of the inflammation in many cases.

Tests.

1. With corrosive sublimate, albumen forms a white precipitate of *Submuriate of Mercury*; this test will detect very minute quantities of the salt.
2. Alkalies form with it a red or yellowish precipitate.
3. Liquor ammoniæ gives a white precipitate.
4. Reduction of the metal with flux (potass and charcoal) is the only decisive test.

Some other preparations of mercury act in a similar manner, but with much less violence; such as the red oxyd, nitrates, sulphurets, &c. The plan of treatment would be similar, and the tests the reduction of the metal.

ANTIMONIAL PREPARATIONS.

EMETIC TARTAR (*Antimonium Tartarizatum*).

Symptoms.

THE vomiting, which is the first symptom, is very distressing and urgent; it is soon followed by pain in the stomach; spasm of the œsophagus; great prostration of strength; a quick small pulse: colicky pains soon attack the bowels, and violent purging succeeds; breathing, anxious and hurried; cold perspirations and other symptoms as above.

Treatment.

Decoction of oak bark, infusion of galls, and common tea, all decompose the tartar emetic; and should be taken freely, that it may be thoroughly expelled from the stomach; mucilaginous drink and milk are also proper. If the stomach should continue very irritable, give opiates. Treat other symptoms as usual.

Tests.

1. With sulphuric acid, lime water, and the alkalies, it forms a white precipitate.

2. A decoction of oak bark or galls throws down a yellowish precipitate.

BUTTER OF ANTIMONY (*Antimonii Murias*).

Symptoms.

This acts as a powerful escharotic, and when swallowed causes great destruction, giving rise to symptoms of a very distressing nature, as violent as are observed after the corrosive sublimate has been taken.

Treatment.

Same as for tartar emetic.

Tests.

1. The revival of the metal by flux.
2. It forms a white flaky precipitate with water.

The antimonial wine, which is often administered by nurses to children, has not unfrequently proved a destructive poison, killing them insidiously; this, the sulphurets, and all antimonial preparations, act in a similar manner, and the symptoms they occasion must be treated as for the tartar emetic.

PREPARATIONS OF COPPER.

VERDIGRIS (*Subacetas Cupri*).

THE preparations of copper are seldom taken or given intentionally as poisons; but from neglect and want of cleanliness, in leaving acid and vegetable substances in copper vessels, these sometimes become corroded, and the oxyd or carbonate of copper is mixed with the food.

Symptoms.

The salts of copper give rise to colicky pain in the stomach and bowels; nausea; coppery taste; vomiting of greenish matter, and violent headache; severe griping pain in the bowels, with purging often of blood; these symptoms are sometimes succeeded by cold perspirations, convulsions, and death.

Treatment.

Milk, white of eggs, sugared water, and mucilaginous fluids freely. If the spasms of the alimentary canal be severe, opiates will be useful; emollient clysters to evacuate and lubricate the bowels.

The sulphate, nitrate, muriate, carbonate, and oxyds of copper, and wines in which either of these preparations may be present, act in a similar way, and require the same treatment.

Tests.

1. All the salts of copper are of a green or blue colour.
2. Liq. ammoniæ, when added to them, forms a greenish precipitate; but if added in excess, the precipitate becomes dissolved, and a beautiful blue solution of the *ammoniaret of copper* is the result. If the salt be so much diluted as not to colour the water, this test will detect it.
3. Prussiate of potass forms a brown precipitate.

PREPARATIONS OF TIN.

MURIATE OF TIN (*Stanni Murias*).

Symptoms.

VIOLENT vomiting and purging, with spasmodic affections of the stomach and bowels; cramps; sharp quick

pulse; sometimes paralysis; with convulsions, and death. It has been mistaken for Epsom salts, and caused death.

Treatment.

Emetic, if necessary; afterwards milk and mucilaginous fluids; emollient and oily clysters. Opiates to allay spasm of the bowels, &c.: antiphlogistic treatment, if required.

Tests.

1. With nitro-muriate of gold, it forms a brownish red, or purplish precipitate (the *powder of Cassius*).
2. With prussiate of potass, a white precipitate.

All the preparations of tin resemble this in their effects, &c.

PREPARATIONS OF ZINC.

WHITE VITRIOL (*Zinci Sulphas*).

Symptoms.

It is generally rejected, immediately that it reaches the stomach, hence it rarely destroys life. It produces a peculiar astringent metallic taste, with a sense of suffocation; but vomiting soon relieves these symptoms; otherwise the countenance becomes pallid and sunk; pulse quick and irregular; bowels always more or less affected: sometimes symptoms occur resembling the lead colic, which are succeeded by obstinate diarrhœa.

Treatment.

Alkalies, magnesia, or chalk, are the best remedies: after this diluents and clysters, with opium if much spasmodic colic.

Tests.

1. Forms with alkalies a white precipitate, which is readily dissolved by sulphuric acid.
2. With prussiate of potass, a blue precipitate.
3. With chromate of potass, an orange yellow precipitate.

PREPARATIONS OF SILVER.

LUNAR CAUSTIC (*Argenti Nitras*).

Symptoms.

It is one of the most corrosive poisons; as we might expect from the result of its external application. It is, fortunately, rarely taken as a poison. Its action is similar to the *corrosive sublimate*.

Treatment.

The best antidote is mucilaginous fluids, in which common salt has been dissolved; this forms a muriate of silver, insoluble and harmless: in other respects treat it as for *corrosive sublimate*.

Tests.

1. With alkalies, it forms a white precipitate.
2. With muriatic acid, and saline muriates, a white precipitate, which soon changes to a blackish colour, by exposure to the air; it may be dissolved by ammonia.

General Morbid Appearances.

