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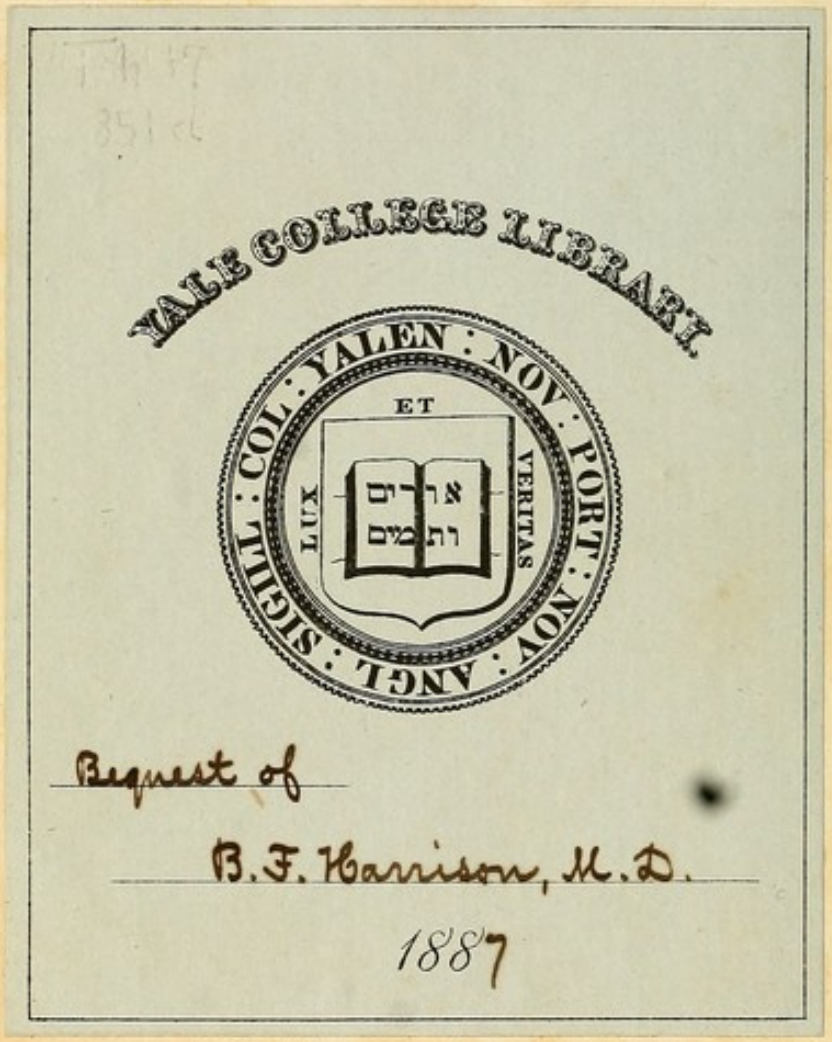

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NEW

REMEDIES:

WITH

FORMULÆ

FOR THEIR ADMINISTRATION.

BY

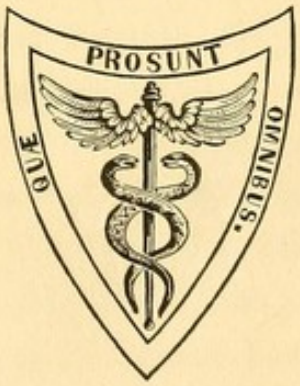
ROBLEY DUNGLISON, M. D.,

PROFESSOR OF THE INSTITUTES OF MEDICINE, ETC., IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA.

SIXTH EDITION,

With Extensive Additions.

PRODESSE QUAM CONSPICI.



PHILADELPHIA:
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PREFACE TO THE SIXTH EDITION.

The last few years have been rich in valuable gifts to Therapeutics; and amongst these, ether, chloroform, and other so called anæsthetics, are worthy of special attention. They have been introduced since the appearance of the last edition of the "*New Remedies*." Other articles have been proposed for the first time, and the experience of observers has added numerous interesting facts to our knowledge of the virtues of remedial agents previously employed. To include all these, it has been necessary to add very greatly to the dimensions of the present edition.

The therapeutical agents now first admitted into this work, some of which have been newly introduced into pharmacology, and the old agents brought prominently forward with novel applications, and which may consequently be regarded as *New Remedies*, are the following:—Adansonia digitata, Benzoate of Ammonia, Valerianate of Bismuth, Sulphate of Cadmium, Chloroform, Collodion, Cantharidal Collodion, Cotyledon Umbilicus, Sulphuric Ether, Strong Chloric Ether, Compound Ether, Hura Braziliensis, Iberis Amara, Iodic Acid, Iodide of Chloride of Mercury, Powdered Iron, Citrate of Magnetic Oxide of Iron, Citrate of Iron and Magnesia, Sulphate of Iron and Alumina, Tannate of Iron, Valerianate of Iron, Nitrate of Lead, Lemon Juice, Citrate of Magnesia, Salts of Manganese, Oleum Cadinum, Arsenite of Quinia, Hydriodate of Iron and Quinia, Sanicula Marilandica, and Sumbul.

To increase the practical value of the work to the therapeutical inquirer, the author has added to the Index of Diseases the particular pages in which the various remedies prescribed in those diseases are referred to.

ROBLEY DUNGLISON.

PHILADELPHIA,
18 GIRARD ST., MARCH, 1851.

ELECTRO-MAGNETISMUS. Since the above was written, the author has received a work by Dr. Froriep,[1] of Berlin, in which he gives cases of good effects produced by Electro-Magnetism, in "*rheumatic effusions* spread over the body"—acute, subacute and chronic; in *hemiplegia rheumatica, rheumatic neuralgia, rheumatic facial palsy, spasmodic contractions of the muscles of the face, writers' cramp, rheumatic paralysis of the forearm, hip, muscles of the thigh and leg*, &c., &c. He rarely employed any remedial agency along with it, being desirous of ascertaining, without the possibility of doubt, its real effect. Currents were transmitted through the medium of sponges saturated with salt and water, and applied to the skin, or by acupuncturation, when it was requisite to act energetically on parts deeply seated, by introducing two needles of platinum in the course of a nerve. Dr. Froriep's testimony is highly confirmative of the good effects ascribed to Electro-Magnetism in certain diseases, in the body of this work.[2]

[1] On the Therapeutic application of Electro-Magnetism in the Treatment of Rheumatic and Paralytic Affections. By Robert Froriep, Doctor in Medicine and Surgery, Public Professor of General Surgery in the University of Berlin, &c., &c., &c. Translated from the German by Richard Moore Lawrance, M. D., Surgeon-Extraordinary to H. R. H. the Duke of Saxe Coburg and Gotha. London, 1850.

[2] See page 296.

PREFACE

TO THE FIRST AND SECOND EDITIONS.

The information concerning the remedies of more recent introduction lies scattered in so many works, that it cannot be accessible to the mass of physicians. The author has, consequently, believed, that he would be rendering a service to the profession by concentrating the results of experience within reasonable limits, so that they may be readily available to all. The majority of the new agents—it will be found—have been furnished by modern chemistry; and their employment has been attended with this advantage, that—when properly prepared—they are not liable to uncertainty in their operation; whilst the various plants from which strychnia, emetia, quinia, &c., are obtained, are liable to irregularity of action, owing to faulty desiccation, to the season in which they are culled, &c., &c.—objections which cannot apply to the active principles when separated from them.

Owing to the difficulty of sifting the results of true from those of false observation, the author has esteemed it proper to give, as far as he was able, the recorded experience of all who have employed the remedies in question.

It need scarcely be said, that to make a correct observer and a good therapeutist, a knowledge of every department of medical science is demanded. Anatomy, physiology, pathology, and materia medica are, indeed, but introductory to the great object which the practitioner has in view—the alleviation and removal of suffering. Were it otherwise, it would be but necessary to institute empirical trials, in every case of disease, with various articles in and out of the received lists of the materia medica, and from such vague trials to endeavour to deduce what is termed "experience."

The erroneous idea prevails too extensively, that every one is capable of profiting by observation, and that, therefore, all who have had the same amount of experience, must be equally capable of treating disease. Setting aside, however, the consideration of the differences that must necessarily result from the varied powers of individuals, it can scarcely be maintained, that he whose attention has

not been properly directed to the study of the preliminary branches which have been enumerated, and whose mind has not been trained in tracing the relation between cause and effect, can ever duly profit by mere experience in that which has been properly termed "the most inductive of all sciences."[1]

To treat disease methodically and effectively, the nature of the actions of the living tissues, in both the healthy and morbid conditions, must be correctly appreciated; the effects which the articles of the materia medica are capable of exerting under both those conditions, must be known from accurate observations, and not until then can the practitioner prescribe with any well-founded prospect of success. Numerous errors would be perpetrated, were we to profess, and to carry out such profession, that we are guided by experience only, unless that experience had been gained by a due consideration of all the physiological, pathological, and therapeutical bearings of the subject. In illustration of this, the well-known case cited by Dr. Paris in his Life of Sir Humphry Davy may be adduced. The enthusiastic Beddoes, having hypothetically inferred that the inhalation of the nitrous oxide might be a specific for palsy, a patient was selected for trial, and placed under the care of Davy—at the time assistant to Beddoes. Before administering the gas, Davy thought of ascertaining the temperature of the body by the thermometer placed under the tongue. The paralytic, deeply impressed by Dr. Beddoes with the certainty of the success of the remedy, of which he knew nothing—soon after the thermometer was placed in his mouth, believing this to be the great curative agent—declared that he felt somewhat better. Nothing more was, therefore, done; and he was requested to return on the following day. The same form was then gone through with the same results; and, at the end of a fortnight, the sick man was dismissed cured, no agent of any kind having been employed except the thermometer.

Now, if the reasoning powers were not duly exerted, experience would obviously teach, as the result of this case, that the thermometer is an antiparalytic. The rational therapeutist is not, however, satisfied with this knowledge of the fact, for "fact it is." He inquires into the mode in which the effect was induced, and he is not long in referring it to the influence exerted by the *moral* over the *physique;* and he classes the thermometer with Perkinism, animal mag-

[1] Propterea sola experientia absque doctrinâ et ratione incerta est et conjecturalis. Qui enim novit rhabarbarum purgare bilem, nescit tamen quando, quibus, et cui morbo prosit, nisi sit medicus doctus et peritus. Primeros. *De vulgi erroribus in medicinâ*, ib. i. cap. xl. Amstelod. 1639.

netism, and their congenerous arts,—amongst articles that act chiefly through the new impressions which they make on the senses.

It might seem to those who are unacquainted with medical history, that in periods approaching our own, no such illogical inferences could be deduced, and that it has been the custom with the profession for ages to bestow all due caution and the most rational inquiry in the collection of facts. Such, however, is far from being the case. It is, indeed, humiliating to reflect on the credulity or faulty observation that has existed among nations, who have successfully cultivated many of the other branches of natural science. It ought scarcely to be credited, and yet it is nevertheless true, that the *aqua spermatis ranarum* or "water of frog's spawn" was to be found not very long ago in the Pharmacopœia of Sardinia; and the *aqua hirundinum cum castoreo* or "water of swallows with castor" in those of Manheim and Wirtemberg. The latter preparation is directed to be made as follows:—Take of *young swallows bruised in a mortar*, forty; rue, two handfuls; castor, one ounce; white wine, three pints. This disgusting preparation was given in hysteria and epilepsy. Again; the *bufones exsiccati* or "dried toads" were in the Pharmacopœias of Spain and Wirtemberg,—having been formerly administered in powder, as a diuretic, in dropsy. In another work,[1] the author has cited many examples as strange as those instanced, and it would be easy to enumerate still more.

In a recent French journal, and in an article by M. Ricord—the distinguished physician to the Venereal Hospital of Paris—we have an example of the pertinacity with which ancient prepossessions and inculcations adhere to us, and how difficult it is to think and to act according to the unbiassed suggestions of our own observation and reflection. In the treatment of blennorrhagic epididymitis or swelled testicle from gonorrhœa, M. Ricord recommends compression to be made by means of the "sparadrap" or plaster of Vigo with mercury. The history of the plaster of Vigo is singular. Although still in the Pharmacopœia of Paris, it resembles its prototypes but in name. In the Pharmacopœia of Wirtemberg, it is directed to be formed of *living frogs* and *living earth-worms*, boiled with various inert and by us rejected herbs in white wine and vinegar,—the decoction being strained, and added to olive oil, litharge, oil of bayberries, turpentine, yellow wax, olibanum, euphorbium, and liquid storax, all melted together.

[1] General Therapeutics, p. 55. Philad. 1836. [See, also, his General Therapeutics and Mat. Medica, 5th edit. i. 66. Philad. 1850.]

Yet it is scarcely possible to conceive, that the frog's spawn could have been supposed to yield a product on distillation differing from that of other animal substances when subjected to the same process; that the swallows—in the preparation cited—added any thing to the antispasmodic virtues of the castor, or that the living frogs and earth-worms exerted any efficacy in the sparadrap de Vigo—a plaster employed for compressing tumours, and for which purpose we use one of simple adhesive constituents. They have all been properly rejected from the lists of our medicinal agents, and are looked upon as irrational; yet we are compelled to infer from the fact of their having been received, in some countries, into officinal publications—into the pharmacopœias, which emanate from congregations of those of our profession, who are esteemed learned by education and by practice—that they were originally admitted under the sanction of fancied experience.

In the darker periods of medical history, monstrous and revolting polypharmacal preparations were introduced, and nothing but the blindest devotion to authority or to established custom could have occasioned their retention. It is not long since the Theriac of Andromachus—itself but a modification of the Antidotum Mithridatum—was dismissed from the British pharmacopœias. It consisted of seventy-two articles, and was a farrago—as Dr. Heberden observed—that had "no better title to the name of Mithridates than—as it so well resembles—the numerous undisciplined forces of a barbarous king, made up of a dissonant crowd collected from different countries, mighty in appearance, but in reality an ineffective multitude, that only hinder each other." The electuarium opiatum polypharmacum of the Parisian codex—the descendant of the old theriac, with even an additional number of ingredients—contains acrid substances, 5; astringent, 5; bitter, 22; indigenous aromatics, 10; umbelliferous aromatics, 7; balsams and resinous substances, 8; fetid ingredients, 6; narcotics, 1; earthy substances, 1; gummy or amylaceous, 4; saccharine, 3. Total, 72—and one of these the *flesh of the viper;* a little more than a grain of opium—which may be regarded as a principal effective ingredient—being contained in a dram of the compound. Yet, when the question arose in the London College of Physicians, as to what should be the fate of this "many-headed monster," and when it was proposed by Dr. Heberden, that it should be ejected from the pharmacopœia,—on a division, it was found that there were *thirteen* votes for retaining and *fourteen* for rejecting it. Its ostracism was determined by a majority of *one* only, in a learned body twenty-seven of whose members were present.

Such was the fate of a "heterogeneous farrago," which, as Dr. Paris has remarked, "can be vindicated upon no principle of combination," and yet enjoyed the confidence of physicians for ages—a confidence unquestionably founded, in their belief, on experience, but experience based upon defective observation, and, consequently, on erroneous inferences—the results being consecutive rather than consequent, and bearing no relation whatever to the assigned cause.

Happily, more correct ideas are beginning to be entertained on the subject of true experience. It is now felt—to employ the language of a distinguished surgeon—Professor Liston—that the greatest number of well-assorted facts on a particular subject constitutes experience, whether these facts have been culled in five years or in fifty. A better system, too, of observation generally prevails, so that we have discarded the absurd and revolting agents that are still retained in the books of authority of some European countries. Much, however, remains to be done. The catalogue of the Materia Medica is yet overstocked, and the pruning knife has still to be applied, to lop off many of the redundancies which have been proved to be such by the more accurate attention that is daily paid to tracing the due relation between cause and effect. "To purchase a clear and warrantable body of truth," as Sir Thomas Browne has well observed, "we must forget and part with much we know."

Every one will be compelled to admit, that it is the duty of the correct therapeutist to doubt the existence of qualities in any article until they have been adequately proved. When such is the case, no reasoning can set aside facts; but unless the evidence be overpowering, it is equally his duty to remain in doubt, especially should reflection suggest to him strong grounds for believing, that the number of observations has been insufficient, that they have not been properly made, or are unconsequential.

To enable the profession to form an accurate estimate of the value of remedies of more recent introduction, or of the older remedies whose use has been revived under novel applications, the present volume was undertaken by the author. In Germany, several works exist on this subject, and that of Riecke—to which the author has repeatedly referred—served as a basis for many of the articles; his observations, however, do not come down farther than the year 1836. Some of the statements—especially in relation to the observations of certain of the German physicians—are given on Riecke's authority,

for he has rarely appended references, by which the correctness of his assertions could be tested.[1]

It has been a great object with the author to furnish exact references to works in which farther information may be obtained, and the number of these will show, that he has devoted no small amount of time and attention to the subject. He has likewise added the results of his own experience in public and in private. The motto which he has selected —*prodesse quam conspici*—conveys, in epitome, his feelings. His sole object has been, "to be useful"—and if he has succeeded, the reward is ample.

ROBLEY DUNGLISON.

Philadelphia, October 15, 1839.

[1] Recently, a second and enlarged edition of Riecke's work has appeared; but the therapeutical additions to it are by no means as numerous as the author had expected to find them. He has, consequently, made but few extracts from it in the present edition. It is entitled "Die neuern Arzneimittel, ihre physischen und chemischen Eigenschaften, Bereitungsweisen, Wirkungen auf den gesungen und kranken Organismus, und therapeutische Benützung. Von Victor Adolf Riecke, Dr. Med., Mitglied des Vereins für Heilkunde in Preussen, u. s. w.; zweite, völlig umgearbeitete Auflage. Stuttgart, 1840." [Note to Preface of edition of 1841.]

ALPHABETICAL

LIST OF REMEDIES.

Abeille mellifique, 703.
Acetas chinicus, 605.
morphicus, 523.
morphii, 523.
quinicus, 605.
strychnicus, 664.
Acetone, 645.
Acetum ligneum, 13.
lignorum empyreumaticum, 13.
pyroligneosum, 13.
Acid, acetic, empyreumatic, 13.
auric, 127.
benzoic, 17.
chromic, 701.
cyanhydric, 23.
gallic, 20.
hydriodic, liquid, 486.
hydrocyanic, 23.
medicinal, 24.
lactic, 36.
muriatic, dephlogisticated, 182.
oxygenated, 182.
nitric, 701.
nitro-muriatic, 187.
of milk, 36.
oxymuriatic, liquid, 189.
prussic, 23.
pyroligneous, 13.
pyrolignic, 13.
tannic, 38.
Acide hydrocyanique, 23.
benzoique, 17.
chromique, 701.
gallique, 20.
iodique, 491.
lactique, 36.
nitrique, 701.
prussique, 23.
pyro-acétique, 13.
pyroligneux, 13.
pyrolignique, 13.
tannique, 38.
Acidum aceticum empyreumaticum, 13.
benzoicum, 17.
benzoicum per sublimationem, 17.
borussicum, 23.
cahincicum, 148.
Acidum caincæ, 148.
chromicum, 701.
gallicum, 20.
hydrocyanicum, 23.
iodicum, 491.
lacteum, 36.
lacticum, 36.
lactis, 36.
ligni pyro-oleosum, 13.
marinum dephlogisticatum, 182.
muriaticum oxygenatum, 182.
muriaticum oxygenatum ad contagia, 182.
nitricum, 701.
prussicum, 23.
pyro-aceticum, 13.
pyrolignosum, 13.
pyroxylicum, 13.
quercitannicum, 38.
tannicum, 38.
zooticum, 23.
zootinicum, 23.
Aconite, extract of, alcoholic, 51.
extract of, ammoniated, 50.
Aconitia, 45.
Aconitine, 45.
Aconitium, 45.
Acqua balsamica arteriale, 82.
Acqua Binelli, 82.
Acqua Brocchieri, 84.
Acqua Monterossi, 83.
Actæa racemosa, 212.
Actée, 212.
Acupuncturation, 51.
Acupuncture, 51.
Adansonia digitata, 702.
Adstringirende Brazilische Rinde, 252.
Æsculin, 410.
Æsculus hippocastanum, 410.
Æther chloricus, 196.
hydrocyanicus, 60.
lignosus, 645.
prussicus, 60.
pyro-aceticus, 645.
sulphuricus, 61.
sulphuricus phosphoratus, 544.
vitriolicus, 61.