When life is destroyed by the metallic salts above enumerated, dissection proves that the appearances are similar in the majority of cases. Where *arsenic* has killed,

the stomach and intestines are highly inflamed, often with gangrenous spots in different parts of the former viscus; the villous coat sometimes becomes eroded, and so tender as to be readily peeled off; the peritonæum, throughout the abdomen, is frequently in a state of inflammation. If death has resulted from *corrosive sublimate*, the inflammation of the villous surface of the stomach and intestines is more general, and the intestines are sometimes ulcerated. In death from *tartar emetic*, the morbid appearances are not generally sufficient to account for death. In the other salts which have caused death, the appearances have resembled those from *corrosive sublimate*; but there are no diagnostic marks by which we can tell what poison has destroyed our patient: it may therefore be sufficient to say, that all the metallic salts mentioned above, produce more or less inflammation of the stomach and intestines, and of the other abdominal viscera.

PREPARATIONS OF LEAD.

SUGAR OF LEAD (*Plumbi Superacetas*).

Symptoms.

THIS metal produces effects upon the constitution in a great measure peculiar to itself, giving rise to considerable derangement in the nervous system; as is frequently observed in plumbers and painters. In a large dose it occasions pain at the stomach; an astringent metallic taste; sometimes vomiting; obstinate constipation; colicky pains in the bowels; and contractions of the abdominal muscles: these are succeeded by pallid countenance; tremors; sometimes delirium; and if the patient should survive the primary symptoms, paralytic affections seldom fail to make their appearance.

Treatment.

Emetics; sulphate of magnesia, dissolved in mucilaginous fluids; opiates, to allay the spasm of the bowels;

warm bath; castor oil, and purgative clysters, composed of infusion of colocynth or senna and salts.

Tests.

1. Sulphuric acid, and the alkaline sulphates, form a white insoluble precipitate.
2. Chromate of potass, throws down a yellow precipitate.
3. Sulphuretted hydrogen, forms at first a brown precipitate, but it soon becomes black.
4. Carbonated alkalies, form a white precipitate.

Morbid Appearances.

There is merely a stricture about the colon, or rather a general contraction of that intestine; no marks of inflammation are observed.

The subacetate, carbonate, and oxyds of lead, and wines or other fluids, which are either accidentally or purposely impregnated with preparations of lead, give rise to symptoms similar to those from the *sugar of lead*, and require the same treatment.

The other metallic salts, as those of gold, platina, bismuth, nickel, &c. are never employed as poisons.

CAUSTIC ALKALIES AND THEIR SUBCARBONATES.

POTASS, SODA, AND AMMONIA.

Symptoms.

DISTRESSING heat and pain in the fauces, œsophagus, and stomach; nausea; a urinous caustic taste; vomiting, often of blood; intestines soon become affected, and bloody evacuations are the result. *Ammonia* is the most active in its operation, generally causing convulsions and derange-

ment of the intellectual faculties. A large dose of liquor ammoniæ has destroyed in five minutes.

Treatment.

Similar in all cases; neutralize the alkali by some mild acid, as vinegar, diluted lemon-juice, &c., and give mucilaginous drinks.

Tests.

Alkalies have a urinous taste; they change violets green, and turmeric paper brown; precipitate metallic oxyds, from their solutions; and form soapy compounds with oily substances.

1. *Ammonia* has a pungent odour.
2. It changes the salts of copper blue.

Potass and soda may be distinguished by the former becoming precipitated in a state of *cream of tartar*, when tartaric acid is added in excess; whilst soda forms a very soluble compound, with tartaric acid in any quantity.

A solution of platina throws down a yellow precipitate with *potass* and not with *soda*.

Morbid Appearances.

Inflammation of the œsophagus, stomach, and bowels, which frequently present a gangrenous and sloughy appearance.

SALTS OF BARYTES.

MURIATE AND NITRATE OF BARYTES.

Symptoms.

Vomiting; purging; violent pain in the stomach and bowels; vertigo; insensibility, paralysis; convulsions; and death. They act with considerable violence and activity.

Treatment.

Sulphate of soda, of magnesia, or of potass, dissolved in some mucilaginous fluid, to be drank freely: they form an insoluble sulphate, which is inert.

Tests.

The salts of barytes form an insoluble compound with sulphuric acid and its salts, which will detect very minute quantities of this earth.

Morbid Appearances.

Same as from the alkalies.

The carbonate, acetate, and other soluble salts of barytes, act in a similar manner, and require precisely the same treatment.

MINERAL ACIDS.

OIL OF VITRIOL (*Acidum Sulphuricum*).
AQUA FORTIS (*Acidum Nitricum*).
SPIRITS OF SALTS (*Acidum Muriaticum*).

Symptoms.

VIOLENT burning pain about the throat, fauces, œsophagus, and whole alimentary canal; fœtid eructations; vomiting of blood; pulse very small and irregular; abdomen tense; great thirst; cold perspirations; convulsions, and death.

Treatment.

In all cases where either of the acids above mentioned have been swallowed, our antidotes must be immediately administered, or they will be useless. *Calcined magnesia*

is the best remedy: if not at hand, soap, chalk, or the alkalies diluted.

Tests.

They turn vegetable blues red. Form neutral salts with the alkalies, and effervesce when added to a carbonated alkali or earth.

Sulphuric acid, forms a white insoluble precipitate, both with muriate of barytes and the acetate of lead.

Muriatic acid, forms an insoluble precipitate with *nitrate of silver*. If the fumes arising from it come in contact with ammoniacal gas, a dense white vapour of *muriate of ammonia* is the result.

Nitric acid may be known by its red fuming nature; by its forming nitre when saturated with potass; and if paper be dipped into the saturated solution, it is converted into touch-paper. It forms no precipitate with the salts used to test the other acids.

Morbid Appearances.

If the acids be concentrated, they occasion complete disorganization and destruction of the parts with which they come in contact: the lining membrane of the œsophagus, stomach, and intestines, is in a high state of inflammation, and holes are generally formed in the stomach, with gangrenous appearances surrounding them. The *nitric acid* proves most destructive; the stomach is converted into a pulpy, soft, blackish, ragged substance, and completely altered in its character; and from the escape of the acid, the peritonæum becomes inflamed; and where this acid has killed, the parts which it has come in contact with, are yellow.