Aetzroggen, 312.
Afterkorn, 312.
Agaric blanc, 138.
white, 138.
Agaricus albus, 138.
Agathosma crenatum, 293.
Agathotes chirayita, 399.
Aimant, 496.
Air-douches into the Eustachian tube, 436.
Akonitin, 45.
Akupunktur, 51.
Alaunerde, reine, 101.
Alcali vegetabile salito-dephlogisticatum, 581.
Alcohol, mesitic, 645.
sulphuris, 668.
Alcool de soufre, 668.
Alexiterium chloricum, 182.
Almond, bitter, water of, 80.
Alumina, acetate of, 74.
pure, 101.
salts of, 74.
sulphate of, 74.
Aluminæ sales, 74.
Alumine factice, 101.
sels d', 74.
Aluminii oxidum, 101.
Aluminum, chloride of, 74.
Ammonia, arseniate of, 104.
benzoate of, 19.
hydriodate of, 490.
phosphate of, 76.
Ammoniæ arsenias, 104.
ferro-citras, 342.
phosphas, 76.
Ammoniak arseniksaures, 104.
Ammoniaque, arséniate d', 104.
phosphate d', 76.
Ammoniated counter-irritants, 245.
Ammonii iodidum, 490.
Ammonium arsenicum, 104.
arseniksaures, 104.
hydroiodicum, 490.
iodatum, 490.
iodide of, 490.
phosphorsaures, 76.
Amylum iodatum, 490.
Anthrakokali, 80.
sulphuretted, 80.
Antidynous counter-irritants, 245.
Apfelgranate, 402.
Apis domestica, 703.
mellifica, 703.
Aqua amygdalarum, 80.
arsenicalis Pearsonii, 105.
balsamica arterialis, 82.
Aqua Binellii, 82.
Brocchierii, 84.
chlorini, 189.
lauro-cerasi, 30, 81.
natri oxymuriatici, 643.
oxygenata-muriatica, 189.
oxygeno-muriatica, 189.
oxymuriatica, 189.
picis liquidæ, 89.
Argent, chlorure d', 94.
et d'ammoniaque chlorure d', 95.
cyanure d', 97.
iodure d', 98.
oxide d', 99.
préparations d', 92.
Argenti chloridum, 94.
chloruretum, 94.
cyanidum, 97.
cyanuretum, 97.
et ammoniaci chloruretum, 95.
et ammoniæ chloridum, 95.
ioduretum, 98.
iodidum, 98.
muriatico-ammoniati liquor, 96.
oxidum, 99.
præparata, 92.
Argentum chloratum, 94.
cyanogenatum, 97.
divisum, 101.
hydrocyanicum, 97.
iodatum, 98.
limatum, 101.
muriaticum, 94.
muriaticum ammoniatum, 95.
oxydatum, 99.
salitum, 94.
Argil, pure, 101.
Argilla pura, 101.
Armoise commune, 108.
Arnica, 103.
montana, 103.
plauensis, 103.
Arnique, 103.
Arsenias ammoniæ, 104.
potassæ acidus, 336.
Arseniate of soda, 105.
Arsenic, hydriodate of, 106.
iodide of, 106.
and mercury, double iodide of, 429.
iodure de, 106.
teriodide of, 106.
Arsenici, 106.
hydriodas, 106.
et hydrargyri hydriodas, 429.
et hydrargyri iodidum, 429.
iodidum, 106.
ioduretum, 106.

Arsenici teriodidum, 106.
Arsenicum iodatum, 106.
Arsenikiodür, 106.
Arseniksaures ammonium, 104.
Arsenite of potassa, 105.
Artanthe elongata, 506.
Artemisia vulgaris, 108.
extractum resinosum, 111.
Aspidium filix mas, 381.
Assacou, 715.
Athyrium filix mas, 381.
Atropia, 113.
Atropin, 113.
Atropina, 113.
Atropine, 113.
Atropinum, 113.
Atropium, 113.
Auri chloretum, 120.
chloretum cum chloreto natri, 122.
chloridum, 120.
chloruretum, 120.
cyanidum, 125.
cyanuretum, 125.
et sodii chloridum, 122.
et sodii chloruretum, 122.
et sodii perchloruretum, 122.
iodidum, 126.
ioduretum, 126.
murias, 116.
nitromurias, 127.
oxidum, 127.
peroxidum, 127.
præparata, 116.
pulvis, 129.
terchloridum, 116.
tercyanidum, 125.
teroxydum, 127.
Aurico-natricum murias, 122.
Auriferès composés, les, 117.
Auro-terchloride of sodium, 122.
Aurum chloratum, 116.
chloratum natronatum, 122.
cyanatum, 125.
cyanicum, 125.
cyanogenatum, 125.
hydrocyanicum, 125.
iodatum, 126.
limatum, 129.
metallicum, 129.
muriaticum, 116.
muriaticum natronatum, 122.
nitro-muriaticum, 127.
oxydatum, 127.
oxydulatum muriaticum, 116.
salitum, 116.
sesquichloratum natronatum, 122.
Bachelor's buttons, 538.
Balaustier, 402.
Ballota lanata, 130.
Ballota wollige, 130.
Ballote cotonneuse, 130.
Bandwurmwaldfarrn, 381.
Bang, 166.
Banksia Abyssinica, 139.
Baobab, 702.
Barii iodati hydras, 132.
iodidum, 132.
Barium iodatum, 132.
iodide of, 132.
Bark, resinous constituents of, 636.
astringent, of Brazil, 252.
Barosma crenata, 293.
Baryt hydriodsaurer, 132.
Baryta hydriodica, 132.
hydriodate of, 132.
Barytæ hydriodas, 132.
Barytin, 680.
Barytium iodatum, 132.
Baryumiodür, 132.
Baumnuss, 493.
Bebeeria, 133.
Bebeerin, 133.
Bebeerina, 133.
Bebeerine, 133.
Bee, 703.
Beifusswurzel, 108.
extract, 111.
gemeiner, 108.
Benzoate of ammonia, 19.
Benzoesäure, 17.
Berberin, 136.
Berberina, 136.
Berberine, 136.
Berberinum, 136.
Berberisgelb, 136.
Bergerthran, 545.
Berliner Blau, 345.
Bétoine des Savoyards, 103.
Biene, 703.
Bignonenbaum, 137.
Bignonia catalpa, 137.
Bile, ox, 708.
Bile, swine, 711.
Bilis porcina, 711.
Bilis taurina, 708.
Binellisches Wasser, 82.
Biogamia, 398.
Biomagnetismus, 398.
Bismuth, valerianate of, 704.
Bismuthi valerianas, 704.
Bismuthum valerianicum, 704.
Bisulphuretum carbonii, 668.
Bitter almonds, water of, 80.
oil of, 81.

Bittererde citronensaures, 501.
Bittermandelwasser, 80.
Blankenheimer Thee, 390.
Blau, Berliner, 345.
Pariser, 345.
Blaud's Pills, 373.
Blausäure, 23.
Blausaures eisenoxydul Zinkoxid, 695.
Quecksilber, 413.
Blaustoffeisen, 345.
Blaustoffgold, 125.
Blaustoffkalium, 588.
Blaustoffquecksilber, 413.
Blaustoffsilber, 97.
Blaustoffzink, 694.
Blé cornu, 312.
Bled avorté, 312.
farouche, 312.
Blei hydriodsaures, 578.
iodwasserstoffsaures, 578.
Bleichpulver, 153.
Bleiiodid, 578.
Bleioxyd, salpetersaures, 723.
Bleitannat, 580.
Bleu de Prusse, 345.
Blue, Prussian, 345.
Berlin, 345.
Boccho, 293.
Bocchoe, 293.
Bole, Armenian, 101.
Boletus albus, 138.
laricis, 138.
purgans, 138.
Boocho, 293.
Brayera anthelmintica, 139.
Brechnuss, 538.
Brechstoff, 309.
Brom, 141.
Brome, 141.
Bromeisen, 338.
Brometum ferricum, 338.
hydrargyrosum, 412.
Bromhydras kalii, 585.
potassæ, 585.
potassii, 585.
Bromidum potassii, 585.
Bromin, 141.
Bromina, 141.
Bromine, 141.
Bromineum, 141.
Brominium, 141.
Brominum, 141.
Bromium, 141.
Bromkalium, 585.
Bromquecksilber, 412.
doppelt, 412.
Bromquecksilber in maximum, 412.
Bromum, 141.
Bromure de potassium, 585.
Bromuretum kalii, 585.
potassii, 585.
Bromwasserstoffsaures eisenoxyd, 338.
kali, 585.
Brucia, 145.
Brucin, 145.
Brucina, 145.
Brucine, 145.
Brush, galvanic, 398.
metallic, 398.
Buccublätter, 293.
Buchu, 293.
Buckeye, 410.
Buckhu, 293.
Bugbane, 212.
Buranhem, 512.
Butyrum zinci, 688.
Cade Oel, 721.
Cadmii sulphas, 705.
Cadmium sulphuricum, 705.
Cadmium schwefelsaures, 705.
Cadmium, sulphate of, 705.
Cæruleum Beroliniense, 345.
Borussicum, 345.
Cahincæ radix, 147.
Cainanæ radix, 147.
Cainca root, 147.
Caincæ acidum, 147.
Caincawurzel, 147.
Calcar, 312.
Calcaria chlorata, 153.
chloretum, 153.
chlorica, 153.
Calcariæ chlorum, 153.
Calcii bichloruretum, 153.
oxychloruretum, 153.
oxydi chloruretum, 153.
proto-chloruretum, 153.
Calcis bichloruretum, 153.
chloridum, 153.
hypochloris, 153.
oxymurias, 153.
Calcium, oxide de, chlorure d', 153.
protoxichlorure de, 153.
Calendula Alpina, 103.
officinalis, 150.
sativa, 150.
Calendulin, 150.
Caltha alpina, 103.
sativa, 150.
Calx chlorinata, 153.
oxymuriatica, 153.
Candytuft, bitter, 716.

Caninanæ radix, 147.
Caniraminum, 145.
Caniramium, 145.
Cannabine, 166.
Cannabis indica, 164.
Caper spurge, 334.
Carboneum trichloratum, 705.
chloratum, 196.
Caro vitulina tosta, 173.
Carbo animalis, 173.
carnis, 173.
mineralis, 339.
Carbon, sesqui-chloride of, 705.
sesqui-iodide of, 176.
sesqui-ioduret of, 176.
terchloride of, 196, 705.
trichloratum, 705.
chloratum, 196.
Carboneum sulphuratum, 668.
chloratum, 196.
trichloratum, 705.
Carbonis sesqui-chloridum, 705.
sesqui-iodidum, 176.
sesqui-ioduretum, 176.
trichloridum, 705.
Carbonicum chloratum, 705.
Carbonium iodatum, 176.
Carbure de soufre, 668.
Carburet of sulphur, 668.
Carragaheen moss, 210.
Carageen moss, 210.
Carrageenin, 210.
Castanea equina, 410.
pavina, 410.
Catalpa, 137.
arborea, 137.
arborescens, 137.
cordifolia, 137.
tree, 137.
Catapuce, 334.
Cataputia minor, 334.
Catawba tree, 137.
Catheterism of the Eustachian tube, 436.
Cephaëlinum, 309.
Cerussa nigra, 339.
Cetrarin, 177.
Cetrarina, 177.
Cetrarine, 177.
Cetrarinum, 177.
Chanvre Indien, 164.
Charbon, animal, 173.
Charcoal, animal, 173.
Chaux, chlorate de, 153.
chlorure de, 153.
muriate suroxigéné ou oxigéné de, 153.
Chaux, oxichlorure de, 153.
oximuriate de, 153.
souschlorate de, 153.
Chestnut, horse, 410.
Chimaphila, 179.
Chimophila, 179.
Chinastoff, 603.
Chinicus citras, 607.
hydrochloricus, 612.
Chinii acetas, 605.
citras, 607.
ferrocyanas, 608.
hydrochloras, 612.
murias, 612.
Chinii nitras, 613.
phosphas, 613.
sulphas, 614.
tannas, 635.
Chinin, 603.
arseniksaures, 606.
citronensaures, 607.
citronsaures, 607.
eisenblausaures, 608.
essigsaures, 605.
gerbesaures, 635.
gerbstoffsaures, 635.
hydrochlorsaures, 612.
iodwasserstoffsaures, 610.
milchsaures, 611.
phosphorsaures, 613.
salpetersaures, 613.
salzsaures, 612.
schwefelsaures, 614.
sulphat, 614.
tanninsaures, 635.
valeriansaures, 633.
zitronsaures, 607.
Chinini acetas, 605.
citras, 607.
phosphas, 613.
Chininum, 603.
aceticum, 605.
citricum, 607.
hydriodicum, 610.
lacticum, 611.
muriaticum, 612.
resino-sulphuricum, 636.
salitum, 612.
tannicum, 635.
valerianicum, 633.
Chinioidine, 636.
Chinium, 603.
aceticum, 605.
citricum, 607.
ferro-cyanogenatum, 608.
ferro-hydrocyanicum, 608.
hydrochloricum, 612.

Chinium muriaticum, 612.
nitricum, 613.
phosphoricum, 613.
salitum, 612.
sulphuricum, 614.
tannicum, 635.
Chinoidine, 636.
Chinolein, 716.
Chiococcæ radix, 147.
Chirayita, 399.
Chiretta, 399.
Chlor, 182.
Chloras kalicus depuratus, 581.
Chloras potassicus, 581.
Chlorate de potasse, 581.
Chlorblei, 722.
Chlorcalciumoxyd, 153.
Chlore, 182.
eau de, 189.
liquide, 189.
Chloretum auri, 120.
cum chloreto natrii, 122.
calcariæ, 153.
zinci, 688.
Chlorflüssigkeit, 189.
Chlorgas, 182.
Chlorgold, 120.
natrium, 122.
Chlorsilber, 94.
Chlorgoldnatronium, 122.
Chlorhydrasmorphicus, 527.
quinicus, 613.
Chlori aqua, 189.
liqūor, 189.
Chloride of gold and sodium, 122.
of soda, 643.
of zinc, 688.
Chlorine, 182.
solution of, 189.
Chlorineum, 182.
Chlorini aqua, 189.
Chlorinium, 182.
Chlorinum, 182.
Chlorkalk, 153.
Chlorkohlenstoff, dreifach, 705.
Chlornatron, 643.
Chlornatrum, 643.
Chloroform, 196.
Chlorplatin, 577.
Chlorplatinnatrium, 578.
Chlorsaures kali, 581.
natrum, 643.
Chlorsilber, 94.
Chlorsodaflüssigkeit, 643.
Chlorum, 182.
calcariæ, 153.
liquidum, 189.
Chlorure d'argent, 94.
d'or, 120.
d'or et sodium, 122.
d'oxide de sodium, 643.
de plomb, 722.
de soude, 643.
Chloruretum argenti, 94.
argenti et ammoniæ, 95.
auri, 120.
auri et sodii, 122.
oxidi calcii, 153.
oxidi sodii, 643.
potassæ oxidatum, 581.
zincicum, 688.
Chlorwasser, 189.
Chlor, wasseriges, 189.
Chlorzink, 688.
Chondrus, 210.
crispus, 210.
polymorphus, 210.
Christophskraut, traubenformiges, 212.
Chromium, peroxide of, 701.
Chromsäure, 701.
Chrysanthemum, 150.
Churrus, 166.
Cicutinum, 706.
Cimicifuga, 212.
Cinchonia, 215.
iodide of, 610.
Cinchonin, 215.
Cinchonine, 215.
Cinchoninum, 215.
Citras chinicus, 607.
ferricus, 341.
quinicus, 607.
Citronensaft, 728.
Clavus secalinus, 312.
siliginis, 312.
Clou de seigle, 312.
Codeia, 218.
Codeine, 218.
Codeinum, 218.
Cod-liver oil, 545.
Cohort, 212.
Cohosh, 212.
Colchicia, 224.
Colchicum, 223.
autumnale, 223.
Colchique, 223.
Collodion, 232.
cantharidal, 236.
Collodium, 232.
tinctum, 235.
Compressio, 237.
Compression, 237.
methodical, 237.

Coneine, 706.
Conia, 706.
Conicinum, 706.
Contra-irritation, 245.
Contre-irritation, 245.
Corrigeen moss, 210.
Cortex adstringens Brasiliensis, 252.
Corylus rostrata, 254.
Cotyledon umbilicus, 707.
Counter action, 245.
Counter-irritant lotions, Granville's, 245.
ammoniated, 245.
antidynous, 245.
Gondret's, 245.
Granville's, 245.
Raspail's, 245.
Counter-irritation, 245.
Cousso, 139.
Crayon noir, 339.
Creasote, 255.
Crocus martis aperiens, 376.
Croton oil, 561.
Crusadinha raiz, 147.
Cubeba, 281.
Cubeben, 281.
Cubebenpfeffer, 281.
Cubebin, 282.
Cubebs, 281.
Cusso, 139.
Cyanäther, 60.
Cyaneisen, 345.
Cyaneisenzink, 695.
Cyanetum hydrargyri, 403.
kalii, 588.
zinci, 694.
zinci et ferri, 695.
Cyangold, 125.
Cyanhydras potassæ, 588.
kalicus, 588.
zincicus, 694.
Cyanidum kalii, 588.
mercurii, 413.
potassii, 588.
Cyankalium, 588.
Cyanquecksilber, 413.
Cyansilber, 97.
Cyanure d'argent, 97.
d'or, 125.
de mercure, 413.
de potassium, 588.
de zinc, 694.
Cyanuret of ethule, 60.
Cyanuretum argenti, 97.
auri, 125.
auricum, 125.
ferrozincicum, 695.
Cyanuretum hydrargyri, 413.
potassicum, 588.
zincicum, 694.
zinci et ferri, 695.
Cyanwasserstoffäther, 60.
Cyanwasserstoffsäure, 23.
Cyanzink, 694.
Delphia, 287.
Delphin, 287.
Delphina, 287.
Delphinia, 287.
Delphinine, 287.
Delphium, 287.
Derosne'sches opiumsalz, 535.
Digitalia, 289.
Digitalin, 289.
Digitalina, 289.
Digitaline, 289.
Digitalinum, 289.
Diosma, 293.
Diosmin, 294.
Dogwood, Jamaica, 722.
Donovan's solution, 429.
Doronic d'Allemagne, 103.
Doronicum Germanicum, 103.
plantaginis folio, 103.
Drops, fever, Warburg's, 135.
Druck, 237.
Duftstrauchblätter, 293.
Eau d'amandes amères, 80.
de Binelli, 82.
de Brocchieri, 84.
de chlore, 189.
de goudron, 89.
de Javelle, 643.
médicinale d'Husson, 223.
styptique de Brocchieri, 84.
Eisen, blausaures, 345.
Eisenbromid, 338.
Eisenchinin, citronensaures, 345.
Eisencyanürcyanid, 345.
Eiseniodür, 349.
Eisen, kohlensaures, 371, 376.
Eisenoxyd, braunes, 376.
baldriansaures, 380.
citronensaures, 341.
eisenblausaures, 345.
gerbesaures, 379.
iodwasserstoffsaures, 349.
kohlensaures, 376.
milchsaures, 359.
mit ammoniak, 342.
salpetersaures, 361.
Eisenoxydhydrat, 364.
Eisenoxydul arsensaures, 336.
arseniksaures, 336.
blausaures, 345.

Eisenoxydul citronsaures, 341.
hydriodsaures, 349.
iodwasserstoffsaures, 610.
kohlensaures, 364, 376.
milchsaures, 359.
Eisenpräparate, 335.
Eisenzink, blausaures, 695.
Eisenzinkcyanür, 695.
Electricitas. See Galvanismus.
animalis, 392.
galvanica seu metallica, 393.
Electricity, galvanic, 392.
magnetic, 296.
Electro-magnetismus, iv, 296.
Electropunctura, 303.
Electropuncturation, 303.
Elixir of opium, M'Munn's, 530.
Emeta, 309.
Emetia, 309.
Emetina, 309.
Emetium, 309.
Emetine of the violet, 309.
indigenous, 309.
Epurge, 334.
Ergot, 312.
Ergota, 312.
Ergotin, 331.
Esprit pyroacétique, 645.
Essigalkohol, 645.
Essiggeist, 645.
Essigsaures morphium, 523.
Ether, acetic, injections of, into the Eustachian tube, 440.
chloric, 196.
chloric, strong, 207.
compound, 209.
hydrocyanic, 60.
prussic, 60.
pyroacetic, 645.
sulphuric, 61.
sulphurique, 61.
Etherine, hydrocyanate of, 60.
Ethyle, cyanuret of, 60.
Eupatorium huaco, 407.
Euphorbia lathyris, 334.
Euphorbie, purgirkörner, 334.
Exoneurism, 398.
Extract, alcoholic, of nux vomica, 538.
Extractum filis maris, 140.
nucis vomicæ alcoholicum, 538.
opii aceticum, 526.
resinosum radicis artemisiæ, 111.
Extrait alcoholique de noix vomique, 538.
de guarana, 569.
savonneux de l'urine, 675.
Extrakt geistiges der Krähenaugen, 538.
Fallkraut, 103.
Farrenkraut, 381.
männlein, 381.
männliches, 381.
Fel bovinum, 708.
bovis, 708.
tauri, 708.
Fer, arséniate de, 336.
bromure de, 338.
carbure de, 339.
citrate de, 341.
cyanure de, 345.
deutoxicyanure de, hydraté, 345.
hydraté, deutocyanure de, 345.
hydriodate de, 349.
iodure de, 349.
lactate de, 359.
nitrate de, 361.
préparations de, 335.
protocarbonate de, 371.
protoiodure de, 349.
réduit par hydrogène, 335.
souscarbonate de, 376.
tannate de, 379.
tritohydrocyanate ferruré de, 345.
tritohydroferro-cyanate de, 345.
valérianate de, 380.
Fern, male, 381.
shield, male, 381.
Ferri et aluminæ sulphas, 711.
ammonio-citras, 342.
et ammoniæ citras, 342.
arsenias, 336.
borussias, 345.
bromidum, 338.
carbonas, 371, 376.
carbonas præcipitatus, 376.
carbonas saccharatum, 372.
carburetum, 339.
carburetum nativum, 339.
citras, 341.
cyanuretum, 345.
deuto-carbonas fuscus, 376.
ferrocyanuretum, 345.
ferro-sesquicyanidum, 345.
hydriodas, 349.
hydrobromas, 338.
iodidum, 349.
ioduretum, 349.
lactas, 359.
et magnesiæ citras, 344.
nitras, 361.
nitratis liquor, 361.
nitrici oxydati liquor, 361.
oxydi ferrocyanas, 345.

Ferri oxydulatum hydrocyanicum, 345.
oxydum fuscum, 376.
oxydum hydratum, 364.
oxydum rubrum, 376.
percyanidum, 345.
pernitras, 361.
persesquinitratis liquor, 361.
præparata, 335.
protocarbonas, 371.
prussias, 345.
pulvis, 335.
et quiniæ citras, 345.
sesquicyanidum, 345.
sesquioxidum hydratum, 364.
sesquioxydum, 364, 376.
subcarbonas, 376.
tannas, 379.
valerianas, 380.
Ferrugo, 364.
Ferrum ammoniaco-citricum, 342.
arseniatum, 336.
arsenicum oxydulatum, 336.
borussicum, 345.
bromatum, 338.
carbonatum, 364, 376.
carbonatum præcipitatum, 376.
carbonicum oxydulatum, 376.
carbonicum saccharatum, 372.
carburetum, 339.
citricum, 341.
citricum cum ammoniaco, 342.
cyanogenatum, 345.
cyanuretum, 345.
hydriodatum, 349.
hydrobromicum oxydatum, 338.
hydrocyanicum, 345.
hydroiodicum oxydulatum, 349.
iodatum, 349.
lacticum, 359.
nitratum, 361.
nitricum oxydatum, 361.
oxydatum hydratum, 364.
oxydulatum hydrocyanicum, 345.
oxydum hydricum, 364.
perbromatum, 338.
supercarburetum, 339.
tannicum, 379.
valerianicum, 380.
zooticum, 345.
Fiel de Bœuf, 708.
Filix mas, 381.
Firing, 251.
Flechtenbitter der Isländischen Flechte, 177.
Fleischkohle, 173.
Flores Benzoes, 17.
Flores Benzoini, 17.
Flowers of Benjamin, 17.
Formylsuperchlorid, 169.
Formylsuperiodid, 176.
Fougère mâle, 381.
Fucus amylaceus, 383.
crispus, 210.
Irlandicus, 210.
lichenoides, 383.
Fuligo, 385.
fornacum, 385.
ligni, 385.
splendens, 385.
Fuligokali, 389.
Fumigatio muriatico-oxygenata, 182.
Fumigation de chlor, 182.
de Guyton, 182.
Guytonienne, 182.
hygiénique, 182.
Fumigations, Guyton-Morveau, 182.
Fungus of the larch, 138.
laricis, 138.
Galeopsis angustifolia, 390.
dubia, 390.
grandiflora, 390.
ochroleuca, 390.
prostrata, 390.
segetum, 390.
versicolor, 391.
villosa, 391.
Gall, ox, 708.
swine, 708.
Gallussäure, 20.
Galvanic brush, 398.
plates, 393.
suppository, 399.
Galvanisation localisée, 397.
Galvanism, 392.
Galvanopuncture, 303.
Gebärpulver, 312.
Gegenreizung, 245.
Gentiana chirayita, 399.
Gerbsaure, 38.
Gerbestoff, 38.
Gerbestoff blei, 580.
Gichtthran, 545.
Gigartina lichenoides, 383.
Glanzruss, 385.
Glycerin, 400.
Glycerina, 400.
Glyceryle, hydrate of oxide of, 400.
Glyceryloxyd, 400.
Glyzerin, 400.
Goharem, 512.
Gold and soda, hydrochlorate of, 122.
muriate of, 122.

Gold and sodium, chloride of, 122.
chlorid, 120.
chlorid, saures, 120.
chloride of, 120.
cyanid, 125.
cyanide of, 125.
cyanuret of, 125.
iodid, 126.
iodide of, 126.
iodür, 126.
ioduret of, 126.
krystalle, 120.
metallic, 129.
metallisches, 129.
muriate of, 120.
natrium-chlorid, 122.
natrum-chlorid, 122.
natrum, salzaures, 122.
nitro-muriate of, 127.
oxide of, 127.
oxyd, 127.
oxyd, blausaures, 125.
oxyd, hydrochlorsaures, 120.
oxydirtes, 127.
oxydül, salzaures, 120.
oxynatrium, salzsaures, 122.
peroxide of, 127.
präparate, 116.
preparations of, 116.
pulver, 129.
salpetersalzsaures, 127.
salz, Figuier's, 122.
salzsaures, 120.
säure, 127.
sodahaltiges, salzaures, 122.
terchloride of, 120.
tercyanide of, 125.
Gondret's counter-irritants, 245.
Gracilaria lichenoides, 383.
Granatapfelbaum, 402.
Granatbaum, 402.
Granatillöl, 561.
Granatin, 403, 503.
Granatum, 402.
Granville's counter-irritants, 245.
Graphites, 339.
Green, winter, 179.
Grénadier, 402.
Grenadin, 403, 503.
Guaco, 407.
Guarana, 569.
Guarana-samenteig, 569.
Guncotton, ethereal solution of, 232.
Gunjah, 166.
Habbi, 139.
Hachisch, 166.
Hæmospasia, 712.
Hæmostasis, 713.
Hagenia Abyssinica, 139.
Hahnensporn, 312.
Haloidum oxygenatum, 581.
Hanf, 164.
Hanfnessel grossblumigte, 390.
Harnstoff, 675.
Harnstoff, salpetersaures, 677.
Haschisch, 164.
Haschischine, 166.
Hazel, beaked, 254.
Hémospasie, 712.
Hémostasie, 713.
Hemp, Indian, 164.
Henricea pharmacearcha, 399.
Herba sideritidis, 390.
Herbe à pisser, 179.
Herbe Saint Christophe, 212.
Herbstblume, 223.
Herbstzeitlose, 223.
Hippocastanum, 410.
Hohlzahns, grossblüthige, 390.
Holzessig, 13.
Holzessigsäure, 13.
Holzsäure, 12.
brenzliche oder brandige, 13.
Honeybee, 703.
Honigbiene, 703.
Hopfenmehl, 718.
Hopfenstaub, 718.
Hornblei, 722.
Hornseed, 312.
Hornsilber, 94.
Horse chestnut, 410.
Huaco, 407.
Huile de foi de poisson, 545.
de cade, 721.
de genévrier, 721.
de morue, 545.
de pignon d'Inde, 561.
volatile de moütarde, 559.
Hundsnessel, gelbe oder grossblüthige, 390.
Hura Braziliensis, 715.
Hydrargyri bibromidum, 412.
bicyanidum, 413.
biiodatum, 421.
biniodidum, 421.
borussias, 413.
bromidum, 412.
cyanetum, 413.
cyanidum, 413.
cyanuretum, 413.
deuto-bromidum, 412.
deuto-ioduretum, 421.
deutonitras, 427.
dipernitras, 427.

Hydrargyri et arsenici iodidum, 429.
et quiniæ proto-chloridum, 715.
hydrocyanas, 413.
iodidulatum, 418.
iodidum, 418.
rubrum, 421.
nitras, 426.
nitratum, 426.
perbromidum, 412.
periodidum, 420.
pernitratis liquor, 428.
præparata, 412.
protobromidum, 412.
proto-iodidum, 418.
proto-ioduretum, 418.
protonitras, 426.
prussias, 412.
subiodidum, 418.
supernitras, 427.
Hydrargyrum biiodatum cum kalio iodato, 592.
biniodidum, 421.
borussicum, 413.
bromatum, 412.
cyanetum, 413.
cyanogenatum, 413.
hydrocyanicum, 413.
iodatum, 418.
cum chlorido mercurii, 491.
flavum, 418.
rubrum, 421.
iodidum, 418.
iodidulatum, 418.
nitricum oxydatum, 427.
nitricum oxydulatum, 426.
perbromatum, 412.
periodatum, 421.
subiodatum, 418.
zooticum, 413.
Hydras ferricus, 364.
Hydriodas ammoniæ, 490.
kalicus, 595.
lixiviæ, 595.
Hydriodate of ammonia, 490.
of potassa, 595.
Hydriodic acid, liquid, 486.
Hydrobromsaures kali, 585.
Hydrochloras morphicus, 527.
chinicus, 612.
Hydrocyanas kalicus, 588.
zincicus, 694.
Hydrocyanäther, 60.
Hydrocyanate of etherine, 60.
Hydrocyanic ether, 60.
Hydrocyansäure, 23.
Hydroiodas kalicus, 595.
lixiviæ, 595.
Hydroiodsaures Eisenoxydul, 349.
Hypochloris sodicus aquâ solutus, 643.
Iberis amara, 716.
Indicum, 432.
Indicus color, 432.
Indig, 432.
Indigo, 432.
Indigum, 432.
Infusum picis liquidæ, 89.
picis empyreumaticæ liquidæ, 89.
Injections of air, &c. into the Eustachian tube, 436.
Iod, 443.
Iodammonium, 490.
Iodarsen, 106.
Iodarsenik, 106.
Iodätherid, 176.
Iodbaryum, 132.
Iodblei, 578.
Iodchlorquecksilber, 492.
Iode, 443.
Iodeisen, 349.
Iodetum hydrargyricum, 421.
hydrargyrosum, 418.
zinci, 698.
Iodgold, 126.
Iodhydras kalicus seu potassæ, 595.
Iodhydrargyrate of ioduret of potassium, 592.
Iodhydrargyrite de chlorure mercureux, 491.
Iodic acid, 491.
Iodide of ammonium, 490.
of arsenic, 106.
of carbon, 176.
of chloride of mercury, 491.
of iron, 349.
of potassium, 595.
of quinia, 610.
of silver, 98.
of starch, 490.
of sulphur, 673.
of zinc, 698.
Iodidum ammonii, 490.
amyli, 490.
argenti, 98.
arsenici, 106.
baryi, 132.
carbonis, 176.
hydrargyri chloridi, 491.
hydrargyricum, 421.
hydrargyrosum, 418.
plumbi, 575.
potassii, 595.

Iodidum quiniæ, 610.
Iodine, 443.
Iodinum, 443.
Iodinschwefel, 673.
Iodium, 443.
Iodkalium, 595.
Iodkohlenstoff, 176.
Iodkohlenwasserstoff, 176.
Iodoforma, 176.
Iodohydrargyrate of potassium, 592.
of ioduret of potassium, 592.
Iodquecksilber doppelt, 421.
gelbes, 418.
in maximum, 421.
in minimum des Iods, 418.
rothes, 421.
Iodsäure, 491.
Iodschwefel, 673.
Iodsilber, 98.
Iodstärke, 490.
Iodstärkmehl, 490.
Iodum, 433.
Iodure d'amidon, 490.
de carbon, 176.
de fer, 349.
plombique, 578.
de potassium, 595.
de quinine, 610.
de soufre, 673.
double de mercure et de morphine, 432.
Ioduret of quinia, 610.
of silver, 98.
of sulphur, 673.
Ioduretum ammonii, 490.
amyli, 490.
argenti, 98.
arsenici, 106.
barytii, 132.
carbonii, 176.
hydrargyrosum, 418.
potassicum, 595.
quiniæ, 610.
Iodwasserstoffsaure Schwererde, 132.
Iodwasserstoffsäures Eisenoxydul, 349.
Iron, ammonio-citrate of, 342.
and alumina, sulphate of, 711.
and magnesia, citrate of, 344.
and quinia, citrate of, 345.
arseniate of, 336.
bromated or bromide of, 338.
carbonate of, 371.
carburet of, 339.
citrate of, 341.
citrate of magnetic oxide of, 342.
Iron, cyanuret of, 345.
hydriodate of, 349.
hydrobromate of, 338.
hydro-oxide of, 364.
iodated, 349.
iodide of, 349.
ioduret of, 349.
lactate of, 359.
nitrate of, solution of, 361.
oxide of, hydrated, 364.
oxyhydrate of, 364.
peroxide of, 376.
peroxide of, hydrated, 364.
pernitrate of, 361.
persesquinitrate of, solution of, 361.
potassio-citrate of, 342.
preparations of, 335.
proto-carbonate of, 371.
proto-iodide of, 349.
proto-ioduret of, 349.
protoxide of, hydriodate of, 349.
protoxide of, lactate of, 359.
prussiate of, 345.
sesquioxide of, 376.
sesquioxide of, hydrated, 364.
sodio-citrate of, 342.
subcarbonate of, 376.
tritoxide of, hydrated, 364.
valerianate of, 380.
Irritamentum metallorum seu metallicum, 392.
Johanniswurzel, 381.
Juglans regia, 493.
Kabliauthran, 545.
Kahincæ radix, 147.
Kali blausaures, 588.
borussicum, 588.
bromwasserstoffsaures, 585.
chloricum, 581.
chlorinicum, 581.
chlorsaures, 581.
cyanwasserstoffsaures, 588.
elainicum, 641.
hydriodicum, 595.
hydriodsaures, 595.
hydrobromicum, 585.
hydrobromsaures, 585.
hydrocyanicum, 588.
hydroiodat, 595.
hydroiodinicum, 595.
hyperoxygenirt salzsaures, 581.
iodwasserstoffsaures, 595.
iodatum hydrargyratum, 592.
muriaticum hyperoxygenatum, 581.
ölsaures, 641.

Kali oxychloricum, 581.
oxydirt, salzsaures, 581.
oxymuriaticum, 581.
salpetersaures, 724.
Kalii cyanuretum, 588.
cyanetum, 588.
cyanidum, 588.
iodidum, 595.
Kaliseife, 641.
Kalium bromatum, 585.
bromid, 585.
bromür, 585.
cyanid, 588.
cyanogenatum, 588.
cyanür, 588.
hydriodatum hydrargyratum, 592.
iodatum, 595.
iodür, 595.
Kalk, chlorigsaure, 153.
oxydirt salzsaures, 153.
Kalkchlorid, 153.
Kaminruss, 385.
Kaniramin, 145.
Katalpa, 137.
Katzermaul, 390.
Kinine, 603.
Kinini citras, 607.
Kininum, 603.
Kinium, 603.
Klapperschlangenwurzel, 212.
Klaprothii sulphas, 705.
Knorpeltang, krauses, 210.
Kodein, 218.
Kohle mineralische, 339.
thierische, 173.
Kohlenschwefel, flüssiger, 668.
Kohlenstoffeisen, 339.
Kohlenstofftrichlorid, 705.
Kohlensulfurid, 668.
Königswallnuss, 493.
Kosso, 139.
Kousso, 139.
Krähenaugen, 538.
Krähenaugen bitter, 649.
geistiges, extrakt der, 538.
Krahenaugenstoff, 649.
Krauser Tang, 210.
Kreasot, 255.
Kreasote, 255.
Kreasoton, 255.
Kreasotum, 255.
Kreosote, 255.
Krotonöl, 561.
Kubebenpfeffer, 281.
Kubebin, 282.
Labarraque's disinfecting liquid, 163, 643.
Lactas ferrosus, 359.
Lactucarium, 496.
Lathyris, 334.
Lattichopium, 496.
Lattigbitter, 496.
Lattigmilchsaft, 496.
Lead, black, 339.
chloride of, 722.
iodide of, 578.
ioduret of, 578.
nitrate of, 723.
tannate of, 580.
Leberthran, 545.
Lemonade, magnesian, 501.
Lemonjuice, 728.
Leonurus lanata, 130.
Leopard's bane, 103.
Lerschenschwamm, 138.
Letheon, 61.
Lettuce opium, 496.
Leucolein, 716.
Leukoleinum, 716.
Liebersche Brust oder Auszehrungskräuter, 390.
Lichen carrageen, 210.
Lime, chloride of, 153.
chlorinated, 153.
chlorite of, 153.
chloruret of, 153.
hypochlorite of, 153.
oxymuriate of, 153.
Limon, suc de, 728.
Liqueur désinfectante de Labarraque, 163, 643.
Liquid, disinfecting, Labarraque's, 163, 643.
adhesive, Maynard's, 232.
Liquor acidi muriatici oxygenati, 189.
alexiterius oxygenatus, 189.
argenti muriatico ammoniata, 96.
chlori, 189.
disinfecting, of Labarraque, 163.
ferri iodidi, 352.
ferri nitratis, 361.
ferri nitrici oxydati, 361.
ferri persesquinitratis, 361.
hydrargyri et arsenici iodidi, 430.
hydrargyri pernitratis, 428.
hydrargyri supernitratis, 428.
hydriodatis arsenici et hydrargyri, 430.
morphiæ citratis, 529.
natri chloreti, 643.
opii, 526.

Liquor opii sedativus, 526.
sodæ chloridi, 643.
chlorinatæ, 643.
Lithanthrakokali, 80.
Lithia, carbonate of, 717.
Lithiæ carbonas, 717.
Lithine, carbonate de, 717.
Lithion kohlensaures, 717.
Lithium, kohlensaures, 717.
Lithon kohlensaures, 717.
Lupulin, 718.
Macrotrys racemosa, 212.
Magnes, 498.
Magnesia and iron, citrate of, 344.
Magnesia, citrate of, 501.
citronensaures, 501.
Magnesiæ citras, 501.
Magnesian lemonade, 501.
Magnésie, citrate de, 501.
Magnet, 498.
Magnetes, 498.
Magnetic electricity, 296.
Magnetism, animal, 398.
Magnetstein, 496.
Malambo, 505.
Malogranatum, 402.
Manganese, salts of, 720.
sulphate of, 718.
Manganesii sulphas, 718.
Manganoxydul, schwefelsaures, 718.
Manganum sulphuricum oxydulatum, 718.
Mannastoff, 503.
Mannazucker, 503.
Mannite, 503.
Mannitum, 503.
Mannleinwurmtüpfelfarrn, 381.
Marigold, garden, 150.
single, 150.
Marronier, 410.
d'Inde, 410.
Matias, 505.
Matico, 506.
Matière de Derosne, 535.
vomitive, 309.
Matter of Derosne, 535.
Meadow saffron, 223.
Melambo, 505.
Melini sulphas, 705.
Mercure, cyanure de, 413.
deuto-iodure de, 421.
deuto-nitrate de, 427.
dipernitrate de, 427.
hydrocyanate de, 413.
nitrate acide de, 428.
nitrate de, 426.
Mercure, periodure de, 421.
préparations de, 412.
protoiodure de, 418.
protonitrate de, 426.
prussiate de, 413.
Mercurii deuto-ioduretum, 421.
protobromuretum, 412.
protoioduretum, 418.
Mercurius hydrocyanicus, 413.
nitrosus calide paratus, 427.
nitrosus frigore paratus, 426.
Mercury and arsenic, hydriodate of, 429.
iodide of, 429.
and morphia, iodide of, double, 432.
bicyanide of, 413.
biniodide of, 421.
bromide of, 412.
cyanide of, 413.
deutoiodide of, 421.
deutonitrate of, 428.
dipernitrate of, 428.
hydrocyanate of, 413.
iodide of, 418.
iodide of, red, 421.
iodide of chloride of, 491.
iodoarsenite of, 429.
nitrate of, acid, 428.
nitrate of suboxide of, 426.
periodide of, 421.
preparations of, 412.
protoiodide of, 418.
proto-ioduret of, 418.
protonitrate of, 426.
prussiate of, 413.
subiodide of, 418.
supernitrate of, 428.
solution of, 428.
Mère de Seigle, 312.
Mesitalkohol, 645.
Mesitylene, bihydrate of, 645.
Mesmerism, 398.
Milchsäure, 36.
Mixture, Scudamore's, 231.
Mohnstoff, 516.
Moleplant, 334.
Monesia, 512.
Monesin, 512.
Moosbitter, 177.
Moos, carragaheen, 210.
Moos, Irländisch, 210.
Morphei acetas, 523.
Morpheum, 516.
Morphia, 516.
acetate of, 523.