The *oxalic*, *tartaric*, *citric*, and *fluoric acids*, when taken in sufficient quantity and undiluted, will give rise to very violent symptoms, and even destroy life; several instances of which have unfortunately happened by the *oxalic acid* or *acid of sugar*.

Tests.

Oxalic acid very much resembles Epsom salts in its external appearance. It is excessively sour to the taste. It readily detects very minute quantities of the salts of lime, forming a white insoluble precipitate with them. The crystals are four-sided prisms.

Tartaric acid forms a compound of supertartrate of potass, when added in excess to a solution of potass.

Citric acid crystallizes in rhomboidal prisms, and is the basis of lemon-juice.

Fluoric acid has a suffocating smell, and possesses the property of corroding glass, acting upon the silex which it contains.

These, with some other acids which it will be unnecessary to enumerate, produce symptoms, &c., similar to the mineral acids, and require a similar mode of treatment, viz. magnesia, chalk, &c.

SALTPETRE (*Potassæ Nitras*).

Symptoms.

Violent pain in the stomach, with spasm; vomiting and purging of blood; very irregular pulse; great prostration of strength; syncope; coldness of the extremities; clammy perspiration; involuntary stools, and speedy dissolution; if the primary symptoms should not destroy, the nervous system becomes more particularly deranged, and paralysis is a consequence.

Treatment.

Emetics, mucilaginous drinks, milk, and emollient purgatives and clysters.

Tests.

1. Crystals six-sided prisms.
2. Detonates on burning coals.
3. When mixed with sulphuric acid, red nitrous fumes escape.

Morbid Appearances.

Same as are observed in cases of death from the corrosive metals.

PHOSPHORUS.

Symptoms.

Most distressing pain and heat in the stomach, which are more urgent if the poison be dissolved; besides this, it occasions other symptoms as observed in the corrosive metals.

Treatment.

It is advisable to expel it from the stomach as speedily as possible; it has been recommended to distend the stomach with food, and then to excite vomiting and give diluents freely. The operation is less violent, the more it is excluded from the air.

Tests.

Its peculiar odour, and general properties, will commonly enable any person to detect it. If dissolved in oil, it is luminous in a dark room.

Morbid Appearances.—See Corrosive Metals.

VEGETABLE POISONS.

NARCOTICS.

OPIUM AND ITS PREPARATIONS.

Symptoms.

This is one of the most common and destructive poisons of this class, and produces symptoms common to all vegetable narcotics. A full dose of *opium* occasions almost immediate insensibility; with slow pulse; stertorous breathing; dilated pupil; greatest difficulty in being roused: the countenance is at first flushed, but soon becomes pallid; sometimes convulsions and paralysis precede dissolution. Vomiting is not a usual symptom when the dose is large.

Treatment.

Sulphate of zinc, gr. viii. vel gr. x. every ten minutes, till vomiting is excited: or sulphate of copper, gr. i. to gr. iii.; tickle the throat with a feather, and use every possible means to evacuate the stomach: it will be advisable to pass an elastic tube down the œsophagus and thus introduce emetics, if the patient cannot swallow: the person must be kept in constant motion and exercise by able assistants. In some cases it will be proper to open the jugular vein, to relieve the vessels of the brain from a state of congestion. If scarcely any pulse, wine, brandy, and ammonia should be introduced into the stomach. Acids should never be given till we are thoroughly convinced no opium remains in the stomach. Active purgatives both by the mouth and per anum. Coffee may be drank freely. Saline purgative and effervescing draughts are useful when the patient is recovering.

Children are often very much injured, and sometimes destroyed, by the too free use of *syrup of poppies;* it gives rise to drowsiness, insensibility, and convulsions. Treatment here will be ammonia, brandy diluted, and wine; with the warm bath.

We are possessed of no tests by which we can distinguish poisons of this class, and can only conjecture they have been taken, by their taste or smell, and the symptoms.

In general no morbid appearances are evident.

HENBANE (*hyoscyamus niger*), HEMLOCK (*conium maculatum*), STRONG-SCENTED LETTUCE (*lactuca virosa*), WATER HEMLOCK (*cicuta virosa*), DEADLY NIGHTSHADE (*atropa belladonna*).

These, with some others, produce symptoms very similar to opium, and require the same mode of treatment.

MONKSHOOD (*aconitum napellus*), POISON NUT (*nux vomica*), SPURIOUS ANGUSTURA BARK (*Angustura pseudo ferruginea*), CAMPHOR (*laurus camphora*), POISONOUS FUNGI, with some other, both indigenous and exotic poisons, produce symptoms in some measure resembling those occasioned by the simple narcotics; they however excite more acrimony and disturbance in the alimentary canal; some exhilarating effects precede their sedative operation, unless the dose be very large; and they more commonly occasion convulsions and spasmodic affections. These have been arranged, by Orfila, under the class Acro-narcotics.

Treatment.

As for narcotics. If the breathing be suspended, keep up artificial respiration.

ACRID VEGETABLES.

BLACK AND STINKING HELLEBORE (*helleborus niger et fœtidus*), WHITE HELLEBORE (*veratrum album*), SQUIRTING CUCUMBER (*momordica elaterium*), GAMBOGE (*stalagmitis gambogioides*), EUPHORBIUM, *several species;* SAVINE (*juniperus sabina*), MEADOW SAFFRON (*colchicum autumnale*), SQUILL (*scilla maritima*), several species of RANUNCULUS, &c.

Symptoms.

All these vegetables, in over-doses, and many others, occasion an acrid taste; burning sensation about the mouth and fauces; constriction of the fauces; pain in the stomach and bowels; distressing vomiting and purging, often of blood, succeeded by insensibility, difficulty and shortness of breath, and convulsions.

Treatment.

Mild emetics, mucilaginous diluents, milk, emollient laxatives, and clysters. If the vomiting, after the poison has been thoroughly expelled, should continue to distress the patient, mild opiates are proper.

Morbid Appearances.

Sometimes, in the more acrid vegetables, there is some inflammation of the stomach and bowels; but we cannot generally depend upon these appearances in poisoning from vegetable substances.