Morphia and codeia, muriate of, 531.
bimeconate of, 530.
citrate of, 529.
hydriodate of, 527.
hydrochlorate of, 527.
iodhydrate of, 527.
iodide of iodhydrate of, 527.
ioduret of, 529.
muriate of, 527.
salts of, 516.
sulphate of, 528.
tartrate of, 530.
Morphiæ acetas, 523.
hydriodas, 527.
hydrochloras, 527.
Morphii murias, 527.
sulphas, 528.
Morphin, 516.
essigsaures, 523.
iodwasserstoffsaures, 527.
salzsaures, 527.
schwefelsaures, 528.
Morphina, 516.
Morphinæ acetas, 523.
bimeconas, 530.
hydrochloras, 527.
murias, 527.
sulphas, 528.
tartras, 530.
Morphine, 516.
acetate of, 523.
and zinc, double iodide of, 666.
bimeconate of, 530.
citrate of, 529.
et codéine, double muriate de, 531.
hydriodate de, 527.
hydrochlorate de, 527.
iodhydrate de, 527.
muriate of, 527.
sels de, 516.
sulphate of, 528.
tartrate of, 530.
Morphinsalze, 516.
Morphinum, 516.
Morphium, 516.
acetat, 523.
aceticum, 523.
essigsaures, 523.
hydrochlorsaures, 527.
muriaticum, 527.
salzsaures, 527.
schwefelsaures, 528.
sulphat, 528.
sulphuricum, 528.
Mort aux chiens, 223.
Moss, carageen, 210.
Ceylon, 383.
Moss, corrigeen, 210.
edible, 383.
Irish, 210.
Jaffna, 383.
marine, 383.
Mousse d'Irlande, 210.
perlée, 210.
Moxa, 531.
Moxiburium, 531.
Moxibustion, 531.
Mugwort, 108.
Murias aurico-nitricum, 127.
morphicus, 527.
zincicus, 688.
Muriate d'or, 120.
Murid, 141.
Muride, 141.
Murigene, 182.
Murin, 141.
Murine, 141.
Mustardseed oil, 559.
Mutterkorn, 312.
Nadelstich, 51.
Naphtha, 645.
phosphorata, 544.
sulphurica, 61.
vitriol, 61.
wood, 645.
Naphthalin, 720.
Naphthaline, 720.
Narcotina, 535.
muriate of, 535.
Narda celtica altera, 103.
Narkotin, 535.
Natrium-gold-chlorid, 122.
Natriumplatinchlorid, 578.
Natron phosphorsaures, 728.
Natronwasser, oxydirt salzsaures, 643.
Natrum chloratum, 643.
chloricum, 643.
chlorsaures, 643.
oxydirt oder hyperoxygenirt salzsaures, 643.
oxymuriaticum, 643.
Navelwort, 707.
Nephrine, 675.
Nephrodium filix mas, 381.
Neurogamia, 398.
Nierenfarrn, männlicher, 381.
Niesswurzstoff, 678.
Nitras ferricus, 361.
hydrargyricus, 427.
hydrargyricus acido nitrico solutus, 428.
hydrargyrosus, 426.
plumbicus, 723.

Nitre, 724.
Nitro-muriatic mixture, 187.
Nitrum saturninum, 723.
Noix vomique, 538.
  extrait alcoolique de, 538.
Nombril de Vénus, 707.
Noyer, 493.
Nussbaum, 493.
Nux vomica, 538.
  alcoholic extract of, 538.
Ochsengalle, 708.
Oelsüss, 400.
Ofenruss, 385.
Oil of bitter almonds, 81.
  cod, 545.
  codliver, 545.
  croton, 561.
  of mustard seed, 559.
Oleum æthereum florum arnicæ, 103.
  æthereum seminum sinapis, 559.
  cadinum, 721.
  crotonis, 561.
  euphorbiæ lathyridis, 334.
  jecoris aselli, 545.
  juniperi empyreumaticum, 721.
  morrhuæ, 545.
  ricini officinale, 566.
  seminis crotonis, 561.
  sinapis, 559.
  tiglii, 561.
  vitrioli dulce, 61.
  volatile seminum sinapis, 559.
Opiane, 585.
Opiumalkaloid, 516.
  lettuce, 496.
Opiumsalz, Derosne'sches, 535.
Or, chlorure d' 120.
  cyanure d', 125.
  divisé, 129.
  oxide de, 127.
  et de sodium chlorure d', 122.
  et soude, hydrochlorate d', 122.
  et soude, muriate d', 122.
  métallique, 129.
  muriate d', 122.
  nitromuriate d', 127.
  oxide d', 129.
  préparations d', 116.
  protoiodure d', 126.
Oxide d'argent, 99.
Oxidum ferricum hydratum, 364.
Oxydirtes silber, 99.
Oxydirt-salzsaures natronwasser, 643.
Oxydum argenti, 99.
Oxyhydrocarburetum ex oleo pyroxilico paratum, 255.
Panacea lapsorum, 103.
Papaverinum, 218.
Pariser blau, 345.
Passerage, 716.
Pasta seminum paulliniæ, 569.
Pâte de guarana, 569.
Paullinia, 569.
Perlmoos Irländisch, 210.
Pfefferstoff, 572.
Pferdekastanie, 410.
Pferdekeste, 410.
Phloiorrhizina, 571.
Phloridzin, 571.
Pierre d'aimant, 498.
Pigmentum indicum, 432.
Pills, Blaud's, 373.
  ferruginous, of Vallet, 372.
Piper angustifolium, 506.
  caudatum, 281.
  cubeba, 281.
  elongatum, 506.
Piperin, 281, 572.
Piperina, 572.
Pipsissewa, 179.
Piscidia erythrina, 722.
Platina, bichloride of, 577.
  muriatica, 577.
  muriatica natronata, 578.
  perchloride of, 577.
  preparations of, 575.
Platinæ chloridum, 577.
Platinchlorid, 577.
Platine, bichlorure de, 577.
  et sodium, chlorure double de, 578.
  perchlorure de, 577.
  préparations de, 575.
Platini bichloridum, 577.
  perchloridum, 577.
  præparata, 575.
Platinoxyd, salzsaures, 577.
Platinpräparate, 575.
Platinum, 575.
  bichloratum, 577.
  bichloride of, 577.
  chloride of, 577.
  perchloride of, 577.
  and sodium, double chloride of, 578.
Plocaria candida, 383.
Plomb, chlorure de, 722.
  iodure de, 578.
  nitrate de, 723.
  tannate de, 580.
Plombagine, 339.
Plumbago, 339.
Plumbi chloridum, 722.
  hydriodas, 578.

Plumbi iodhydras, 578.
iodidum, 578.
ioduretum, 578.
nitras, 723.
tannas, 580.
Plumbum iodatum, 578.
hydroiodicum, 578.
nigrum, 339.
nitricum, 723.
scytodepsicum, 580.
tannicum, 580.
Poison nut, 538.
Poivre à queue, 281.
Polypodium filix mas, 381.
Polyporus officinalis, 138.
Polystichum filix mas, 381.
Pomegranate, 402.
Potassa, arsenite of, 105.
chlorate of, 581.
hydrocyanate of, 588.
hydriodate of, 595.
ioduretted, 598.
hydrobromate of, 585.
hyperoxymuriate of, 581.
nitrate of, 724.
oxymuriate of, 581.
Potassæ bromhydras, 585.
chloras, 581.
cyanhydras, 588.
euchloras, 581.
hydriodas, 595.
hydrobromas, 585.
hydrocyanas, 588.
murias hyperoxygenatum, 581.
murias oxygenatum, 581.
nitras, 724.
Potasse, bromure de, 585.
chlorate de, 581.
hydriodate de, 595.
iodure de, 595.
nitrate de, 724.
Potassii bromidum, 585.
cyanidum, 588.
cyanuretum, 588.
hydrargyro-iodidum, 592.
iodidum, 595.
iodohydrargyras, 592.
ioduretum, 595.
oxygeno-chloruretum, 581.
proto-hydriodas, 595.
protoxidi hydriodas, 595.
Potassium, bromide of, 585.
cyanide of, 588.
cyanuret of, 588.
dihydrargyro-biniodide of, 592.
hydrargyro-iodide of, 592.
iodide of, 595.
Potassium, iodohydrargyrate of, 592.
ioduret of iodohydrargyrate of, 592.
ioduret of, 595.
protoxide of, chlorate of, 581.
Potio picea, 89.
Poudre de blanchement, 153.
de Tennant, 153.
Powder, bleaching, Tennant's, 153.
Preta, raiz, 147.
Principium adstringens, 33.
scytodephicum, 38.
Prussiate de potasse et de fer, 345.
Pseudoangusturinum, 145.
Ptarmica montana, 103.
Pulvis ad fumigationes muriaticas, 182.
Punica granatum, 402.
Purgirkörner-Euphorbie, 334.
Pyrola umbellata, 179.
Pyrola corymbosa, 179.
Pyrole en ombelle, 179.
Quecksilber, blausaures, 413.
bromid, 412.
bromür, 412.
cyanid, 413.
deuto-bromür, 412.
deuto-iodür, 421.
deuto-iodür des, 421.
iodid, 418, 421.
iodid, gelbes, 418.
iodidul, 418.
iodür, 418.
oxyd, blausaures, 413.
oxydul, salpetersaures, 426.
präparate, 412.
proto-iodür des, 418.
proto-bromüre des, 412.
Quecksilberiodidkalium, 592.
salpetersaures, kaltbereitetes, 426.
heissbereitetes, 427.
Quillaia, 512.
Quina, 603, see Quiniæ.
acetica, 605.
citrica, 607.
Quinia, 603, (for its salts see Quinine.)
Quiniæ acetas, 605.
arsenias, 606.
arsenis, 607.
citras, 607.
et cinchoniæ tannas, 635.
ferrocyanas, 608.
hydriodas, 610.
iodidum, 610.
lactas, 611.
murias, 612.
nitras, 613.

Quiniæ phosphas, 613.
sulphas, 614.
impurus, 636.
valerianas, 633.
Quinin, 603.
Quinina, see Quinine.
Quinine, 603.
acetate of, 605.
amorphous, 637.
arseniate of, 606.
arsenite of, 607.
brute, 604.
citrate of, 607.
disulphate of, 614.
extract of, 636.
ferrocyanuret of, 608.
hydriodate of, 610.
iodide of, 610.
iodide of iodhydrate of, 611.
lactate of, 611.
muriate of, 612.
nitrate of, 613.
phosphate of, 613.
sulphate of, 614.
valerianate of, 633.
and cinchonine, tannate of, 635.
and iron, hydriodate of, 611.
Quininum, 603.
Quiniodine, 636.
Quinium, 603.
Raiz crusadinha, 147.
preta, 147.
Reissblei, 339.
Resina chinæ præparata, 636.
Rindsgalle, 708.
Ringelblume, 150.
Rochenleberthran, 546.
Rosscastanien, 410.
Rosskeste, 410.
Russ, 385.
Russkali, 389.
Rye, corned, 312.
spurred, 312.
Sabadillina, 678.
Saccharum mannæ, 503.
Safran bätard, 212.
de mars apéritif, 376.
des prés, 223.
wilder, 223.
Saffron, meadow, 223.
Saint Christophe, herbe, 212.
Sal essentiale corticis Peruviani, 603.
Salicina, 637.
Salicinum, 637.
Salpetersäure, 701.
Salt of Derosne, 531.
Salzsäure, dephlogistisirte oder oxydirte, 189.
Salzäure übersaure, 189.
Salzsaures silberammonium, 95.
Sanicula Marilandica, 726.
Sanicle, 726.
Sanicle, Maryland, 726.
Sapo domesticus mollis, 641.
ex oleo et potassâ confectus, 641.
elainicus, 641.
kalicus, 641.
mollis, 641.
niger, 641.
viridis, 641.
Satzmehliodür, 490.
Sauerdornbitter, 136.
Savon à base de potasse, 641.
mou, 641.
noir, 641.
Scheel'sches süss, 400.
Schmierseife, 641.
grüne, 641.
Schwanzpfeffer, 281.
Schwarzkorn, 312.
Schwefeläther, 61.
Schwefelalcohol, 668.
Schwefeliodür, 673.
Schwefelkohlenstoff, 668.
Schwererde, iodwasserstoffsaure, 132.
Schwindelkörner, 281.
Scorodite, 336.
Scudamore's mixture, 231.
Secale clavatum, 312.
cornutum, 312.
luxurians, 312.
Secalis cerealis, semina monstrosa, 312.
mater, 312.
Seemoos, Irländisch, 210.
geperltes, 210.
Seetang, 210.
Seife, kali, 641.
schwarz, 641.
Seigle cornu ou corrompu, 212.
à éperon, 312.
ivré, 312.
noir, 312.
ergoté, 312.
faux, 312.
Sel de Derosne, 531.
de Gregory, 531.
essentiel d'opium, 531.
Senföl ätherisches, 559.
Serpentaria, cimicifuga, 212.
Serpentariæ Braziliensis radix, 147.
Sidhee, 166.
Silberammonium, salzsaures, 95.
chlorür, 94.
iodür, 98.

Silberammoniumoxyd, 99.
oxyd, cyansaures, 97.
oxydirtes, 99.
präparate, 92.
salmiak, 95.
salzsaures, 94.
zertheiltes, 101.
Silver, ammonio-chloride of, 95.
chloride of, 94.
chloruret of, 94.
cyanide of, 97.
cyanuret of, 97.
iodide of, 98.
ioduret of, 98.
metallic, 101.
muriate of, 94.
and ammonia, chloride of, 95.
chloruret of, 95.
preparations of, 92.
Sinapis oleum, 559.
Sipeerine, 133.
Snake root, black, 212, 726.
Soap, soft, 641.
Soda, arseniate of, 105.
chlorinata, 643.
chloruret of, 643.
chlorite of, 643.
hypochlorite of, 643.
hyposulphite of, 727.
phosphate of, 728.
Sodæ chloridum, 643.
chloruretum, 643.
hyposulphis, 727.
oxymurias, 643.
phosphas, 728.
Sodii auri-terchloridum, 122.
chloroplatinas, 578.
Sodium, auro-terchloride of, 122.
chloroplatinate of, 578.
chlorure d'oxide de, 643.
Soldier's weed, 506.
Solutio alexiteria oxygenata, 189.
chlorinii, 189.
ferri nitratis, 361.
Solution of chlorine, 189.
Coindet's, 597.
de Pearson, 105.
Donovan's, 429.
Fowler's, 105.
Lugol's, 489, 598.
of nitrate of iron, 361.
of persesquinitrate of iron, 361.
Soot, 385.
Souci, 150.
ordinaire, 150.
Soude, chlorure de, 643.
hyposulfite de, 727.
Soude, phosphate de, 728.
sulfite sulfuré de, 727.
Soufre carburé, 668.
ioduré, 673.
Species pro vaporibus superoxydi muriatici, 182.
Sphærococcus crispus, 210.
lichenoides, 383.
Spicanard, 729.
Spiegelruss, 385.
Spinnblume, 223.
Spirit, pyro-acetic, 645.
Spiritus pyro-aceticus, 645.
salis marini dephlogisticatus, 182.
Sponsa solis, 150.
Springkraut, kleines, 334.
Spur, the, 312.
Spurge, caper, 334.
garden, 334.
Starch, iodide of, 490.
Starkmehliodür, 490.
Steinkohlenkali, 82.
Stephensia elongata, 506.
Stinkstoff, 141.
Stockfischleberthran, 545.
Stockung des Blutes in der Gefässen, 713.
Strychna, 649.
Strychnia, 649.
acetate of, 664.
hydriodate of, 665.
iodate of, 665.
iodide of iodhydrate of, 666.
nitrate of, 667.
sulphate of, 668.
Strychnia and zink, double iodide of, 666.
Strychnin, 645.
acetat, 664.
essigsaures, 664.
iodsaures, 665.
iodwasserstoffsaures, 665.
nitrat, 667.
salpetersaures, 667.
schwefelsaures, 668.
sulphat, 668.
Strychnine, see Strychnia.
Strychninum, 645.
aceticum, 664.
iodicum, 665.
nitricum, 667.
sulphuricum, 668.
Strychnium, 645.
Subjee, 166.
Succus limonis, 728.
Suffitus chlorini, 182.
oxymuriaticus, 182.

Sugar of manna, 503.
Suie, 385.
Sulfure de carbon, 668.
Sulphas cadmicus, 705.
manganosus, 718.
morphicus, 528.
quinicus, 614.
Sulphur, iodide of, 673.
Sulphuret of carbon, 668.
Sulphuretum carbonii, 668.
Sulphuris carburetum, 668.
iodidum, 673.
ioduretum, 673.
Sumbuli radix, 729.
Sumbul root, 729.
Sumbulwurzel, 729.
Superchloridum formylicum, 196.
Suppository, galvanic, 399.
Swertia chirayita, 399.
Tabac de Montagne, 103.
des Savoyards, 103.
des Vosges, 103.
Tang, krauser, 210.
Tannas chinii seu cinchonicus seu quinicus, 635.
plumbi, 580.
Tannic acid, 38.
Tannicum, 38.
Tannin, 38.
Tanninum, 38.
Tar water, 89.
Tellurismus, 398.
Terra aluminis, 101.
aluminosa pura, 101.
argillacea pura, 101.
bolaris, 101.
sigillata, 101.
Thé de seigle noirci des sages-femmes Américaines, 312.
Theerwasser, 89.
Thierkohle, 173.
Thonerde, gereinigte, 101.
reine, 101.
Thonerdensalze, 74.
Thridace, 496.
Tithymalus latifolius, 334.
Todtenblume, 150.
Tue-chien, 223.
Ulva crispa, 210.
Urea, 675.
nitrica, 677.
Ureæ nitras, 677.
Urée, 675.
nitrate de, 677.
Uricum, 675.
Ussacu, 715.
Ustilago, 312.
Vallet's ferruginous pills, 372.
Vauquelin, 645.
Veratria, 678.
sulphate of, 687.
Veratrin, 678.
Veratrina, 678.
Veratrium, 678.
Verrucaria, 150.
Vieillotte, 223.
Vinaigre de bois, 13.
Violine, 309.
Volta'sche Electricität, 392.
Voltaism, 392.
Vomicina, 145.
Vomic nut, 538.
Wachholder-oel, brenzliches, 721.
Wallnussbaum, 493.
Walnut tree, 493.
Wälschennuss, 493.
Wasser, Binellisches, 82.
Brocchierisches, 84.
oxydirt, salzsaures, 189.
Wasserstoffblausäure, 23.
Water, Binelli, 82.
of bitter almonds, 80.
Brocchieri, 84.
tar, 89.
Weed, soldier's, 506.
Weidenbitter, 637.
Weidenstoff, 637.
Weisensafran, 223.
Winter green, 179.
Wintergrün, 179.
holdenblüthigen, 179.
Wismuth, valeriansaures, 704.
Wohlverlei, 103.
blumenöl, 104.
Wohlverleiöl, 104.
Wolfstrapp, wolliger, 130.
Woodsoot, 385.
Yerba del Soldada, 506.
Zeitlose, 223.
Zinc and morphia, double iodide of, 698.
and strychnia, double iodide of, 666.
butter of, 688.
chloride of, 688.
cyanuret of, 694.
ferrocyanuret of, 695.
ferrohydrocyanate of, 695.
hydrochlorate of, 688.
hydrocyanate of, 694.
iodide of, 698.
muriate of, 688.
prussiate of, 694.
Zinci butyrum, 688.

Zinci chloridum, 688.
chloruretum, 688.
cyanhydras, 694.
cyanidum, 694.
cyanuretum, 694.
ferrocyanuretum, 695.
ferrohydrocyanas, 695.
iodidum, 698.
ioduretum, 698.
valerianas, 699.
Zincum borussicum, 694.
chloratum, 688.
cyanogenatum, 694.
ferrohydrocyanicum, 695.
hydrocyanicum, 694.
iodatum, 698.
muriaticum oxydatum, 688.
salitum, 688.
Zincum valerianicum, 698.
zooticum, 699.
Zink, baldriansaures, 699.
Zinkbutter, 688.
Zinkchlorid, 688.
Zinkchlorür, 688.
Zink, chlorwasserstoffsaures, 688.
Zinkcyanür, 695.
Zinkeisenblausaures, 695.
Zinkeisencyanür, 694.
Zinkiodür, 698.
Zinkoxyd, eisenoxydul, blausaures, 695.
salzsaures, 688.
valeriansaures, 699.
Zinkoxydul, blausaures, 695.
Zink, salzsaures, 688.
Zoomagnetismus, 398.

NEW REMEDIES.

I. AC″IDUM ACE′TICUM EMPYREUMAT′ICUM.

Synonymes. Acidum pyro-aceticum seu Ligni pyro-oleosum seu pyroligneosum seu pyroxylicum, Acetum ligneum seu pyrolignosum seu lignorum empyreumaticum, Pyroligneous, and Pyrolignic acid.

French. Acide pyro-acétique, A. pyrolignique, A. pyroligneux, Vinaigre de bois.

German. Brenzliche oder brandige Holzsäure; Holzsäure; Holzessig; Holzessigsäure.

Pyroligneous acid, although brought much into notice—revived as it were—in recent times, is by no means the product of those times exclusively. The cedria, with which the Egyptians embalmed the bodies of the dead, it is presumed, was identical with it. Pliny recommends cedria, or the oil of tar, got from the cedar, in toothach,[1] and Galen unites with him.[2] The virtues of pyroligneous acid are often also referred to by Boerhaave.[3]

METHOD OF PREPARING.

Pyroligneous acid is prepared in chemical laboratories by the dry distillation of wood, especially of hard wood, which is placed in an iron retort heated to redness. First of all, there passes over a light brown or greenish fluid, which contains some empyreumatic oil; to this succeeds the pyroligneous acid, which is formed during distillation. If the distillation be continued, more empyreumatic oil passes over, and lastly tar.

The chief constituent of pyroligneous acid is vinegar, which can be deprived of its empyreumatic constituents by rectification with fine porous animal charcoal. Besides vinegar, it contains empyreumatic oil (*pyrelain;*) empyreumatic resin (*pyrretin,*) a peculiar matter containing nitrogen, and similar to an extract (empyreumatic extract,) and spirit of tar (*spiritus pyrolignicus.*) Reichenbach discovered in it the new substance, creasote,[4] which seems to be the most important ingredient,—its medicinal efficacy appearing to be dependent upon that substance.

Impure pyroligneous acid is of a brownish colour, and of an acid smoky smell and taste. This is the preparation which is gene-

[1] Hist. Nat. xxxiv. 11.

[2] De Simpl. Medic. Facult. lib. vii. See Cormack on Creasote, p. 59. Edinburgh, 1836.

[3] Riecke, Die neuern Arzneimittel. u. s. w. S. 6, Stuttgart, 1837.

[4] See the article Creasote.

rally used externally; but, by chemical means, the acid may be purified so as to furnish the *acidum aceticum empyreumaticum rectificatum*. This differs from impure pyroligneous acid in containing less empyreumatic resin and extract, and creasote. The London College, again, prepare from it a stronger acid,—the *acidum aceticum fortius*,—which is extremely volatile and pungent, and is used as a revellent.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments instituted on animals, it would appear, that the administration of pyroligneous acid in large doses occasions vomiting of a considerable quantity of frothy fluid, having a strong odour of the acid; tremors of the limbs; convulsions; tetanus; protrusion of the eyes; insensibility; paralysis of the limbs; dyspnœa; croupy cough; hoarseness, &c. The death of the animal supervenes with symptoms of suffocation, and the fatal termination is often rapidly induced. Inspection after death exhibits manifest venous congestion in the brain, spinal marrow, lungs, liver, and spleen, and in the right side of the heart,—with, at times, inflammation of the stomach. According to Berres, it occasions marked narcotic effects. In by no means considerable doses, he found it to cause violent pain in the stomach and bowels, nausea and vomiting, general weakness, heaviness, vertigo, convulsions, and even death, without exhibiting any decided effect upon the vascular system. In smaller doses, it is said to produce a sensation of burning in the stomach, and after a time to quicken the pulse, and augment the cutaneous and renal depurations. Others —and the best observers, we think—deny it any narcotic properties.[1]

As an antiseptic, its efficacy is undoubted, and this has been long known. Creasote is, doubtless, a main agent in producing this result; and wherever the administration of creasote is indicated, the use of pyroligneous acid may be proper.

EFFECTS ON THE ECONOMY IN DISEASE.

Possessed of the properties described above, pyroligneous acid was at once suggested in cases of *gangrene* and *sphacelus*, in which it was successfully used, as well as in *cachectic conditions* brought on by the misuse of mercury, and in *herpetic*, *flabby*, *fungous*, and *sloughing ulcers*, in *porrigo*, and in *toothach* produced by caries—the acid being dropped upon cotton and applied to the hollow tooth. In most of these cases, it was generally exhibited both internally and externally. Numerous experiments have been made with it in various affections by different observers; but its use has been more especially extolled in cases of gangrene, in which it corrects fœtor, and promotes the separation of the dead

[1] Richter's Specielle Therapie, S. 255. Berlin, 1828.

parts.[1] The physicians of the Berlin Charité experimented with it in cases of *sloughing gangrenous sores*, with such success, that they pronounced it an antiseptic of the highest order.[2] Besides the cases mentioned, it has been advised, mixed with white of egg, in *excoriated nipples*,[3] in *cancerous* and *scrofulous affections*, in *cancrum oris*, by Berres, Klaatsch, Heim and Romberg; in *mercurial* salivation by Schneider; in *caries of the bones*. and as a gargle in *scarlet fever* by Barth. It has, moreover, been recommended by Buchanan[4] in *deafness* caused by deficient secretion of the cerumen of the ear, and in *discharges of an offensive character from the meatus auditorius*, as well as from other outlets; in *chronic inflammation of the tarsal edges of the eyelids;* in *scabies;* in *favus* by Berres and Wigan; in *toothach* by Berres. In *gastromalacia* it has been recommended by Pitschaft[5] and Teufel;[6] in *phthisis* by Harless, and in *dropsy*, *diarrhœa*, *putrid nervous fevers*, &c., by Ampach;[7] and in *scorbutus* by Berres,[8] yet, as was before remarked, it is rarely employed internally: indeed both externally and internally, it has been greatly supplanted by creasote.

MODE OF ADMINISTRATION.

The inequality in the strength of the preparation renders it difficult to fix upon any precise dose. Of the impure pyroligneous acid, Sachs administered from five to thirty drops, three or four times a day, in simple or aromatic water.

Externally, it is applied both in a pure and dilute state; in the former case to ulcers, by means of a pencil, several times in the day. It is generally diluted with simple water: but in cases of cancrum oris, sugared water has commonly formed the diluent. It is also applied at times in the way of *cataplasm*. As a *wash* in porrigo, and as an *injection*, it may be diluted with six or eight parts of water; as a *collyrium*, the proportion may be one part of the acid to twelve of water, and it may be employed, of about the same strength, as a *gargle*.

Heim has recommended the following application in *cancrum oris*.

[1] T. Y. Simons, in American Journal of the Medical Sciences, vol. v.
[2] Riecke, Op. cit. S. 9.
[3] Bursharat, in Gazette Médicale, cited in Amer. Journ. of the Medical Sciences, Feb. 1833, p. 503.
[4] Illustrations of Acoustic Surgery, Lond. 1825.
[5] Med. Chirurg. Zeitung, No. 7, 1825.
[6] Annal. für die gesammte Helkund. unter der Redact. d. Mitglied. der Badensch. Sanitatsk. 2ter Jahrg. 1825.
[7] Rust's Magazin, B. xvi. H. 2, S. 353, and Richter, Op. cit. B. x. S. 257, Berlin, 1828.
[8] Aschenbrenner, Die neueren Arzneimittel und Arzneibereitungsformen u. s. w. S. 7, Erlargen, 1848.

Mel acidi acetici empyreumatici.

Honey of pyroligneous acid.

R. Acid. acet. empyreum. crud. f ʒiss.
Mellis rosæ ʒj. M.

To be applied by means of a pencil.

Buchanan advises the following form of injection in cases of *purulent discharges from the meatus auditorius.*

Injectio acidi acetici empyreumatici.

Injection of pyroligneous acid.

R. Acid. acetic. empyreum. f ʒij.
Aquæ destillatæ f ℥vj. M.

Fiat injectio bis die utenda.

The following drops he recommends in cases where *the cerumen is deficient* in quantity.

Guttæ acidi acetici empyreumatici.

Drops of pyroligneous acid.

R. Acidi acet. empyreum. crud.
Olei. terebinth. rectif.
Sp. ætheris sulphur. comp. aa. partes æquales. M.

Two drops of this compound are to be dropped every night into the meatus auditorius.

Cataplasma acidi acetici empyreumatici.

Cataplasm of pyroligneous acid.

R. Furfur. ℔ss.
Lin. pulv. ʒj. M. bene et adde
Acid. acetic. empyreum. crud. q. s. ut fiat cataplasma.

To be applied to *foul ulcers.*

Linimentum acidi acetici empyreumatici.

Liniment of pyroligneous acid.

R. Acid. acet. empyreum. ʒss.
Myroxyl. ʒij.
Vitell. ovi q. s. ut fiat linimentum.

To be applied on lint three times a day to *sloughs* and *ulcers.*

Collutorium acidi acetici empyreumatici.

Mouth-wash of pyroligneous acid.

R. Acid. acet. empyreum. rectif. f ℥ss.
Aquæ cinnamomi f ℥iv.
Syrup. mori f ℥ij. M.

Phöbus advises this as a wash for the mouth in cases of *cancrum oris.* It should be kept in a glass vessel covered with black paper to prevent decomposition.

II. ACIDUM BENZOICUM.

SYNONYMES. Acidum Benzoicum per sublimationem, Flores Benzoës seu Benzoini, Benzoic Acid, Flowers of Benjamin.
French. Acide Benzoique.
German. Benzoësäure.

Benzoic acid exists in the various balsamic substances, as benzoin, storax, tolu balsam, &c.

METHOD OF PREPARING.

In pharmacy it is obtained from benzoin by sublimation. The following process is given in the last edition of the Pharmacopœia of the United States (1842.) Take of *benzoin*, in coarse powder, a pound. Put the benzoin, previously thoroughly mixed with an equal weight of fine sand, into a suitable vessel, and, by means of a sand bath, with a gradually increasing heat, sublime until vapours cease to rise. Deprive the sublimed matter of oil, by pressure on bibulous paper, and again sublime.

A superior method, according to Messrs. Ballard and Garrod,[1] is to boil the *benzoin* in powder with *hydrate of lime*, so as to form a benzoate of lime, which is dissolved in the water, while the resin remains combined with the lime in the form of an insoluble compound. *Muriatic acid* being added to the filtered liquid, the benzoic acid is set free, and crystallizes on cooling.

Benzoic acid, obtained by the process of the Pharmacopœia of the United States, is in white feathery crystals, of an agreeable odour, fusible, wholly volatilizable if cautiously heated, and sparingly soluble in cold water, more so in boiling water, which deposits it on cooling; very soluble in alcohol, and readily dissolved by solution of potassa, from which it is precipitated by chlorohydric acid.

EFFECTS ON THE ECONOMY.

In another work[2] the author has remarked:—"The therapeutical action of benzoic acid is doubtless excitant, and it has been imagined by Dr. Pereira[3] and others, that its influence is principally directed to the mucous surfaces, and especially to the aërian membrane." The author has no reason for believing in this affinity, and such would appear to be the general feeling of the profession, as it is now scarcely used except in one or two preparations, in which it seems to be retained only from old prepossessions and associations. Of late years, however, it has been introduced for a special purpose, and on this account is noticed here. In a paper communicated by Mr. A. Ure to the Medico-chirurgical Society, January 7th, 1841,[4] he stated, that when a certain portion

[1] Elements of Mat. Med. and Therap. p. 275, Lond. 1845.
[2] General Therapeutics and Materia Medica, 4th edit. 1, 236. Philad. 1850.
[3] Elements of Mat. Med. and Therap. 2d Amer. edit. 1, 373. Phila. 1846.
[4] Provincial Medical and Surgical Journal, July 17, 1841.

of benzoic acid or of a soluble benzoic salt is introduced into the stomach, the urine, in the course of a couple of hours, is found, upon adding a portion of muriatic acid, to yield a copious precipitate of beautiful rose pink acicular crystals of hippuric acid. In pursuing his investigations farther, he ascertained, that no trace whatever of uric acid or of any of its salts could be discovered in the urine in question. It had been wholly superseded by the hippuric; and as the salts, which this acid forms with the ordinary bases occurring in the animal fluids, as soda, ammonia and potassa, are all of easy solubility, Mr. Ure inferred, that in benzoic acid we have an agent of great value in the *uric acid diathesis;* and he affirmed, that "the application of the above principle had proved of material benefit in the treatment of certain unhealthy conditions of the urine occurring in subjects of a *calculous* or *gouty diathesis;* since it enabled the practitioner to obviate entirely the various depositions resulting from *excess of uric acid*, the fruitful source of that most distressing malady, stone in the bladder; as also to control and prevent the formation of the so called *tophaceous concretions* or *chalkstones*, which occasion so much inconvenience, deformity and pain to individuals labouring under gout."

The statement of Mr. Ure attracted the attention of chemists, whose observations did not however confirm the inference, that the hippuric acid was formed at the expense of the uric acid in the urine,[1] although they established, that the benzoic acid was converted into the hippuric.[2] Neither, therefore, in the uric acid diathesis, nor in cases of the formation of gouty or tophaceous deposits, the chief constituent of which is generally urate of soda, can the administration of benzoic acid be of service, and its inefficiency in these diseases is now admitted;[3] but from its power of causing increased acidity of the urine, it has been considered to slightly stimulate the mucous membrane of the urinary organs, and has been found useful in *catarrh of the bladder*, and in cases where there exists *a secretion of granular mucus mixed with phosphates.*[4]

The suggestions of Mr. Ure, in regard to the action of benzoic acid on the urates, induced Dr. Walker of Huddersfield,[5] to administer it in *chronic dysuria* incidental chiefly to persons in the decline of life, or in what he terms *dysuria senilis*,—an affection, which is, of course, dependent upon various pathological conditions,—and he asserts, that he was disposed to augur favourably of its utility. "In some instances," he says, "we may account for the benefit resulting from its use by its chemical action on the

[1] Keller, in appendix to Liebig's Animal Chemistry, p. 315, Cambridge, 1842.

[2] Garrod, Lond. Edinb. and Dubl. Phil. Mag. June, 1842, Lond. Lancet, vol. 2, 1844, p. 239, and Profs. Booth and Boyé, Transactions of the Amer. Philos. Soc., vol. ix. pt. 2, p. 185. Phila. 1845.

[3] Ballard and Garrod, op. cit. p. 408, Lond. 1845.

[4] Ballard and Garrod, p. 409, and Mr. Ure, Provincial Med. and Sur. Journ. Feb. 11, 1843, and Lond. Lancet, Nov. 16, 1844.

[5] Ibid. Feb. 26, 1842.

urates, which if in excess may add to the acrimony of the urine, and thus prove a source of irritation to the mucous membrane of the bladder. But it is often of service where the gravel in the urine is inconsiderable, and where the irritation and pain would seem to have arisen from some other cause." Dr. Walker, however, used it in association with copaiba; and his remarks induced Mr. Soden[1] to employ the combination in some urinary affections, accompanied with *vesical irritation* and *increased secretion from the mucous membrane*. The most remarkable result appeared to Mr. Soden to be its decided efficacy in diminishing, and in some instances of completely suppressing, the muco-purulent deposition in the urine, which is so prominent a symptom in most cases of affection of the bladder. He properly remarks, however, that a doubt may be very fairly entertained, whether this effect be attributable to the benzoic acid or to the copaiba, or to their combination; and in the doubt Mr. Ure deduces no positive inference in regard to the precise agency of the benzoic acid.[2]

It may be concluded, then, that benzoic acid has been introduced as a remedy in *lithuria* on erroneous chemical deductions: and hence that the favourable results recorded have been fallacious, or depending on other causes.

Dr. Seymour[3] states, that he has frequently used the BENZOATE OF AMMONIA in *gout*, in cases in which the small joints were red and swollen, or where fluid was deposited in the joint of the great toe; and also in cases where the urate of soda existed in the joints of the fingers; and that it was decidedly useful. He thinks, that early depositions were arrested, and large depositions diminished, under its use. He esteems it a good diuretic, and especially adapted for those cases of *dropsy*, in which an irritable stomach renders the employment of ordinary diuretics impracticable. He has also seen the albumen in renal dropsy diminish under its use.

MODE OF ADMINISTRATION.

The dose of benzoic acid may be from five grains to half a drachm.

Mistura Acidi Benzoici et Copaibæ.
Mixture of Benzoic acid and Copaiba.

R. Acid. Benzoic. ʒj.
Copaib. f ℥ss.
Vitell. ovi q. s.
Aq. Camphor. f ℥vij. M.

Dose. Two table-spoonfuls three times a day.

[1] Ibid. July 29, 1842. [2] Ibid. Feb. 11, 1843.
[3] Thoughts on the Nature and Treatment of several severe Diseases of the Human Body, vol. i. p. 123, Lond. 1847.

ACIDUM GAL'LICUM.

SYNONYMES. Gallic acid.
French. Acide Gallique.
German. Gallussäure.

Gallic acid is by no means so abundant as tannic acid. A solution of the latter in water, exposed to the air, gradually absorbs oxygen, and deposits crystals of gallic acid, formed by the destruction of tannic acid.

METHOD OF PREPARING.

A strong extract of *gall-nuts* in cold water may be precipitated in the cold by *sulphuric acid:* the thick mass must be mixed with *dilute sulphuric acid;* be expressed whilst still humid, and be introduced, in this state, into a mixture of *sulphuric acid* with two parts of *water* at the boiling temperature. The liquid is boiled for some minutes, and then allowed to cool. Crystals of gallic acid are deposited, which may be purified by crystallizing again from water;—converting the new product—which is still coloured—by means of *acetate of lead*—into an insoluble gallate of lead, which is washed, then diffused through water, and decomposed by a stream of *sulphuretted hydrogen gas.* The sulphuret of lead, thus formed, assists in carrying down the colouring matter.[1]

It may also be produced by adding *sulphuric acid* to a solution of *tannic acid*, which causes a precipitation of the tannic acid in combination with the sulphuric: the precipitate is dissolved in *dilute sulphuric acid* by the aid of heat, and the solution is boiled for a few minutes; the tannic acid is all decomposed; and, on cooling, crystals of gallic acid, coloured, are obtained.[2]

Gallic acid is in thin silky needles. It requires one hundred parts of cold water, and three of hot water, to dissolve it. It is very soluble in alcohol, and slightly so in ether. The solution in water has an acid and astringent taste, and is gradually decomposed by keeping.

EFFECTS ON THE ECONOMY.

Gallic acid has long been esteemed a valuable astringent; yet doubts appear to have been entertained in regard to its being possessed of such property; and until its use was revived of late it had fallen into disrepute. Sir Benjamin Brodie, according to Dr. A. T. Thomson,[3] gave a patient, who had a frightful hemorrhage from the prostate gland, and in whose case all other remedies had

[1] Graham's Elements of Chemistry, American edit., p. 637, Phila. 1843.
[2] Ballard and Garrod, Elements of Materia Medica and Therapeutics, p. 415, London, 1845.
[3] Elements of Mat. Med. and Therap. 3d edit., and Watson, in Lond. Med. Gaz. July 8, 1842, p. 547, or in his Lectures on the Principles and Practice of Physic, Amer. edit. p. 921, Phila. 1845.

failed, a dose of "Ruspini's styptic," and repeated the dose twice in the course of twelve hours. About half an hour after the first dose was taken, the bleeding ceased, and it never recurred. This styptic is said to consist of gallic acid, a small quantity of sulphate of zinc, and opium, dissolved in a mixture of alcohol and rose water; but as the quantity of sulphate of zinc and of opium appears to be too small to influence the medicine, a simple solution of gallic acid in diluted alcohol, it has been conceived, may answer all the purposes of the expensive nostrum. Hence gallic acid has been used in cases in which the styptic has been found efficacious.

In a paper read before the medico-chirurgical society of Edinburgh, Professor Simpson[1] stated, that in the previous year he had employed gallic acid in *menorrhagia* with the most successful results. Some of the cases, which had yielded under its use, were of old standing, and of an aggravated description. He gave it during the interval, as well as during the discharge; and he was first induced to prescribe it from finding that a case of very obstinate menorrhagia got well under the use of Ruspini's styptic, after many other remedies had failed. Professor Simpson suggests, whether the anti-hemorrhagic properties of some of our common astringent drugs may not depend upon the gallic acid, as much as, or more than, upon the tannic acid which they contain, or upon the tannic acid becoming converted into gallic acid within the body.

Dr. Stevenson[2] has published several cases to show the value of this acid in *uterine hemorrhage* and *hæmaturia;* and Mr. James S. Hughes[3] has recorded a case of profuse *hæmaturia*, the result of injury on the lumbar region, which was treated successfully by it in the form of pill with extract of gentian—two grains and a half of the acid to each pill,—one of these being given at intervals of three hours; and Homburger[4] administered it successfully in *hæmaturia renalis;* in *bloody diarrhœa* accompanying the morbus maculosus; and in the *hæmoptysis* of phthisis. Dr. Christison[5] has seen several cases of *menorrhagia* recover promptly under its use. He has likewise seen *hæmaturia* repeatedly yield to it, and in two instances of *hæmoptysis* the hemorrhage rapidly ceased after the third dose of six grains given every hour. Messrs. Ballard and Garrod[6] declare it to be one of the most powerful astringents that chemical art has derived from the vegetable kingdom; and that a tolerably extensive experience by them of its use

[1] Lond. and Edinb. Monthly Journal of Med. Science, July, 1843, p. 661.
[2] Edinb. Med. and Surg. Journal, July, 1843.
[3] Dublin Quarterly Journal of Med. Science, cited in Med. Examiner, July, 1847, p. 447.
[4] Canstatt and Eisanmann's Jahresbericht über die Fortschritte in der Heilkunde im Jahre, 1848, S. 149.
[5] Dispensatory, American edit. by R. E. Griffith, p. 967. Philad. 1848.
[6] Op. cit. p. 415. Lond. 1845.

enables them to declare it to be an invaluable remedy in most forms of *passive hemorrhages* and *fluxes*. The chief of the cases in which they have employed it, and where they have found it of the greatest service, are *menorrhagia* and *leucorrhœa*, as well as for checking the distressing *night-sweats* of phthisis. In the first two of these especially, no astringent that they had employed would bear a comparison with this, either for the rapidity with which the cure was effected, or the permanency of the result. Their eulogy, however, of its action in the night-sweats of phthisis is calculated to throw some doubts on the accuracy of their experience in other cases. No medicine can be expected to exert much efficacy on them, any more than on the hectic, inasmuch as they are mere morbid expressions of the condition of the lungs and general system. Messrs. Ballard and Garrod state, that if the use of the acid be continued beyond two or three days, it manifests some constipating tendency, whilst Professor Simpson affirms that it has the advantage over most other anti-hemorrhagic medicines, that it has no constipating effect. The observations of Messrs. Ballard and Garrod are probably the most accurate. They affirm, also, that the *excessive expectorations* of chronic bronchitis and phthisis are much influenced by its administration. In *leucorrhœa* they have found it highly useful as an injection, and Mr. Sampson[1] gave it with good effect in *gonorrhœa* in the quantity of a drachm in the twenty-four hours, taken in twelve grain doses; and he places great confidence in its use in cases of *albuminuria*. Dr. Christison,[2] too, had his attention turned to its apparent power of arresting the excretion of albumen in the urine in *Bright's Disease of the Kidney*, and in a few instances it appeared to him to have that effect.

MODE OF ADMINISTRATION.

Gallic acid may be given in doses of from two grains to five or more, in the form of pill, repeated every two or three hours.

Pilulæ acidi gallici.
Pills of gallic acid.