PRUSSIC ACID.

Symptoms.

It occasions nausea, vertigo, vomiting, sense of suffocation, and almost immediate death, if concentrated. The mere act of smelling to it produces a sense of suffocation and giddiness. Fortunately this poison is seldom taken in the concentrated form; but from its existence in the kernels of some fruits, laurel leaves, &c., it is right to be acquainted with its operation. In one case it caused immediate death, as if the patient had been suddenly seized with an apoplectic fit. Its external application will destroy life. The essential oil of bitter almonds contains a considerable portion of prussic acid; but the almonds themselves may be eaten with impunity, in moderation.

Treatment.

Ammonia, brandy, and oil of turpentine in small doses, conjoined with artificial respiration if required.

ANIMAL POISONS.

SPANISH FLIES (*Lytta Cantharidis*).

Symptoms.

They very soon cause great pain and irritation about the urinary organs; difficulty and pain in making water, which is often reduced in quantity, though sometimes increased; breath has an unpleasant smell, and there is often a great aversion to liquids; stomach and bowels are tense and tender; satyriasis, sometimes in a very distressing degree; frequently bloody evacuations; blood is also frequently ejected by vomiting, and passed with the urine; sometimes convulsions and tetanus.

Treatment.

Diluent emetics; mucilaginous draughts, in which gum-arabic is dissolved, in abundance; warm bath; clysters of oil. The antiphlogistic treatment is generally required, with opiates.

Morbid Appearances.

Inflammation of the stomach and bowels; also of the kidneys, ureters, and bladder; sometimes the penis is in a gangrenous state.

BITES OF SNAKES, VIPERS, VENOMOUS SERPENTS, &c.

Symptoms.

Acute pain and swelling of the part bitten, which soon extends over the limb; nausea and intoxicating symptoms

soon come on, succeeded by delirium; the part bitten becomes livid, and often gangrenous; pulse quick and irregular; breathing difficult and anxious; often bilious vomiting; sometimes impossibility of swallowing, with convulsions.

Treatment.

If possible remove the parts bitten, by excision; then use some caustic application. Oil and ammonia are generally preferred: in the West Indies they employ eau de luce, the action of which depends on the ammonia it contains. Give brandy, ammonia, and other stimuli, with opiates. Arsenic has been recommended in doses of gr. ss. or gr. i., and it is said, that this practice has been successful. (Vide Medico-Chirurgical Transactions.)

The bites of some venomous insects sometimes occasion unpleasant symptoms; but local applications will generally be sufficient to cure them. If possible, remove the poison; oil applied to the part will often relieve; at other times some evaporating spirituous lotion is necessary, to subdue the inflammation which exists.

MUSCLES, LOBSTERS, CRABS, AND OTHER FISH.

Symptoms.

Uneasiness and pain about the stomach, with sickness and headache; vertigo; redness and swelling of the face; generally a species of nettle-rash all over the body; shortness of breath; rarely, cold extremities, delirium, and convulsions.

Treatment.

Emetics, diluents, and purgatives; stimulants and opiates if necessary.

Means to be resorted to in Cases where Animation is Suspended, from Drowning, Hanging, or Breathing Deleterious Airs.

FROM DROWNING.

First remove all clothes, and then convey the patient to a convenient and airy situation; artificial respiration is now to be commenced, by inflating the lungs from the nose by a pair of bellows passed up one nostril; or with your own mouth, if no other means be at hand: when the proper apparatus can be readily procured, that is best for the purpose; after each inflation the lungs must be again emptied, by pressure made on the chest. Wrap the body in warm blankets, and apply warmth to the body in any gradual manner. It is useless and improper to rub the body with any stimulating application. Apply hot water to the feet, or warm bricks. Introduce an elastic tube into the stomach, in order to convey stimulating fluids into that organ, as brandy, wine, &c.

When respiration becomes natural, we suspend our artificial operations; and, as soon as the patient is able to swallow, give wine and water, and nourishing food. Never leave the person until he has perfectly recovered his senses. If oxygen gas be at hand, it may be employed. Electricity has been considered by some as a useful adjunct; it may be tried.

FOR HANGING.

A similar plan of treatment is necessary. Bleeding is oftener required here, from the jugular vein, to relieve the vessels of the brain and lungs; it should only be in small quantity.

Similar treatment necessary. Here the temperature of the body is generally above the natural standard, and cold water should be suddenly dashed over the body, in addition to the other means. It is likewise very desirable, if possible, to substitute oxygen gas for the atmospheric air, in these cases.

When suffocation is occasioned by substances lodging in the air passage, and thus obstructing respiration, it is often necessary to perform the operation of bronchotomy: here two methods have been recommended; one dividing the rings of the trachea longitudinally; the other making an opening between the thyroid and cricoid cartilages: each operation has its advocates, but I should prefer the former.

APPENDIX, No. III.

ART OF PRESCRIBING MEDICINES.

In prescribing a medicine, the following circumstances should always be kept in view: viz.—Age, Sex, Temperament, Habit, Climate, State of Stomach, and Idiosyncracy.

AGE.

For an adult, suppose the dose to be	one	or 1 drachm.
Under 1 year will require only	1-12th	5 grains.
2	1-8th	8 grains.
3	1-6th	10 grains.
4	1-4th	15 grains.
7	1-3d	1 scruple.
14	half	½ drachm.
20	2-3ds	2 scruples.
Above 21 The full dose	one	1 drachm.

65 The inverse gradation of the above.

Sex.—Women require smaller doses than men, and the state of the uterine system must never be overlooked.

Temperament.—Stimulants and purgatives more readily affect the sanguine than the phlegmatic, and consequently the former require smaller doses.

Habits.—The knowledge of these is essential; for those in the habitual use of stimulants and narcotics require larger doses to affect them when labouring under disease, whilst those who have habituated themselves to the use of saline purgatives are more easily affected by these remedies.

Climate.—Medicines act differently on the same individual in summer and winter, and in different climates.

State of Stomach, and Idiosyncracy.—The least active remedies operate very violently on some individuals,

owing to a peculiarity of stomach, or rather disposition of body, unconnected with temperament. This state can be discovered only by accident or time; but when it is known, it should always be attended to by the practitioner.

In prescribing, the practitioner should always so regulate the intervals between the doses, that the next dose may be taken before the effect produced by the first is altogether effaced; for by not attending to this circumstance, the cure is always commencing, but never proceeding. It should, however, also be kept in mind, that medicines such as the mercurial salts, arsenic, &c. are apt to accumulate in the system; and danger may thence arise if the doses too rapidly succeed to each other. The action also of some remedies, elaterium and digitalis for example, continues long after the remedy is left off; and therefore much caution is requisite in avoiding too powerful an effect, by a repetition of them even in diminished doses.

Examples of the most usual Forms of Extemporaneous Prescriptions.

POWDERS.

NARCOTIC.

R. Pulveris conii, gr. iii,
——— glycyrrhizæ radicis, gr. vi,
Sit pulvis, ter quotidie sumendus.

In scirrhous affections, scrofula, painful old ulcers, &c.

R. Pulveris belladonnæ foliorum, gr. i,
——— potassæ nitratis, gr. x,
——— sacchari, gr. ix.
Fiat pulvis, hora somni omni nocte sumendus.

In chronic rheumatism, extensive ulcerations, mania, and epilepsy.

ANTISPASMODIC.

R. Pulveris valerianæ radicis, ℈i,
——— cinnamomi comp. gr. x.
Fiat pulvis, ter quaterve quotidie sumendus.

In hysteria, hemicrania, chlorosis.

R. Pulveris ipecacuanhæ radicis, gr. i,
——— sodæ subcarbonatis, gr. xii,
——— opii, gr. i.
Fiat pulvis, octava quaque hora sumendus.
Spasmodic asthma, hooping-cough.

TONIC.

R. Pulveris cinchonæ, ʒss,
——— cinnamoni comp. gr. x.
Sit pulvis, secundis horis in cyatho lactis, absente paroxysmo, sumendus.
In intermittents, after the stomach and bowels have been cleared.

R. Ferri tartarizati, gr. viii,
Pulveris columbæ, ℈i.
Fiat pulvis, quarta quaque hora sumendus.
After diarrhœa, in scrofulous tumours and dyspepsia.

ASTRINGENT.

R. Pulveris catechu extracti, gr. xv,
——— cretæ comp. cum opio, ℈i.
Sit pulvis, post dejectiones singulas liquidas sumendus.
In diarrhœa from a weakened state of the bowels.

R. Pulveris kino compositi, gr. x.
Pulvis ex cyatho aquæ menthæ viridis sexta quaque hora sumatur.
In chronic diarrhœa and intestinal hæmorrhagies.

EMETIC.

R. Pulveris ipecacuanhæ, ℈i,
Antimonii tartarizati, gr. i.
Fiat pulvis emeticus.

CATHARTIC.

R. Hydrargyri submuriatis, gr. iii,
Pulveris jalapæ,
Sacchari, sing. gr. x.
Sit pulvis, vespere vel primo mane sumendus.
In bilious fevers, and slimy and obstructed bowels.

R. Hydrargyri submuriatis, gr. iii,
Pulveris scammoniæ compositi, gr. xii.
Tere in pulverem, quamprimum sumendum.
In worm cases.

EMMENAGOGUE.

℞. Pulveris foliorum sabinæ,
——— zingiberis, āā gr. vii,
Sodæ boratis, gr. xv.
Fiat pulvis, bis die sumendus.

In amenorrhœa with a languid pulse.

DIURETIC.

℞. Supertartratis potassæ, ℥i,
Pulveris scillæ siccatæ, gr. ii,
——— zingiberis, gr. iv.
Sit pulvis, octava quaque hora sumendus.

In ascites.

DIAPHORETIC.

℞. Pulveris antimonialis, gr. iii,
——— tragacanthæ comp. gr. x.
Sit pulvis, quarta vel sexta quaque hora sumendus.

In the commencement of febrile diseases, after emptying the stomach and bowels.

℞. Antimonii tartarizati, gr. ii,
Testarum preparatarum, ℈ij.
Intime misceantur in pulverem, et divide in doses æquales decem, quarum sumat unam tertia quaque hora.

In puerperal fever, after bleeding and the exhibition of a clyster.

EXPECTORANT.

℞. Pulveris ipecacuanhæ, gr. vi,
——— potassæ nitratis, ℈iss,
——— myrrhæ, gr. xii.
Misce, et divide in doses æquales quatuor, quarum sumat unam quartis horis.

In asthma, and the earlier stage of phthisis pulmonalis.

REFRIGERANT.

℞. Potassæ nitratis, gr. viii.
Pulveris tragacanthæ comp. ℈j.
Tere in pulverem, quartis horis, in cyatho aquæ vel infusi lini sumendum.

In gonorrhœa.

PILLS.

NARCOTIC.

℞. Opii, gr. i.
Fiat pilula, hora somni sumenda.
To procure sleep in ordinary cases.

℞. Pulveris digitalis, gr. iv.
Camphoræ, gr. xii,
Extracti hyosciami, gr. xviii.
Fiant pilulæ duodecim. Sumat tres omni nocte.
In maniacal and spasmodic affections.

SEDATIVE.

℞. Plumbi superacetatis, gr. x.
Pulveris colchici, gr. xx,
——— opii, gr. iii.
Mucilaginis acacia, q. s.
Misce optime, et divide in pilulas æquales decem, quarum sumat unam sexta quaque hora.
In active hæmorrhagies. They have also been given in phthisis; one pill twice a day, after bleeding.

ANTISPASMODIC.

℞. Opii, gr. ss,
Castorei Rossici, gr. viss,
Pulveris digitalis, gr. i,
Syrupi, q. s.
Fiant pilulæ duæ, bis vel ter die sumendæ.
In spasmodic asthma, and dyspnœa.

℞. Cupri ammoniati, gr. ii.
Micæ panis, q. s.
Fiant pilulæ quatuor. Sumat unam bis quotidie.
In epilepsy, gradually increasing the dose.