R. Acid. gallic. gr. ij.—v.
Confect. rosæ q. s. ut fiat pilula.

Injectio acidi gallici.
Injection of gallic acid.

R. Acid. gallic. ℈j. ad ʒj.
Aquæ Oij. M.

[1] London Lancet, Dec. 1st, 1849. [2] Op. cit.

IV. AC"IDUM HYDROCYAN'ICUM.

SYNONYMES. Acidum Prussicum seu Borussicum seu Zooticum seu Zootinicum, Hydrocyanic, Prussic, Cyanohydric or Cyanhydric Acid.
French. Acide Hydrocyanique, Acide Prussique.
German. Blausäure, Wasserstoff blausäure, Hydrocyansäure, Cyanwasserstoffsäure.

This acid can scarcely be looked upon as new; yet it is only in recent times that its application to pathological conditions has been well appreciated. It was discovered by Scheele in 1780; but its preparation in a state of purity, and its exact chemical constitution, were not understood until Gay-Lussac published the results of his investigations on the subject in the year 1815.[1]

METHOD OF PREPARING.

The three chief modes for preparing hydrocyanic acid at one time received into the pharmacopœias were those of Scheele, Gay-Lussac, and Vauquelin; the *first* of which was adopted by the framers of the United States Pharmacopœia of 1820, and by those of Belgium, Paris, and Ferrara; the *second*, by the pharmacopœias of Paris and Ferrara; and the *third* by those of Belgium, Paris, and the United States. (Edition of 1830.)

1. **Scheele's Method.**—Take of *Prussian blue*, 128 parts; *Red oxide of mercury*, 64 parts; *Distilled water*, 105 parts. Boil for a quarter of an hour, constantly shaking; strain, filter, and wash the residuum with *Boiling water*, 128 parts. Mix the two liquids together; introduce them into a flask, and add *Porphyrized iron filings*, 96 parts; *Sulphuric acid* (66°,) 24 parts: diluted with *Distilled water*, 24 parts. Shake the mixture, and keep the flask for an hour in cold water; pour the decanted liquor into a tubulated retort placed in a sand bath, to the neck of which is attached an adapter that passes into a tubulated receiver, whence a curved tube issues that passes into a flask filled with water; lute the apparatus; cover the receiver with wet rags; raise the heat until the liquid boils, and until there have passed into the receiver 192 parts. Add to this liquid, 8 parts of *Carbonate of lime*. Distil again; and draw off 128 parts, which must be kept in a bottle covered with black paper.

The process of Scheele always affords an acid mixed with a variable quantity of water.

2. **Gay-Lussac's Method.**—Take *Cyanuret of mercury*, at pleasure. Introduce it into a tubulated retort, the neck of which is furnished with a wide tube of glass filled with broken marble and chloride of calcium, which tube communicates, through a smaller one, with a bell glass surrounded by a freezing mixture.

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

Pour on *muriatic acid* sufficient to rise above the cyanuret to the height of a finger; heat gradually and moderately, and receive the condensed product into the bell glass.

The acid obtained in this way is anhydrous, and of the specific gravity .700.

3. Vauquelin's Method.—Take of *Cyanuret of mercury*, 1 part; *Distilled water*, 8 parts. Pass a current of *sulphohydric acid gas* into the solution, until the gas is in excess; pour into the liquid pulverized *subcarbonate of lead* in sufficient quantity to remove the excess of *sulphohydric acid;* shake the mixture constantly, and when it has no longer the smell of putrid eggs, and ceases to blacken paper impregnated with acetate of lead, filter and preserve it carefully.

The product of this operation has been considered to approximate the average density of the acid of Scheele.[1]

The variable density of the acid prepared after Scheele's method has prevented it from being generally used in medicine. The acid of Gay-Lussac is most commonly employed; but as its degree of concentration renders it dangerous, it is diluted with distilled water. Robiquet has proposed to bring its density to .900, by adding two parts of water to it. Thus reduced, it resembles the acid of Scheele, with the advantage, that there is a constant and known ratio between the pure or anhydrous acid and the quantity of water united with it. Magendie adds to it six times its bulk, or eight and a half times its weight, of distilled water, and calls the mixture *Acide prussique médicinal*,[2] *Medicinal prussic or Medicinal hydrocyanic acid.* Others have advised the employment of a mixture of three parts of water, and one part of acid, under the name of *Acide hydrocyanique au quart* or "Hydrocyanic acid of quarter strength."[3]

Dr. Bache asserts, that he had the process (Proust's or Vauquelin's) of the United States' Pharmacopœia (1830) repeated, when he found the acid obtained to have the specific gravity .998.

In the last edition of the Pharmacopœia of the United States, (1842,) the following form was introduced. It is essentially that of the London Pharmacopœia. Take of *Ferrocyanuret of Potassium*, ℥ij.; *Sulphuric acid*, ℥iss,; *Distilled water*, a sufficient quantity. Mix the acid with four fluidounces of distilled water, and pour the mixture, when cool, into a glass retort. To this add the ferrocyanuret of potassium, previously dissolved in ten

[1] See Notes on Hydrocyanic acid, by R. E. Griffith, in Philad. Journ. of Pharmacy, iv. 17. Philad. 1833; also, Pereira, Elements of Materia Medica, 2d edit. i. 429. Lond. 1842. The Dispensatory of the United States of America, by Wood and Bache, 6th edit. p. 786, Philad. 1845, and Mr. David Stewart, Maryland Medical and Surgical Journal, April, 1840, p. 264.

[2] Formulaire pour la préparation etc. de plusieurs nouveaux médicamens.

[3] Pharmacopëe Universelle, par Jourdan, i. 31. Paris, 1828.

fluidounces of distilled water. Pour eight fluidounces of distilled water into a cooled receiver, and having attached this to the retort, distil, by means of a sand bath, with a moderate heat, six fluidounces. Lastly, add to the product five fluidounces of distilled water, or as much as may be sufficient to render the hydrocyanic acid of such a strength, that 12.7 grains of nitrate of silver, dissolved in distilled water, may be accurately saturated by 100 grains of the acid.

When hydrocyanic acid is wanted for immediate use, the following formula is recommended.—Take of *Cyanuret of silver*, fifty grains and a half; *Muriatic acid*, forty-one grains; *Distilled water*, a fluidounce. Mix the muriatic acid with the distilled water, add the cyanuret of silver, and shake the whole in a well-stopped vial. When the insoluble matter has subsided, pour off the clear liquor and keep it for use.

The characters that hydrocyanic acid should possess, according to the forms last given, are as follows:—It is colourless, of a peculiar odour, and wholly volatilizable by heat. One hundred grains of it produce, with solution of nitrate of silver, a white precipitate, which, when washed and dried, weighs ten grains, and is readily dissolved by boiling nitric acid. The acid of the Pharmacopœia of the United States contains two *per cent.* of pure anhydrous acid.[1]

No matter how prepared, hydrocyanic acid should be kept in well-stopped bottles from which the light is excluded.

EFFECTS ON THE ECONOMY IN HEALTH.

Hydrocyanic acid is usually classed amongst the narcotic poisons,[2] yet there is reason for believing, that its ordinary effects are purely sedative. Whilst the agents belonging to the class of narcotics produce, first of all, excitation in the organic actions, followed, sooner or later, when the agent is in sufficient dose, by signs of sedation, this acid would seem to occasion the latter results only.

It is the most powerful of our poisons, at times producing, in an adequate dose, the fatal result so suddenly, that the animal experimented upon can scarcely be removed from the lap of the experimenter before all signs of life are extinct. This rapidity of action has seemed to be unfavourable to the idea, that it acts through the mass of blood, and to favour the view of those who believe, that the impression is made immediately on the nerves of the part with which it is placed in contact, or on the nerves that are distributed to the lining membrane of the blood-vessels, as suggested by Messrs. Addison and Morgan.[3] The same objection, however, applies to the explanation of these gentlemen as to that

[1] Pharmacopœia of the United States, p. 59. Philadelphia, 1842.
[2] Christison, Treatise on Poisons, 1st Amer. from 4th Edin. ed. p. 582. Phila. 1845.
[3] An Essay on the Operation of Poisonous Agents upon the Living Body. London, 1829.

which ascribes the effects to the poison being taken into the blood—that the fatal result is often too sudden for us to presume, that it has entered the blood-vessels; unless we esteem it an agent possessed of powerfully penetrating properties.

A female, who was deceived by the odour of a solution of hydrocyanic acid in alcohol, drank a small vialful, and died in two minutes as if struck with apoplexy. A strong healthy man, thirty-six years of age, being detected in thieving, swallowed a small vialful of the acid, staggered a few steps, and fell dead. Four or five minutes afterwards, the physician who was called found him lifeless, without the slightest trace of pulse or respiration. In a few minutes, convulsive expirations were observed, but no indications of returning life: the face was sunken and livid; the hands and feet deadly cold; the forehead and face cold and dry; and the eyes half open and glassy.[1]

M. Damason[2] relates the case of a druggist, who had some hydrocyanic acid in a vial with a ground stopper, and, as it had been prepared almost three months, thinking that it was decomposed, he opened the vial, and applied it to his nose to ascertain whether the acid retained any smell; he instantly fell down, and remained for half an hour without giving the slightest signs of life; but finally recovered after an illness of several days.

Many experiments have been made on animals with this acid. A drop, introduced into the bill or anus of a sparrow, induced death in from one to two minutes, preceded by convulsions. Even holding the bill over a vial filled with the acid proved fatal. A duck was destroyed by fourteen drops. Twenty drops introduced into the stomach of a rabbit killed it in three minutes. When a few drops were injected into the jugular vein, death supervened still sooner. A small dog, to which two drops had been given, experienced shortness of breath, staggered, fell, passed its urine repeatedly, vomited twice, and afterwards seemed quite well. The same animal took, five hours later, eight drops, and fell into a tetanic, comatose condition, but recovered in half an hour. More severe but not fatal effects resulted from sixteen drops. Thirty to forty drops administered to dogs and cats produced violent convulsions and death, in from six to fifteen minutes.

The experiments of Emmert and Coullon seem to have shown that the action of hydrocyanic acid is more violent when it is injected into the jugular vein, or inhaled in a concentrated form; less so when injected into the rectum. In the case of a horse, into whose jugular it was injected, death occurred in twenty-one minutes. When placed in contact with the dura mater, or with

[1] Hufeland. Journal der Practisch. Heilkund. Band. xl. St. 1, S. 85—92, and Osann, in Art. Blausäure, in Encyc. Wörterb. der Medicinischen Wissenschaft. Band. v. S. 528, Berlin, 1830.

[2] Journal de Chimie Médicale. Juin, 1831.

nerves, no striking phenomena were perceptible. This fact was confirmed by Viborg.[1] On the other hand, when received into a wound in its concentrated state, it acts most violently. Scharring, who broke a glass containing the acid, and received some of it into the wound produced thereby, died in an hour after the accident.

It is not easy to deduce comparative results from the discordant statements of different experimenters, inasmuch as we are ignorant of the precise strength of the acid employed. A French physician made some experiments on the uncertainty of the strength of the medicinal acid; and found, that he could swallow a whole ounce of one sample, and a drachm of a stronger sample, without sustaining any injury: but on trying some, which had been recently prepared by Vauquelin, he was immediately taken ill, and narrowly escaped with life.[2] Dr. Pereira[3] caused the instantaneous death of a rabbit by applying its nose to a receiver filled with the vapour of the pure acid: the animal died without a struggle. A drop of the pure acid of Gay-Lussac, placed in the throat of the most vigorous dog, caused it to fall dead after two or three hurried respirations.[4]

We have already alluded to the effect of the acid when dropped upon the conjunctiva—a mucous surface, and therefore possessed of highly absorbing powers; but it cannot even be placed with impunity in contact with surfaces, which, owing to their being covered with cuticle, do not readily absorb. Orfila[5] states, that a professor of Vienna having prepared a pure and concentrated acid, spread a certain quantity of it on his naked arm, and died a short time afterwards. Dr. Christison,[6] however, says this was probably a mistake. On repeating some of the experiments, he found, that a single drop, weighing scarcely a third of a grain, dropped into the mouth of a rabbit, killed it in eighty-three seconds, and began to act in sixty-three; that three drops, weighing four-fifths of a grain, in like manner, killed a strong cat in thirty seconds, and began to act in ten; that another was affected by the same dose in five, and died in forty seconds; that four drops, weighing a grain and a fifth, did not affect a rabbit for twenty seconds, but killed it in ten seconds more; and that twenty-five grains, corresponding with an ounce and a half of medicinal acid, began to act on a rabbit, as soon as it was poured into its mouth, and killed it outright in ten seconds at farthest. Three drops, projected into the eye, acted on a cat in twenty seconds, and killed it in twenty more; and the same quantity, dropped on a fresh

[1] Osann, loc. cit. S. 580.

[2] Revue Médicale, xvii. 265, and Christison on Poisons, 1st American Edit. p. 582. Phila. 1845.

[3] Elements of Mat. Med. &c., 2d edit. i. 437. Lond. 1842.

[4] Magendie, in Annales de Chimie et de Physique, vi. 347, and Formulaire, &c.

[5] Toxicologie.

[6] Op. cit. p. 592.

wound in the loins, acted in forty-five, and proved fatal in one hundred and five, seconds.[1]

As before remarked, from the rapidity with which the toxical effects are observed after hydrocyanic acid has been taken, it has seemed to be almost impossible for the poison to have entered the blood-vessels, and have passed with the current of the circulation to the great vital organ on which its deleterious agency is exerted. The well devised and carefully conducted experiments of Professor Blake,[2] of St. Louis, show, however, that in the case of this poison, as of every other, the velocity of the circulatory current is so great, as to enable us to understand that the deadly influence may be exerted in all cases by the reception of the poison into the blood. He found, that sufficient time always elapses between the application of the poison and the first evidences of its action to admit of such contact. In an experiment on a rabbit with hydrocyanic acid,[3] the animal, immediately after the contact of the acid with the lining membrane of the mouth, jumped from the table, and when on the floor was perfectly able to stand on its feet. At two seconds and a half after the application of the poison it fell on its side, and in five seconds was dead. "This," says Dr. Blake, "is but one of many experiments which have been performed on cats and rabbits, and in no instance have I observed instantaneous death, or even the instantaneous action of the poison."[4]

If given in rather too strong a dose, or—if in proper doses—at too short intervals, it produces headach, and vertigo, which go off, however, in a few minutes. When inhaled, even if diluted with atmospheric air, it causes vomiting, prostration, pains in the back part of the head, and great diminution of the arterial pulsations. In a more concentrated state, the effects are more rapidly fatal than in any other form of administration. M. Robert found, that when a bird, a rabbit, a cat, and two dogs, were made to breathe air saturated with its vapour, the first and second died in one second; the cat in two seconds, one dog in five, the other in ten seconds.[5]

With regard to the parts of the economy that are primarily acted upon by the hydrocyanic acid after it has entered the blood, most observers have designated the nervous system.[6] In no other way, it has been conceived, is it as easy to account for the extreme

[1] See, also, Geoghegan, in Dublin Medical Journal, for 1835, and Pereira, Op. cit. p. 242.

[2] Edinb. Med. and Surgical Journal, April, 1839, p. 339, and St. Louis Med. and Surg. Journal, Nov. and Dec., 1848.

[3] American Journal of the Medical Sciences, July, 1849, p. 106.

[4] See the Author's General Therapeutics and Materia Medica, 4th edit., 8vo., Phila. 1840.

[5] Annales de Chimie, xcii. 59.

[6] Lonsdale, Edinb. Medical and Surgical Journal, January, 1839, and Lond. Lancet, June 15th, 1839, p. 440.

rapidity of its action in fatal cases. When mixed with the blood, however, out of the body, it altogether changes the character of that fluid, and opposes its coagulation;[1] and a recent writer, M. Coze,[2] of Strasburg, is of opinion, that it affects more especially the circulatory apparatus; death resulting from the suspension of the movements of the heart, and the constriction of the ultimate arterial divisions, whence follow repletion of the larger arterial trunks and stasis of the blood—the convulsions being owing to a defective supply of blood to the spinal marrow. Some of the German writers[3] have endeavoured to indicate three grades of its action on the economy. *First.* In moderate doses, long continued, it occasions a marked diminution in the action of the nervous and vascular systems; vertigo; disposition to syncope; epistaxis as a consequence of thinness of the blood; and a disposition to putrid diseases.[4] *Secondly.* In larger doses, the sedative effect of the acid on the spinal marrow, and the abdominal ganglia, is indicated by feelings of weakness, numbness, tremors, and other involuntary motions of the extremities; involuntary discharge of the urine and fæces; augmentation of the cutaneous and urinary depurations; palpitations; anxiety at the præcordia; weak pulse; and, according to some, headach, especially in the back part of the head; excoriation of the tongue and inner parts of the cheeks,[5] and salivation. This last symptom is given by Dr. Christison[6] on the authority of Drs. Macleod and Granville.[7] It has been suspected, however, that salivation, in these cases, was brought about by the use of an impure acid, containing probably a small quantity of the corrosive chloride of mercury, particularly if the acid had been prepared—according to the process of the Dublin College—with bicyanuret of mercury, muriatic acid and water. Mercury is, indeed, asserted to have been actually discovered in the acid by Sylvester's test. *Thirdly.* In still larger doses, it induces violent affections of the spinal marrow, convulsions, trismus, opisthotonos, emprosthotonos, fainting, &c.

From the results of all his observations, Osann[8] infers, that hydrocyanic acid acts dynamically on the nervous system, by diminishing, depressing, and annihilating its life; and, through the nervous system, affecting the organs of vegetation or nutrition, and of hæmatosis;—that it incontestably has a specific relation to the spinal marrow, the ganglions of the abdomen, and the dependent

[1] Magendie, Lectures on the Blood. Lect. xvii. in Lancet, for Jan. 26, 1839, p. 636, and Blake, Op. cit.

[2] Bouchardat, Annuaire de Thérapeutique pour 1850, p. 20. Paris, 1850.

[3] Richter, Specielle Therapie, Band. x. S. 280. Berlin, 1828; and Osann, loc. cit. S. 527.

[4] Encyc. Wörterb. B. ii. S. 315. Berlin, 1828.

[5] Born, in Rust's Magazin, B. xiii. S. 282.

[6] Op. citat.

[7] Lond. Med. and Phys. Journ. xlvi. 359 and 363.

[8] Loc. citat. S. 526.

organs; and hence it is, that, in comparison with other narcotic agents, it is less stupefying, whilst it influences more deeply the phenomena of vegetative or organic life. He properly remarks, however, that the inferences of Jörg,[1] from his experiments, are apparently opposed to this view. Jörg considered its effects upon the brain to be excitant, and that it occasioned turgescence of that organ.

There would seem to be no distinct evidence of hydrocyanic acid being a cumulative poison, although this has been at times suspected. Its operation must be diligently watched at first, until the proper dose is ascertained. This, says Dr. Christison,[2] is the only secret for using it with safety and confidence.

EFFECTS ON THE ECONOMY IN DISEASE.

From the effects produced by the hydrocyanic acid on the healthy body, we may infer the cases of disease in which it may be indicated. It is decidedly sedative, allaying nervous irritability and vascular action, and therefore adapted for all cases in which these are inordinately excited. Yet its power, as a medicinal agent, is not as great as was at one time presumed, and as is still presumed, by many. In some countries, too. it has found more favour than in others. In Italy, France and England, it has been more extensively used than in Germany; yet in many of the Pharmacopœias of the last country it has been admitted into the list of officinal agents. The great objections that have been urged against it are—its danger, even in a small dose, if not carefully administered; the difficulty of having it always of the same strength; the impossibility of administering it undiluted, and the danger of giving too strong a dose in consequence of its rising to the surface of water. More than once the difference in the strength of the acid prepared by different methods would seem to have occasioned unfortunate results. Orfila,[3] mentions the case of a sick person, who had used it for a length of time in increasing doses, with advantage; when, being compelled to send her prescription to another apothecary, the acid he employed was so strong as to produce death, with all the symptoms of poisoning by hydrocyanic acid. For these and other reasons, Riecke, L. W. Sachs, and Osann greatly prefer the *Aqua laurocerasi* and the *Aqua amygdalarum amararum*, which, although in other respects not less objectionable, are less dangerous.[4] Sir George Lefevre[5] affirms that cherry-laurel water is a more effective preparation than hydro-

[1] Materialien zu einer künftigen Heilmittellehre, B. i. S. 53, 117.
[2] On Poisons, edit. cit. p. 588.
[3] Toxicologie.
[4] Die neuern Arzneimittel, u. s. w. von V. A. Riecke, S. 5. Stuttgart, 1837; Osann, loc citat, and Encyclopäd. Wörterb. ii. 315.
[5] An Apology for the Nerves, &c.. p. 291. Lond. 1844.

cyanic acid. In many nervous affections, as palpitation, hysteria, &c., he generally prescribes the following draught:

R. Aq. lauro-cerasi ♏ xx.
—— flor. aurant. f ℥i.
Syrup tolut. f ℥j. M.

The draught to be taken pro re natâ.

Possessed of the powerful sedative agency which has been described, it is not to be wondered at, that hydrocyanic acid should have been given in a multitude of cases; and, as constantly happens, that unsuccessful trials, suggested by the merest empiricism, should have been made with it.