STIMULANT.

℞. Assafœtidæ gummi resinæ, dr. i.
Pulveris zingiberis, dr. ss,
Syrupi, q. s.
Ut fiant pilulæ triginta, quarum sumat tres tertiis horis.
In palsy.

TONIC.

℞. Pulveris rhei,
——— zingiberis, āā dr. ss,
Extracti anthemidis, dr. i,
Fiat massa, in pilulas æquales triginta dividenda, quarum capiat tres ante prandium quotidie.

In dyspepsia and chlorosis.

℞. Ferri carbonatis,
Extracti conii, āā dr. j,
Distribue in pilulas æquales viginti-quatuor. Sumat duas bis die.

In fluor albus and scrofula.

ASTRINGENT.

℞. Extracti cinchonæ, dr. ii,
Aluminis, dr. i,
Syrupi, q. s.
Ut fiant pilulæ triginta-sex. Sumat quatuor quarta vel sexta quaque hora.

In passive hæmorrhagies.

CATHARTIC.

℞. Scammoniæ in pulv. gr. iv,
Extracti taraxaci, gr. xiv,
Fiant pilulæ sex, quarum sumat tres bis die.

In hypochondriasis and chronic hepatitis.

℞. Hydrargyri submuriatis, gr. iii,
Pulveris, jalapæ, gr. ix,
Mucilaginis acaciæ, q. s.
Fiant pilulæ tres hora somni sumendæ.

To empty the bowels in bilious affections.

EMMENAGOGUE.

℞. Ferri sulphatis,
Potassæ subcarbonatis,
Myrrhæ,
Pulveris aloes compositi,
Contunde simul, et divide massam in pilulas æquales triginta. Sumat tres bis quotidie.

In amenorrhœa with a languid pulse.

℞. Pilulæ hydrargyri, dr. i,
Divide in pilulas æquales quindecim. Sumat unam omni mane et nocte.

In suppression of the menstrual discharge.

DIURETIC.

℞. Pulveris digitalis, gr. xii,
Hydrargyri submuriatis, gr. iv,
Opii, gr. iv,
Confectionis rosæ, q. s.
Fiant pilulæ duodecim. Sumat unam octava quaque hora.

In hydrothorax, and ascites depending upon visceral obstruction.

℞. Pilulæ hydrargyri, dr. i,
Pulveris scillæ, scr. i.
Confectionis rosæ, q. s.
Fiant pilulæ viginti. Sumat unam octava quaque hora.

In ascites and anasarca.

DIAPHORETIC.

℞. Antimonii tartarizati, gr. ¼,
Opii,
Hydrargyri submuriatis, āā gr. i,
Confectionis rosæ, q. s.
Fiant pilulæ duæ hora somni sumendæ.

In acute rheumatism.

℞. Antimonii tartarizati, gr. ii,
Opii, gr. vi,
Camphoræ, gr. xxxvi,
Spiritus rectificati, min. iii,
Confectionis rosæ, q. s.
Fiant pilulæ æquales duodecim, quarum sumat unam quarta quaque hora.

In fevers.

EXPECTORANT.

℞. Pulveris scillæ, gr. xxx.
Ammoniaci gum. res. dr. iss,
Extract. conii, gr. xxx.
Contunde simul, et divide massam in pilulas æquales triginta, quarum sumat duas sextis horis.

In asthma and chronic catarrh.

SIALOGOGUE.

℞. Pilulæ hydrargyri, dr. i,
Divide in pilulas æquales duodecim. Sumat unam mane nocteque.

In syphilis, herpetic eruptions, and chronic hepatitis.

℞. Submuriatis hydrargyri, scr. i,
Opii, gr. v,
Confectionis rosæ, q. s.
Fiant pilulæ viginti. Sumat unam omni mane et nocte.
In syphilitic cases.

LITHONTRIPTIC.

℞. Sodæ subcarbonatis exsiccatæ, dr. iss,
Pulveris cinnamomi comp. dr. ss,
Saponis, dr. ss,
Balsami Peruviani, q. s.
Fiant pilulæ æquales triginta. Sumat tres ter quotidie.
In calculous affections.

TONIC AND PURGATIVE COMBINED.

℞. Ferri ammoniati, dr. i,
Extracti aloes,
——— gentianæ, āā dr. ss,
Contunde simul, et divide massam in pilulas triginta, quarum sumat duas ter quotidie.
In dyspepsia, hysteria, scrofula, and mesenteric obstructions.

DIAPHORETIC AND ALTERATIVE.

℞. Hydrargyri sulphureti rubri,
Serpentariæ radicis in pul. āā dr. i,
Syrupi aurantii, q. s.
Misce, et divide in pilulas viginti-quatuor, quarum sumat quatuor ter quotidie.
In herpetic, and other obstinate cutaneous affections.

DRAUGHTS.

NARCOTIC.

℞. Misturæ camphoræ, f℥iss,
Tinturæ opii, min. xxxv.
Ætheris sulphurici, f. dr. i,
Syrupi croci f. dr. i.
Fiat haustus in promptu habendus, et urgente febris paroxysmo sumendus.
In intermittent headache.

℞. Ammoniæ subcarbonatis, gr. ii,
Succi limonis recentis, f. dr. iv,
Aquæ distillatæ, f. oz. i,
Spiritus myristicæ, f. dr. i,
Syrupi aurantii, f. dr. ss,
Extracti conii, gr. iv,
Fiat haustus ter die sumendus, addendo de die in diem extracti conii, gr. i; donec doses ad gr. vii, pervenerit in singulis haustibus.

In diseases of increased irritability.

ANTISPASMODIC.

℞. Misturæ moschi, f. dr. xiv,
Liquoris ammoniæ, min. xvi,
Tincturæ castorei, f. dr. i,
Syrupi papaveris, f. dr. ss.
Fiat haustus, quarta quaque hora sumendus.

In hysteria and convulsive affections, after the bowels have been effectually cleared.

℞. Olei anisi, min. x,
Magnesiæ, scr. i,
Tincturæ sennæ, f. dr. ii,
Aquæ menthæ piperitæ, f. dr. x,
Fiat haustus, urgente flatulentia sumendus.

In spasm of the stomach arising from flatulence.

TONIC.

℞. Infusi cinchonæ cordifoliæ, f. ℥iss,
Tincturæ cinchonæ comp. f. dr. i,
Pulveris cinchonæ cordifoliæ, scr. ii,
Syrupi aurantii, f. dr. ss.
Fiat haustus, secunda quaque hora sumendus.

In intermittents and acute rheumatism, after purging.

℞. Infusi cascarillæ, f ℥iss,
Tincturæ cascarillæ,
——— zingiberis, āā f. dr. i.
Fiat haustus bis quotidie sumendus.

In dyspepsia arising from intemperance.

ASTRINGENT.

℞. Extracti hæmatoxyli, gr. xii,
Aquæ cinnamomi, f. dr. xv,
Tincturæ catechu, f. dr. i,

Fiat haustus, quarta quaque hora vel post dejectiones singulas liquidas sumendus.

In diarrhœas and protracted dysentery.

EMETIC.

R. Pulveris ipecacuanhæ, scr. i,
Vini ipecacuanhæ, f. dr. ii,
Aquæ communis, f. dr. vi.
Fiat haustus emeticus, quamprimum vel vespere sumendus.

For unloading the stomach in ordinary cases.

R. Zinci sulphatis, scr. j,
Aquæ distillatæ, f ℥ii,
Fiat haustus, quamprimum sumendus.

In the commencement of the paroxyism of intermittent fever, or in cases of poisons having been taken into the stomach.

CATHARTIC.

R. Potassæ tartratis, dr. i,
Tincturæ sennæ, f. dr. i,
Infusi sennæ, f. dr. xivss,
Syrupi croci, f. dr. ss.
Fiat haustus, quamprimum vel primo mane sumendus.

In acute diseases.

R. Magnesiæ sulphatis, dr. ii,
Infusi rosæ, f. dr. xiv,
Acidi sulphurici diluti, min. x,
Mannæ, dr. ii,
Fiat haustus quartis horis sumendus.

In inflammatory affections.

DIURETIC.

R. Tincturæ jalapæ, f. dr. ii,
Aceti scillæ, f. dr. i,
Aquæ menthæ piperitæ, f. dr. viii,
Fiat haustus ter in die sumendus.

R. Potassæ nitratis, gr. viii,
Tincturæ digitalis, min. xvi,
Infusi rosæ, f. dr. xiii,
Syrupi rosæ, f. dr. i,
Fiat haustus ter in die sumendus.

In dropsy.

DIAPHORETIC.

℞. Potassæ subcarbonatis, scr. i,
Succi limonis recentis, f. dr. iv,
Antimonii tartarizati, gr. 1-6th,
Aquæ distillatæ, f. dr. xi,
Syrupi papaveris, dr. i,
Fiat haustus, quarta vel sexta quaque hora sumendus.

℞. Liquoris ammoniæ acetatis, f. dr. vi,
Misturæ camphoræ, f. dr. x,
Vini ipecacuanhæ, min. xx,
Syrupi tolutani, f. dr. ss,
Fiat haustus sextis horis sumendus.

In fevers and inflammatory diseases.

REFRIGERANT.

℞. Potassæ nitratis, gr. xii,
Misturæ amygdalæ, f. ℥iss,
Syrupi tolutani, f. dr. i,
Fiat haustus quarta quaque hora sumendus.

℞. Potassæ subcarbonatis, scr. i,
Syrupi, f. dr. ss,
Spiritus myristicæ, f. dr. ss,
Aquæ distillatæ, f ℥xi,
Fiat haustus, in effervescentia cum succi limonis cochleari magno, secunda quaque hora sumendus.

In fevers and inflammatory diseases.

ANTACID.

℞. Magnesiæ, dr. i,
Aquæ menthæ piperitæ, f. ℥iss,
Tincturæ aurantii, f. dr. i,
Fiat haustus pro re nata sumendus.

In heart-burn, and other cases of acidity of the stomach.

℞. Liquoris ammoniæ, min. xvi,
Misturæ amygdalæ, f. ℥ii,
Tincturæ opii, min. x,
Fiat haustus ter die sumendus.

In acidities of the primæ viæ.

MIXTURES.

TONIC.

℞ Infusi calumbæ, f. ℥vss,
Tincturæ cinnamomi comp. f. dr. ii,
Syrupi aurantii, f. dr. ii,
Fiat mistura, cujus cochlearia duo majora quarta quaque hora sumantur.

In debilities of the digestive organs, and to check the severe vomiting which often occurs during pregnancy.

ASTRINGENT.

℞ Catechu extracti, dr. ii,
Aquæ cinnamomi, f. ℥viii,
Tincturæ opii, min. lx,
Fiat mistura, cujus sumantur cochlearia tria magna post singulas dejectiones liquidas.

In the last stage of diarrhœa or dysentery.

EMETIC.

℞ Antimonii tartarizati, gr. viii,
Aquæ distillatæ, f. ℥vi,
Syrupi mori, f. dr. i,
Fiat mistura, cujus cochlearia magna duo quamprimum, et octavis minutis donec evomuerit, sumenda.

℞ Pulveris ipecacuanhæ, dr. ss,
Antimonii tartarizati, gr. i,
Tincturæ scillæ, f. dr. i,
Aquæ distillatæ, f. ℥viiss,
Fiat mistura, cujus sumat quamprimum cochlearia majora quatuor, et cochlearia duo sexta quaque parte horæ, donec supervenerit vomitus.

In dropsies, before exhibiting the fox-glove.

CATHARTIC.

℞ Potassæ sulphatis, dr. ii,
Aquæ fontanæ, f. oz. vss,
Tincturæ jalapæ, f. dr. iv,
Sit mistura, cujus sumat cochlearia duo magna omni bihorio.

EXPECTORANT.