It is rarely employed in *fevers*,—intermittent, remittent, or continued. By many, it has been esteemed beneficial in *hectic;* but here its agency must be doubtful.[1]

In *inflammations*, especially when accompanied with marked erethism of the nervous system, it has been greatly extolled, and, next to blood-letting, has been regarded by many as one of our most valuable antiphlogistics. The followers of the contra-stimulant school esteem it as one of their most efficacious contra-stimulants. In the *acute inflammations* of internal organs, it has been highly recommended by the Italian physicians, Borda and Brera; in *thoracic inflammation*, after blood-letting, in conjunction with tartrate of antimony and potassa, and similar sedative agents; and by others in *enteritis*, *metritis*, and *nephritis*, and in *active hemorrhages*. In *chronic inflammations* it has been advised by Granville, Magendie, Heller, Elwert, Behr, Roch, &c., and especially in *chronic catarrh*, *bronchitis*, and *hooping cough*. In the last affection it is conceived by Dr. A. T. Thomson[2] to be "the sheet anchor of the practitioner;" and by Dr. Roe[3] to possess a "specific" (?) power. In warm weather, he thinks, it will cure almost any case of simple hooping cough in a short time; in all seasons it will abridge its duration, and in almost every instance, where it does not cure, it will, at least, materially relieve the severity of the cough.

In *pulmonary consumption* it has been recommended by Granville, Magendie, S. G. Morton,[4] Fantonetti,[5] and others, particularly where there is any inflammatory or spasmodic complication; but others as Neumann, Weitsch, Sir James Clark, Andral,[6] Forget,[7] and, we may add, ourselves, have given it in these very cases without any success. By some, indeed, it has been affirmed, that

[1] See the author's General Therapeutics and Mat. Med., 4th edit. ii. 183, Phila. 1850.
[2] Elements of Mat. Med. and Therapeutics, i. 435. Lond. 1832.
[3] A Treatise on the Nature and Treatment of Hooping Cough, &c., p. 10. Lond. 1838.
[4] Illustrations of Pulmonary Consumption, p. 131. Philad. 1834.
[5] Gazette des Hôpitaux, 19 Fév., 1839.
[6] Bulletin Général de Thérapeutique, Mars, 1840.
[7] L'Expérience, 14 Nov., 1839; and Amer. Med. Intel., Sept. 1, 1840, p. 170.

its administration in phthisis is to be adopted with caution, as in many cases, instead of allaying, it appears to increase, the cough and fever, diminish the expectoration, and occasion a sense of suffocation.[1] It has been, moreover, asserted, that its depressing and destructive agency has acted injuriously on the organism of the consumptive.[2]

In *chronic nervous diseases*, especially when of a spasmodic character—as in *spasmodic affections of the heart*—even when organic, hydrocyanic acid has been advised as a soothing agent, as well as in *spasmodic asthma;* in the *sense of suffocation* that accompanies hydrothorax and other affections; and in *spasmodic dysphagia.* Its efficacy, too, has been marked, according to Dr. Elliotson,[3] in various *neuropathic disorders of the stomach*, especially in those in which pain at the epigastrium was the leading symptom,—in every form, indeed, of *gastrodynia;* and in *painful affections of the bowels*, of a similar character —*enteralgia*—it has been found useful by Dr. Pereira.[4]

In *enlargement of the heart* it was found by Heller to diminish the force and frequency of the pulsations, and in this way to afford essential relief. In an old person, labouring under *anasarca accompanied by great pain in the breast*, Dr. Rees observed, after the administration of Vauquelin's acid, great diuresis, with the removal of the dropsy and its concomitant symptoms.[5]

In the *asthma pulverulentum* of the Germans, (Staubasthma,) that is, in the variety to which millers, bakers, grinders and others are liable, Creutswicher is said to have found it highly serviceable.[6] Its efficacy has not been so marked in *epilepsy*, *chorea*, and kindred affections; yet it has been strongly recommended in *tetanus*. Trevezant ordered it in a case of *traumatic tetanus*, after opium had been given in vain, in the dose of from two to twelve drops with favourable results.[7] On the other hand, Klein gave it in a similar case, with no other apparent effect than that of rendering death more easy.[8] It has likewise been advised in *spasmodic pains of the uterus.* Yet, although it would seem to be soothing and antispasmodic in many cases of erethism, Grindel and Osann[9] consider it by no means adapted for the radical cure of spasmodic diseases.

In violent *neuralgia*, especially in an impressible condition of

[1] Schneider, Med. prakt. Adversarien am Krankenbette, Erste Liefer. S. 62, referred to by Osann.

[2] Siebergundi, in Hufeland's Journal der pract. Heilkund. B. liii., St. 6, S. 15.

[3] On the Efficacy of Hydrocyanic or Prussic Acid in Affections of the Stomach, &c. Lond. 1820.

[4] Op. citat., p. 443.

[5] Osann. Op. cit., and Harless, Rhein-Westphäl. Jahrbuch. Bd. x. St. 1, S. 82.

[6] Rust's Magazin, Bd. xxii. S. 335.

[7] Froriep's Notizen, Bd. xiv. No. 15, S. 324.

[8] Heidelberger Klinische Annalen, Bd. ii. S. 112.

[9] Loc. citat., S. 535.

the vascular system in *nervous cephalalgia, hemicrania, tic douloureux*, and in *gouty rheumatic sciatica*, it has been extolled. Dr. E. S. Bonnet,[1] of Charleston, treated successfully some cases of *facial neuralgia* of great severity, by applying it externally in the form of the distilled water of prunus lauro-cerasus. It is proper, however, to remark, that in two of the three cases described, belladonna was employed in combination. The mode of applying it was by lotion, composed of four ounces of the laurel water, one ounce of sulphuric ether, alone, or with half a drachm or a drachm of extract of belladonna. With this lotion the affected parts, previously covered with carded cotton or cotton wadding, were kept constantly wet. It has likewise been recommended by Dr. Elliotson[2] in the cure of *vomiting* not dependent upon inflammation.

These are the chief cases in which its internal use has been prescribed. It has been employed *externally* in the following. As a soothing agent in *severe pain;*—for example, in *toothach* from caries; one to two drops, according to Elwert, being put into the hollow tooth. Krimer applied it in a dilute state to *painful wounds;* and it has been injected with advantage into *fistulæ*.

In *neuralgia*, the application of a cataplasm of belladonna and hydrocyanic acid has been advised by some.

In *cutaneous affections*, of an itching, painful or inflammatory nature, it has been used with much success. In five cases of obstinate *herpes*, Schneider used a solution of the acid in alcohol: in similar cases Dr. A. T. Thomson, besides the use of a purgative of calomel and colocynth, applied compresses to the parts wetted with the dilute acid. In two cases of *impetigo*, the local application completely allayed the distressing and intolerable itching and tingling, after other external applications, and the internal use of anodynes, had been of no avail. The discharge was diminished and rendered milder: alterative doses of mercury, combined with sarsaparilla, formed the internal treatment.[3] Dr. Thomson found the lotion useful, in combination with small doses of corrosive chloride of mercury, in *acne rosacea*, and in several *other cutaneous affections*. In *herpes*, Magendie advises a lotion of hydrocyanic acid and lettuce water in the proportions mentioned hereafter.

The acid has likewise been used, in the form of glyster, in *scirrhus of the pylorus*, in the strength of six drops of Vauquelin's acid to eight ounces of water;[4] and *uterine pain from scirrhus*, injections of the acid, combined with infusion of belladonna, have been employed with advantage.

[1] North American Archives of Medical and Surgical Science, April, 1835.

[2] Lond. Med. Gazette, 1831, and Amer. Journ. of Med. Sciences, May, 1831, p. 242.

[3] London Medical and Physical Journal, Feb. 1822; and the author's edit. of Magendie's Formulary, p. 112. Lond. 1824. Philad. 1825.

[4] Bernd, in Rust's Magazin. Bd. xiii., S. 273.

In *ophthalmia*, especially of the scrofulous kind, with engorgement of the conjunctiva, it has been advised by Elwert[1]—two drops of the acid being mixed with a drachm of water, and a little dropped frequently into the eye; and it has been given in the active inflammatory stage of *blennorrhœa*.[2]

Its vapour has been advised in *amaurosis*, and in *opacity of the cornea*;[3] but it does not seem to be entitled to much credit in those affections.

Lastly, when a portion of *tænia* has protruded from the rectum, it has been advised by Cagnola, Golnecke, and others, that hydrocyanic acid should be applied to it with the view of destroying it.[4]

Such are the principal affections in which the hydrocyanic acid has been used. The author has often employed it internally in many of the cases recommended, especially in *painful affections accompanied by great nervous impressibility*, and in *consumption*, but he has not had sufficient reason to place it high in rank amongst medicinal agents.[5] He has certainly had no evidence, that it can cure consumption when not beyond its first stage, as remarked by Magendie.[6] If the practitioner will bear in mind the effects which the acid is capable of inducing upon healthy man, when the dose is carried to the requisite extent, he will have no difficulty in deciding upon the cases in which its agency may be appropriate. If not a true sedative, it is the nearest approach to one in the catalogue of the materia medica; and therefore its employment is clearly indicated in all diseases in which there is much erethism,—administered alone or along with other appropriate agents.

MODE OF ADMINISTRATION.

After the remarks that have been made on the varying strength of the hydrocyanic acid, according to the particular form by which it may have been prepared, it is hardly necessary to say, that the physician must be acquainted with the character of the acid he prescribes. The ordinary dose of that of the Pharmacopœia of the United States is a drop, given three times a day in a little sugared water: it must be borne in mind, however, that the specific gravity of the acid is less than that of water, and hence the necessity of dropping the quantity of acid at the time of using it, rather than forming a mixture with a larger quantity of the acid, which will certainly rise to the surface, if the mixture be put to

[1] Rust's Magazin, B. xiii., S. 182.
[2] Ibid. B. xiii., S. 228.
[3] Paterson in Lond. Med. Gaz. May 15, 1844, p. 808.
[4] Osann, Op. cit., and Gerson and Julius, Magaz. d. ausländischen Litteratur der gesammt. Heilkund. B. ii. 177. Also, Hufeland und Osann's Journal der prakt. Heilkund. Bd. lviii, St. 6, S. 122, and Richter, Op. cit., S. 313.
[5] See, also, Becquerel, Gazette Medicale de Paris, 13 Jan., 1840.
[6] The author's edit. of his Formulary, p. 108.

one side: and unless the vial is shaken, a much larger dose may be administered than was intended. It must also be recollected, that the acid loses its strength by keeping. Magendie remarks,[1] that when left to itself in a close vessel, it sometimes becomes decomposed in less than an hour, and that it rarely preserves its integrity for more than a fortnight.

The substances that are incompatible with it in the same prescription, are most metallic oxides, particularly those of mercury and antimony, nitrate of silver, salts of iron, sulphurets, mineral acids and chlorine.

The proper plan is to begin with a small dose and to augment it carefully until some effect is induced, but if any of the signs—mentioned above as indicating the supervention of the sedative effects of the acid—should supervene, it ought to be discontinued.

Magendie, it has been seen, uses the hydrocyanic acid of Gay-Lussac, diluted with 8.5 times its weight of water; and this mixture he denominates *medicinal prussic acid.*

The following are forms in which the acid may be administered.

Mistura acidi hydrocyanici.

Mixture of hydrocyanic acid.

(*Melange pectoral.*)

R. Acidi hydrocyanici medicinalis f ʒj.
Aquæ destillatæ Oj.
Sacchari albi ℥iss. M.

A dessert-spoonful of this is directed to be taken every morning and evening at bed time—the dose being gradually increased to six or eight spoonfuls in the 24 hours. *Magendie.*

R. Acidi hydrocyanici (Scheele's) ♏xij.
Vin. antimon. f ʒj.
Tinct. opii camphoratæ f ʒiiss.
Aquæ camphoræ f ℥vijss. Fiat mistura.

Dose.—In *hooping cough*, a table-spoonful every four hours for a delicate boy four years old, to be given in some warm drink. The child to remain in a warm room, and to live upon light pudding and broth. *Roe.*

R. Acidi hydrocyanici (Scheele's,) ♏ xx.
Vin. antimon. f ʒiss.
—— ipecacuanhæ f ʒiss.
Aquæ f ʒxiij. Fiat mistura.

Dose.—A tea-spoonful every two hours for a healthy-looking female child, five years of age. *Roe.*

Syrupus acidi hydrocyanici.

Syrup of hydrocyanic acid.

R. Syrupi purificat. Oj.
Acidi hydrocyanici medicinalis f ʒj. M.

[1] Op. citat. p. 104.

This syrup may be added to common pectoral mixtures, and used as other syrups are. *Magendie.*

Lotio acidi hydrocyanici.

Lotion of hydrocyanic acid.

R. Acidi hydrocyanici f ℥ss.
Alcohol. f ℥j.
Aquæ destillat. f ℥xss.

This was the lotion employed by Professor Thomson in cases of *impetigo.*

The following was used by Schneider in *herpes.*

R. Acidi hydrocyanici f ʒiss.
Alcohol. f ℥vi. M.

And in the same cases Magendie employed the subjoined formula.

R. Acidi hydrocyanici f ʒij.
Aquæ lactucæ Oij. M.

The distilled water of the garden lettuce probably contains nothing to recommend it over common distilled water.

Dr. Joy[1] advises the following lotion in *acne* and *impetigo* to correct itching; and in *ulcerated cancer* to diminish pain.

R. Acid. hydrocyan. dil. f ʒi—ʒiv.
Decoct. malvæ Oj. M.

The bottle should be shaken before each application.

All these formulæ are objectionable for the reasons before assigned; and it is consequently better to drop the acid at the time of using it, taking care that it has not lost its properties.

V. AC'IDUM LACTIS.

Synonymes. Acidum Lacteum seu Lactis seu Lacticum, Lactic Acid, Acid of milk.

French. Acide Lactique.

German. Milchsäure.

This acid has been recommended as a therapeutical agent by Magendie.[2]

METHOD OF PREPARING.

Lactic acid may be obtained either from *milk* or from the *juice of the red beet.* In the latter case, the juice is put in a situation the temperature of which is between 77° and 86° Fah. After the lapse of a few days, a commotion is observed in the mass, which

[1] Tweedie's Libr. of Med., v. 288, Lond. 1840, or Amer. edit.

[2] Formulaire pour la préparation et l'emploi de plusieurs nouveaux médicamens, &c., Edit. 9ème. Paris, 1836.

is known under the name "viscous fermentation," (*fermentation visqueuse,*) and hydrogen and carburetted hydrogen are evolved in considerable quantity. When the mass has become fluid again, and the fermentation has ended, which generally requires about two months, it is evaporated to the consistence of syrup, the whole then becomes traversed by a multitude of mannitic crystals, which—when washed with a small quantity of water, and dried—are entirely pure. The mass, moreover, contains a saccharine matter, which affords all the signs of the sugar of the grape. The product of the evaporation is next treated with *alcohol;* this dissolves the lactic acid, and precipitates several substances that have not yet been examined. The alcoholic extract is then dissolved in water, which occasions a fresh precipitation. The liquid is now saturated with *carbonate of zinc*, and by this means a fresh precipitation is effected, more copious than the preceding. By concentration, the lactate of zinc shoots into crystals, which are collected and heated in water, to which *animal charcoal*, previously washed in muriatic acid, has been added: the fluid is then filtered, and the lactate of zinc is deposited in perfectly white crystals: these are washed in *boiling alcohol*, in which they are insoluble; afterwards they are treated with *baryta*, and then with *sulphuric acid*, which separates the lactic acid. This is finally concentrated *in vacuo*.[1]

Mitscherlich[2] gives the following process for preparing it pure. *Lactate of lead*, formed in the usual way, is decomposed by *sulphate of zinc;* the sulphate of lead is separated, and the lactate of zinc crystallized by evaporation; this is at first yellow, but by repeated crystallizations it is obtained of a pure white. This solution of the lactate is decomposed by *pure baryta;* the oxide of zinc separated, and the lactate of baryta, which is in solution, is decomposed by *sulphuric acid*, and the fluid evaporated; this yields a clear, colourless, syrupy, not volatile acid, which is decomposed, and leaves a residue of charcoal when heated at a sufficiently high temperature.

Milk, which has been suffered to ferment for a long while, and is treated in the same way, affords lactic acid. Corriol has likewise detected it in an aqueous infusion of the nux vomica.

When concentrated *in vacuo* until it parts with no more water, lactic acid is a colourless liquor, of syrupy consistence; its specific gravity being about 1.215. It is inodorous, but of a very sour taste, similar to that of the strongest vegetable acids. When exposed to the air, it attracts moisture. Water and alcohol dissolve it in all proportions. One of its most striking properties, which

[1] Gay-Lussac and Pelouze, Annales de Chimie et de Physique, Avril, 1833. (Tom. lii. 410.)

[2] Report to British Association, 2d meeting, and Phila. Journal of Pharmacy, vi. 83. Philadelphia, 1834-5.

is of especial interest to the physician, is, that it quickly dissolves phosphate of lime, especially that which is contained in bones.

EFFECTS ON THE ECONOMY.

As lactic acid was conceived to play a part amongst the juices which effect the solution of the food in the stomach, Magendie thought it might be given with advantage in cases of *dyspepsia* produced by simple debility of the digestive apparatus; and his experiments afforded him very encouraging results.

In consequence of the facility with which lactic acid dissolves phosphate of lime, it has been suggested, whether it might not be administered with advantage in cases of *white gravel*, or, in other words, of *phosphatic depositions* from the urine. Magendie has not yet been able to institute experiments on this matter. At the time when the edition of his Formulary, to which we have referred, was published, he had commenced some clinical experiments with lactate of potassa, and lactate of soda, but without any results worthy of being communicated to the profession. He recommends these salts, however, to the attention of physicians.

MODE OF ADMINISTRATION.

Magendie gives lactic acid either in the form of lemonade or of lozenges.

Potus acidi lactis.

Lemonade of lactic acid.

R. Acid. lact. liquid. f ʒj. ad ʒiv.
Aquæ Oij.
Syrupi f ℥ij. M.

Pastilli acidi lactis.

Lozenges of lactic acid.

R. Acid. lact. pur. ʒij.
Sacch. pulv. ℥j.
Gum. tragac. q. s.
Ol. æther. vanil. gtt. iv. M.

Make into lozenges weighing half a dram each. Let them be kept in a well closed vessel. Of these, from two to six may be taken in the 24 hours without any evil consequences.

VI. AC″IDUM TAN′NICUM.

Synonymes. Acidum Quercitannicum, Tanninum Purum, Tannicum, Principium Adstringens seu Scytodephicum, Tannin, Tannic acid.
French. Acide Tannique.
German. Tannin, Gerberstoff, Gerbsäure.

This article, in its pure state, has been subjected to experiment of late years only.

METHOD OF PREPARING.

According to Buchner,[1] tannic acid should be prepared for medical use in the following manner. From eight to twelve parts of *hot water* must be poured on one part of powdered *galls*, and the mixture be allowed to digest for an hour, frequently agitating it. It must then be filtered, and the residue be again treated in the same manner with a little hot water. The different infusions, which generally pass through the filter turbid, must be mixed together, and a little *dilute sulphuric acid* be added by drops, constantly shaking the mixture so long as any precipitate of tannic acid follows. The acid is deposited very soon in this way, in a collected yellowish white, gelatiniform mass, which by the influence of air gradually assumes a brown colour.

After the fluid is poured off, the residue is washed twice with cold water *acidulated with sulphuric acid: carbonate of baryta*, or *carbonate of potassa*, is then added to it in small portions, carefully shaking the mixture, until there is no farther effervescence, and until a portion of the mass dissolved in water and tested by chloride of barium affords no more evidence of the presence of sulphuric acid. The yet moist mass is then put into a retort with *alcohol* of about ninety *per cent.*, which is added repeatedly in small portions; the alcohol is made to boil, to dissolve the tannic acid, and separate it from the sulphate of baryta or sulphate of lime; the alcoholic solution is then poured off clear, and by a gentle heat evaporated to dryness.

The following form for its preparation is given in the last edition of the Pharmacopœia of the United States (1842.) Take of *Galls*, in powder; *Sulphuric ether*, each a sufficient quantity. Put into a glass adapter, loosely closed at its lower end with carded cotton, sufficient powdered galls to fill about one half of it; and press the powder slightly. Then fit the adapter accurately to the mouth of a receiving vessel; fill it with the sulphuric ether, and close the upper orifice so as to prevent the escape of the ether by evaporation. The liquid which passes separates into two unequal portions, of which the lower is much smaller in quantity and much denser than the upper.

When the ether ceases to pass, pour fresh portions upon the galls, until the lower stratum of liquid in the receiver no longer increases. Then separate this from the upper, put it into a capsule, and evaporate with a moderate heat to dryness. Lastly, rub what remains into powder. The upper portion of liquid will yield by distillation a quantity of ether, which, when washed with water, may be employed in a subsequent operation.

[1] Repertorium, B. xxxiv. H. 3; also, A. W. Buchner, Neueste Entdeckung. über die Gerbsäure, u. s. w. Frankf. 1833, and Dierbach, in Heidelberger Klinische Annalen, B. x. H. 3, S. 339, Heidelb. 1834.

For the process of M. Duval, see Annal. de Chimie et de Physique, and Amer. Journal of Pharm. July, 1841, p. 171.