℞ Misturæ amygdalæ, f. oz. v,
Vini ipecacuanhæ,

Tincturæ scillæ, āā, f. dr. i,
Syrupi tolutani, f. dr. vi. Misce.
Sumat cochleare magnum urgente tussi.
In humoral asthma, and the latter stage of catarrh.

DEMULCENT.

R. Decocti althææ officinalis, f. oz. vi,
Syrupi, f. oz. i,
Fiat mistura, cujus sumatur tertia pars sexta quaque hora.
In calculous cases, and inflammation of the kidneys.

DETERGENT GARGLE.

R. Potassæ nitratis, dr. ii,
Mellis rosæ, f. dr. iv,
Infusi rosæ, f. oz. vss. Misce.
Fiat gargarysma sæpe utendum.
In inflammatory sore throat.

ASTRINGENT GARGLE.

R. Infusi rosæ, f. oz. vii,
Tincturæ catechu, f. dr. vi,
Acidi sulphurici diluti, f. dr. i,
Tincturæ opii, f. dr. iss,
Sit gargarysma sæpe utendum.
In relaxations of the uvula.

EXTERNAL APPLICATIONS.

LOTIONS.

R. Ammoniæ muriatis, dr. i,
Aquæ fontanæ, f. oz. v,
Spiritus rectificati, f. oz. i,
Misce, ut fiat lotio tumori applicanda.
In swelled testicle, and other inflammatory tumours.

R. Opii, dr. ii,
Aceti distillati, f. oz. vi,
Tere ut fiat lotio, parti dolenti applicanda.
To painful affections of the joints, and in colic.

STIMULANT EMBROCATION.

R. Linimenti ammoniæ fortioris, f. dr. vi,
Olive olei, f. dr. ii.
Fiat embrocatio, cum panno laneo faucibus externis applicanda.

In cynanche tonsillaris.

STIMULANT AND ANODYNE EMBROCATION.

R. Linimenti camphoræ comp. f. dr. ix,
Tincturæ lyttæ, f. dr. i,
——— opii, f. dr. ii,
Parti dolenti applicandum.

To be rubbed over the bowels in colic, cramp, and in painful affections of the joints.

POWDERS.

R. Pulveris gummi acaciæ, oz. ss,
Aluminis, gr. v,
Misce diligenter ut fiat pulvis, cujus inspergatur pauxillum super mamillas pro re nata.

In sore nipples, to be applied after suckling.

R. Superacetatis plumbi, dr. i,
Pulveris cinchonæ, dr. vii,
Tere, ut fiat pulvis, cujus pauxillum super ulceres omni mane spergatur.

For scrofulous ulcers.

OINTMENTS.

R. Hydrargyri nitrico-oxydi, scr. ii,
Adipis, oz. i,
Tere diligenter in mortario donec bene misceantur.

In ulcerations of the eyelids.

R. Zinci oxydi, scr. j,
Adipis, oz. i,
Tere optime in mortario, ut fiat unguentum.

In porrigo scuttilata.

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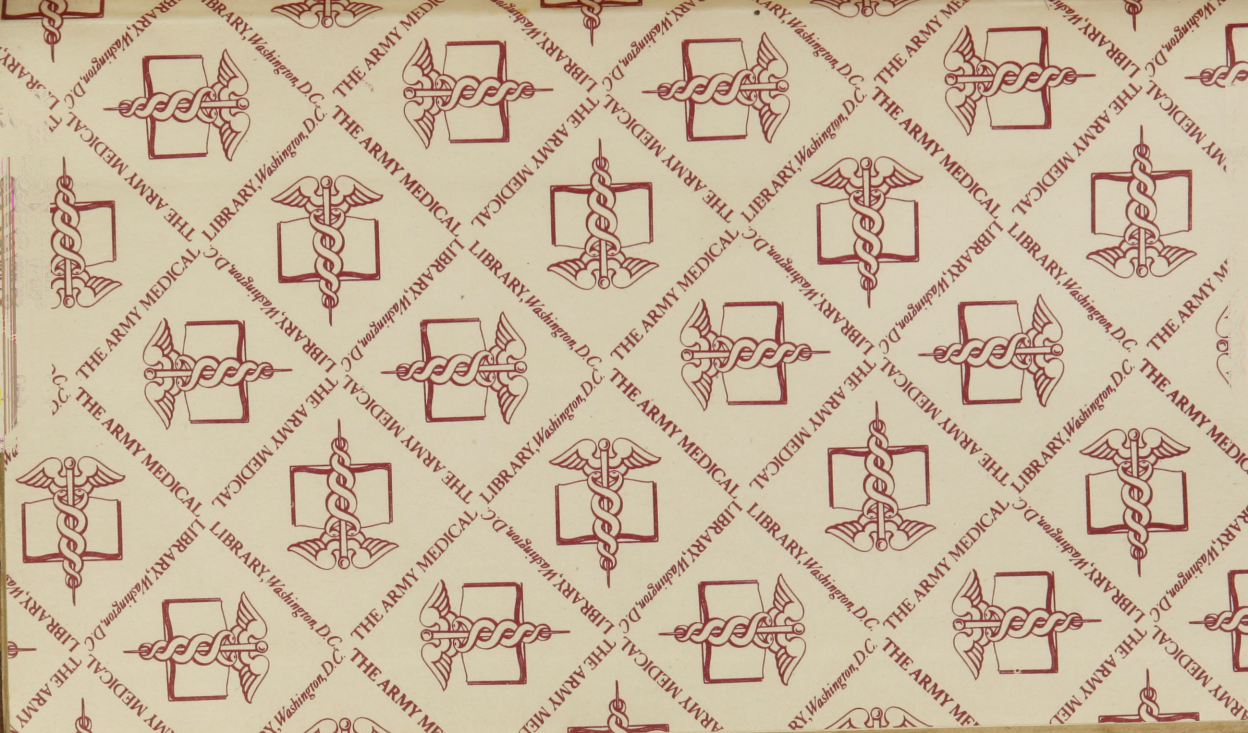
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