Tannic acid, thus prepared, is of a yellowish-white colour; of a strongly astringent taste; very soluble in water, and less so in alcohol and in ether. It reddens litmus paper.[1]

EFFECTS ON THE ECONOMY.

Tannic acid is a strong astringent,[2] which has hitherto been mainly used in *uterine hemorrhage*, and especially by the Italian physicians. Porta[3] was, perhaps, the first who tried it. He found it very efficacious in cases not dependent upon any organic mischief in the uterus. It exhibits its powers, according to him, even in small doses—as of two grains, and is well borne by the stomach. Ferrario[4] likewise administered it with advantage in the same affection, but he does not consider it adapted for cases in which either partial or general plethora, or local excitement of the uterus, or any organic disease, exists: it is indicated only where mere atony is present. He gives it in the form of powder or pill, in two grain doses, six times a day. The effect is generally good: the hemorrhage diminishes and soon ceases, and, at the same time, the strength augments, and recovery succeeds without any disturbance of the functions. Giadorow[5] details two cases of *diabetes* cured by it, when given in combination with opium, as in the prescription at the end of this article. The first patient was cured in ten, the second in twelve days. M. Dumars[6] extols it in the same disease, administered by the mouth as well as by the rectum.

According to Ricci,[7] tannic acid has frequently been employed in Italy both in *internal and external hemorrhages*. G. A. Richter,[8] however, affirms, that he has given it in *habitual metrorrhagia* without any advantage whatever. Within the last few years, M. Cavarra[9] has instituted many experiments on animals, as well as on himself, from which he concludes, that when tannic acid is placed in contact with certain parts of the living economy, it exerts upon them the same chemico-vital action which it does on an inert organic tissue, or, in other words, it tans them as it tans leather. "These parts," he says, "are the mucous membranes of the urethra, vagina, intestines, and lungs. The action of tannic acid appears to be, to cause such a condensation or contraction in them, that the glands with which they are studded no longer afford passage for the mucus which they secrete."

[1] Pharm. of the United States, p. 63, Philad. 1842.

[2] See, on the action of this agent, Mitscherlich, Medicinische Zeitung, No. 43, 1838, and Bullet. Général de Thérap. 30 Mars, 1837.

[3] Delpech, Mémorial des Hôpitaux du Midi, &c. Février, 1829, p. 51.

[4] Annali universali di Medicina, Gennajo, 1829.

[5] Annali universali di Medicina, and Gazette Médical, Sep. 15, 1832.

[6] Cited in the Provincial Medical and Surgical Journal, Nov. 18, 1842.

[7] Bulletin des Sciences Médicales, Sept. 1828.

[8] Arzneimittellehre, Supplement, s. 60; also, Cavalier, in Archiv. Générales, xix. 589.

[9] Bulletin de l'Académie Royale de Médecine, Janvier, 1837; also, American Medical Intelligencer, Oct. 16, 1837, p. 258.

M. Cavarra asserts, that he has proved these positions by numerous experiments and demonstrations. When tannic acid is taken internally, its immediate effect is constipation, by arresting the secretion from the mucous membrane. When it has reached the stomach, it is absorbed, and carried into the current of the circulation. There exists between this organ and the vagina, the urethra, and the lungs, no communication except through the circulatory system, and, consequently, the tannic acid—it is fair to presume—must be absorbed to cure *leucorrhœa*, *gonorrhœa*, and the most obstinate *chronic catarrhs*. M. Cavarra concludes, that of all the effects of tannic acid, two of the most surprising are, the cures operated by it in cases of *obstinate nervous coughs*, and the excellent action it exerts in *phthisis*. Farther experiments are, however, demanded before this last point can be admitted. From our knowledge of the properties of tannic acid, it is not easy to see how it—or any astringent—can be of much service in the latter malady. Mixed with powdered sugar, in the proportion of from two to ten parts of the acid to ten parts of sugar, it has been blown, with advantage, by M. P. de Mignot,[1] into the fauces to facilitate the expulsion of *false membranes*.

Dr. S. S. Allison,[2] who has for six years constantly prescribed tannic acid internally with much success in various diseases, speaks highly of it in *chronic bronchial catarrh*, *chronic diarrhœa*, *leucorrhœa*, *menorrhagia*, *the hemorrhagic diathesis*, and *albuminuria*. As a local application, he extols it in *sponginess* and *hemorrhage of the gums*, *relaxation of the throat*, *prolapsus ani*, *hemorrhoidal tumours*, *gonorrhœa;* and as an external application to the skin where astringents are indicated. He has found it likewise of service in *dyspepsia;* and as a nervine in several cases of *nervous debility*, *languor* and *excitability*. In these last cases, he generally combines it with camphor, hops, or hyoscyamus.

M. Subregondi[3] strongly recommends it in *hooping-cough*, when the period of excitement has passed away. His practice is to give from a quarter to half a grain every two hours along with some soothing agent, as the extractum conii, and Durr[4] speaks highly of a combination of it with benzoin in the latter stages of the same malady. He prepares powders, each containing from two to five *centigrammes*,—gr. $\frac{1}{3}$ to $\frac{3}{4}$—with 50 *centigrammes*—gr. S of sugar; one to be given every two hours.

[1] Bouchardat, Annuaire de Thérapeutique pour 1848, p. 138.

[2] London Journal of Medicine, Jan. 1850, cited in Ranking's Half yearly Abstract, &c., Amer. edit., xi. 77. Phila. 1850; and in Amer. Jour. of the Med. Sciences, Oct. 1850, p. 507.

[3] Cited in Northern Journal of Medicine, Dec. 1844, and in Braithwaite's Retrospect, Amer. edit. viii. 54. New York, 1845.

[4] Cited in Provincial Med. and Surg. Journal, April 3, 1850.

M. Amédée Latour[1] has highly extolled it for its efficacy in *hæmoptysis*. In one case, it completely succeeded when other remedies had failed; and in three cases of *hemorrhage* to a slighter degree, it was wholly successful. M. Charvet[2] has also recommended it in the *sweats of phthisis*. He gives it in the dose of from half a grain to a grain and a half, alone or associated with opium, and generally at bed-time.

Hüter affirms, that tannic acid, prepared from dried galls, in the form of ointment, or diluted with distilled water, is very serviceable in most cases of *Egyptian ophthalmia*. It has likewise been advised in *hemorrhoids* and *fissures of the anus*.[3]

In the *hyperemesis* induced by ipecacuanha or emetia, it may be administered as an antidote.

M. Druitt[4] thinks, that in any case in which a vegetable astringent is indicated, tannic acid should have the preference. A simple solution in distilled water, he says, is much more easily and quickly prepared, as well as much more elegant, than the ordinary decoctions or injections of oak bark, catechu, &c. It can be made, moreover, of uniform strength, and free from foreign inert matter, and is not liable to decompose quickly. In *sore nipples*, he found it to be invaluable. He employs it in solution—five grains to the fluidounce of distilled water—on lint covered with oiled silk. He has also found it of great service in *toothach*. The gum around the tooth is first scarified with a fine lancet, and then a little cotton wool, imbued with a solution of a scruple of tannic acid, and five grains of mastich in two fluidrachms of ether, must be put into the cavity; and, "if the ache is to be cured at all, this plan will put an end to it in nine cases out of ten."

In a case of open, almost incurable, *cancerous ulceration*, in which it was applied by Dr. Michaelsen,[5] to arrest the bleeding, it excited a wonderful effect on the ulcer and the carcinoma itself.

According to the experiments of Magendie,[6] tannic acid is one of the substances that oppose the coagulation of the blood.

MODE OF ADMINISTRATION.

It may be given in the form of pill, or draught, or as a *lavement*. In the dose of from a quarter of a grain to two grains, it does not produce any unpleasant constipation, but its effects must be observed with care.[7]

[1] Journal de Médecine et de Chirurg. Pratiq. Nov. 1839. See, also, Bouchardat, Annuaire, &c., pour 1849, p. 203.

[2] Bulletin Général de Thérapeutique, Mai, 1840.

[3] Diday, in Bouchardat, Annuaire de Thérapeutique pour 1847, p. 170. Paris, 1847.

[4] Provincial Med. Journ Oct. 9, 1844.

[5] Med. Chir. Zeitung, xviii. 24, cited in Schmidt's Jahrbucher, u. s. w. No. 6, S. 287. Jahrgang 1849.

[6] Lond. Lancet. Jan. 26, 1839, p. 636.

[7] Cavarra, in Bulletin Général de Thérapeutique, 30 Mars, 1837.

Vinum aromaticum cum acido tannico.

Aromatic wine with tannic acid.

R. Vini aromat. f ℥viij.
Acid. tannic. ℈ij. M.

R. Vini aromat. f ℥viij.
Acid. tannic. ℈ij.
Ext. opii purif. ʒss. M.

Used as local dressings to *chancres*. *Ricord.*

The VINUM AROMATICUM of the French Codex, used by Ricord, is composed of four ounces of *aromatic herbs*, (rosemary, rue, sage, hyssop, lavender, absinthium, origanum, thyme, laurel leaves, red rose leaves, chamomile, melilotum, and elder,) digested in two pints of *red wine* for eight days.

Injectio acidi tannici.

Injection of tannic acid.

R. Acid. tannic. ℈iv.
Infunde per minut. x. in
Aquæ bullientis Oj.

To be injected slowly into the rectum in cases of *uterine hemorrhage*. *Dumars.*

R. Vin. rubr. f ℥vj.
Acid. tannic. gr. xviij. M.

Used in chronic *blennorrhœa*, or what is called an old gleet.[1] *Ricord.*

In the case of the female, the quantity of tannic acid may be doubled, or still farther increased.

Pilulæ acidi tannici.

Pills of tannic acid.

R. Acid. tannic. pulv. gr. vj.
Acac. pulv. gr. xij.
Sacchar. pulv. gr. lxxij.
Syrup. q. s. ut fiat massa in pilulas pond. gr. iv. sing. dividend.

Dose.—One to four, morning and evening, where an astringent is needed. *Cavarra.*

Pilulæ acidi tannici compositæ.

Compound pills of tannic acid.

(*Pilules de tennin composées.*)

R. Acidi tannic. gr. xvss., (1 *gramme.*)
Morphiæ acetat.
Antimon. et potassæ tartrat. āā gr. iss.
Confect. q. s. ut fiant pilulæ xx.

[1] La Lancette Française, No. 33, Paris, 1838, and Parker, Modern Treatment of Syphilitic Diseases, American Med. Library edit. p. 44. Philad. 1840.

Dose.—One or two in the day in *hemorrhage, diarrhœa,* &c.
Jourdain.

Pilulæ acidi tannici cum opio.
Pills of tannic acid with opium.
(*Pilules narcotiques astringentes.*)

R. Acid. tannic. ʒss.
Extract. opii gr. ¾.
Confect. rosæ q. s. M. et divide in pilulas xx.

One every hour in *uterine hemorrhage.* *Dumars.*

Pulveres acidi tannici et opii.
Powders of tannic acid and opium.

R. Acid tannic. ℈ij.
Opii pulv. gr. ss. Misce et divide in pulveres tres.

Dose.—One, morning, noon, and night; gradually increasing the quantity of tannic acid to four scruples daily. *Giadorow.*

Syrupus acidi tannici.
Syrup of tannic acid.

R. Acid. tannic. p. v.
Syrup. p. 500.—Mix and filter.
Bouchardat.[1]

Unguentum acidi tannici.
Ointment of tannic acid.

R. Acidi tannici gr. xvss.
Adipis ʒss. M.

This is the *Pommade contre les gerçures de l'anus,* of M. Diday, applied, in *fissure of the anus,* on the extremity of the little finger. *Diday.*

Dentifricium acidi tannici compositum.
Compound dentifrice of tannic acid.

R. Acid. tannic. ʒss.
Sacchar. lact. lb. iiss.
Carmin. ʒiiss.
Essent. Menth.
——— Anis. āā gtt. xx.
——— Flor. aurant. gtt. x. M.

To prevent accumulation of tartar, and give tone to the gums.
Mialhe.[2]

Pomatum acidi tannici.
Pomatum of tannic acid.
(*Liparolé de tannin.*)

R. Adipis suill. ʒxij.
Acid. tannic. ʒij.
Aquæ pur. f ʒij.

[1] Annuaire de Thérapeutique pour 1848, p. 138, Paris, 1848.
[2] L'Abeille Médicale, Mai, 1848, p. 116.

Dissolve the tannic acid in the water, by triturating in a glass mortar; add the fat and mix.[1] *Béral.*

Lotio acidi tannici.

Lotion of tannic acid.

Hydrolotif de tannin, pour l'urèthre.

R. Aquæ destillat. f ℥viij.
Acid. tannic. gr. xxxij. Solve.

Employed in *obstinate blennorrhœa.* *Béral.*

VII. ACONI'TIA.

Synonymes. Aconitina, Aconita, Aconitium, Aconitinum, Aconitine. *German.* Akonitin, Aconitin.

This active principle, which was discovered by Peschier,[2] and by Brandes, has been recommended by Dr. Turnbull,[3] whose eulogies on the medical virtues of the natural order Ranunculaceæ are evidently, however, overstrained.

METHOD OF PREPARING.

Turnbull gives two processes; the former being the more easy of manipulation; the latter yielding a purer result, and on the whole being preferable. A quantity of the fresh root of *Aconitum napellus* being very carefully and cautiously dried, and reduced to powder,—one part of it by weight, and two parts by measure of *strong alcohol*, are to be digested together at a gentle heat for seven days, and the tincture, whilst warm, is to be filtered. It must then be reduced to the consistence of an extract, by careful evaporation, at a low and well regulated temperature; the object of this being to prevent the destruction or expulsion of the active principle, which would very probably ensue, if the temperature employed were higher than barely sufficient to carry off the alcohol. To the extract, thus prepared, *liquid ammonia* is to be added, drop by drop, and mixed well with it, to precipitate the alkaloid: in this part of the process care must be taken that too much be not added, as in some instances the product appears to have been decomposed by inattention to this circumstance. It is not easy to give a precise rule as to the quantity; but enough will have been added, if the extract exhales the odour of ammonia when

[1] Bulletin Général de Thérapeutique, Janvier, 1838.
[2] Trommsdorff's Journal der Pharmacie, v. 84.
[3] On the medical properties of the natural order Ranunculaceæ, and more particularly on the uses of sabadilla seeds, delphinium staphysagria and aconitum napellus, and their alcaloids, veratria, sabadilline, delphinia and aconitine. Chap. iii. Lond. 1835.

stirred. The mass now consists of impure aconitia, mixed with a quantity of extractive, and other matters soluble in water, and it may be taken up either by *boiling alcohol* or by *sulphuric ether;* or the soluble matter may be removed by repeated washings with small quantities of cold water, which will leave the aconitia. This latter process, Turnbull says, is the one he has generally employed, and it is performed by pouring a little water on the extract, and mixing them carefully together; then allowing the undissolved part to subside, pouring off the fluid, and repeating the operation as long as any soluble matter is taken up: a quantity of light brown or gray powder is left, which may be purified by subsequent solution in *alcohol.* This powder contains the active properties of the aconite, in a high degree of concentration.

The second process consists in dissolving the *alcoholic extract,* prepared as above, without the addition of the ammonia, in as much *cold water* as will take it up, carefully decanting the solution from the insoluble part, and filtering it. To the filtered solution *liquid ammonia* is to be added, drop by drop, as long as any precipitation is occasioned. When the precipitate has subsided, the supernatant fluid must be carefully poured, or drawn off by means of a syphon; and after the precipitate has been deprived of as much of the fluid as possible, it should be purified by a sufficient number of washings with small quantities of cold water, or, what is better, it may be dissolved in as much *alcohol* as will take it up, and the solution be thrown into *cold water:* the precipitate thus formed is to be carefully dried. The product obtained by this process is white.

The London College, in their Pharmacopœia of 1836, give the following form:—Take of *aconite root,* dried and bruised, two pounds; *rectified spirit,* three gallons; *diluted sulphuric acid, solution of ammonia* and *purified animal charcoal,* of each a sufficient quantity. Boil the aconite with a gallon of the spirit for an hour, in a retort with a receiver fitted to it. Pour off the liquor, and again boil the residue with another gallon of the spirit, and with the spirit recently distilled, and pour off the liquor also. Let the same be done a third time. Then press the aconite, and having mixed all the liquors and filtered them, distil the spirit. Evaporate the remainder to the proper consistence of an extract. Dissolve this in water and filter. Evaporate the solution with a gentle heat, so that it may thicken like syrup. To this add diluted sulphuric acid, mixed with distilled water sufficient to dissolve the aconitia. Next drop in solution of ammonia, and dissolve the aconitia which is thrown down in dilute sulphuric acid, mixed as before with water; then mix in the animal charcoal, occasionally shaking for a quarter of an hour. Lastly, filter; and having again dropped in solution of ammonia so as to precipitate the aconitia, wash and dry it. This process, however, according to

Messrs. Ballard and Garrod,[1] mostly fails in procuring the alkaloid.

Aconitia occurs in the form of an amorphous powder, having an intensely acrid and bitter taste. It is not volatile, and should leave no ash when heated to destruction. When well prepared, according to Geiger, it is a firm, colourless, and translucent mass; of a shining appearance, friable and inodorous: the taste is disagreeably bitter, leaving behind it an acrid sensation in the throat, but not corrosive or burning. It does not dissolve readily in water: at the ordinary temperature requiring one hundred and fifty parts thereof, but only fifty parts of boiling water. It is soluble in alcohol and in ether. Tincture of iodine occasions in the solution a reddish-brown precipitate; tincture of galls a white one. It forms, with the acids, for the most part, salts that are not crystallizable, which readily dissolve both in water and alcohol.

EFFECTS ON THE ECONOMY.

The effects of aconitia appear to be essentially analogous to those of delphinia. A grain of the first of the two preparations described by Turnbull was dissolved in a dram of alcohol; twenty drops of the solution put into the mouth of a guinea-pig occasioned death in a few minutes. Other experiments, too, have been performed, all of which demonstrate the extreme activity of the substance. If a grain or two of aconitia or veratria or delphinia be mixed with a little lard, or dissolved in a dram of alcohol, and a small quantity be rubbed on the skin, a sensation of heat and tingling is experienced after the friction has been persevered in for a minute or two. There is a slight difference, however, in the effects produced, and the resemblance is greatest between those of delphinia and aconitia.

When a small quantity of aconitia, says Dr. Turnbull, either made into an ointment, or dissolved in alcohol, is rubbed for a minute or two upon the skin, a sensation of heat and prickling is experienced; to this succeeds a feeling of numbness and constriction in the part, as if a heavy weight were laid upon it, or as if the skin were drawn together by the powerful and involuntary contraction of the muscles beneath. This effect lasts from two or three to twelve or more hours, according to the quantity rubbed in. So small a portion as the one hundredth part of a grain has produced a sensation that has continued a whole day. A minute portion of it mixed with lard, and applied to the eye, occasions contraction of the pupil according to Dr. Pereira, whilst Geiger and Hesse affirm that the aconitia which they obtained produced dilatation of the pupil. Dr. Pereira states, that the aconitia prepared by Mr. Morson of London is so powerful, that one-fiftieth

[1] Elements of Mat. Med. and Therap. p. 164. Lond. 1845.

of a grain has endangered the life of an individual. It is, he considers, the most virulent poison known, not excepting hydrocyanic acid.[1]

Whilst employing aconite itself in his clinical practice, Dr. Lombard,[2] of Geneva, tried its effects on animals, and chiefly in reference to its action on the heart. The experiments were made on frogs, whose hearts beat with great regularity, and for a considerable time after the animal has been mutilated. The medicine was introduced into the stomach or applied locally to the heart, which was laid bare after the animal had been stupified by blows on the head. He found, that aconite employed internally rendered the pulsations less frequent, but not irregular, and consequently that it exerted a decidedly sedative effect on the heart; whence he infers, that it is a proper remedy in active diseases of that organ, and indeed in inflammatory affections in general, in which he exhibited it with success. In cases of poisoning by it, the contractions of the heart have been found diminished and almost suspended.[3] The homœopathists regard it as an energetic antiphlogistic.

Dr. Eades[4] concludes, from his own observations, that the most remarkable symptoms exhibited by animals from the use of aconite or its alkaloid, are—weakness; staggering; gradually increasing insensibility of the surface; slowly increasing weakness of the voluntary muscles, ending, perhaps, in paralysis; great languor of the pulse; more or less blindness, and convulsive twitchings before death.

The ablest investigation yet undertaken into the actions of aconite, according to Dr. Christison,[5] is contained in the inaugural dissertation of Dr. Fleming[6] since published, and with a copy of which the author was favoured by Dr. Fleming. He found that the most remarkable symptoms are weakness and staggering, gradually increasing paralysis of the voluntary muscles, slowly increasing insensibility of the surface, and more or less blindness. He farther observed, that the pupil becomes much contracted; the irritability of the voluntary muscles is impaired; the veins are congested after death, the blood unaltered, and the heart capable of contracting for some time after respiration has ceased. From its action on the cerebro-spinal and muscular systems, he deduces the following practical inferences. *First*, it is sedative, anodyne and antispasmodic. *Secondly*, it is an advisable antiphlogistic in apoplexy, phrenitis, or any disease in which the circulation of the brain is excited. *Thirdly*, it is contra-indicated in head-ach arising

[1] Elements of Mat. Med. &c., 2d edit. ii. 1811. Lond. 1842.
[2] Gazette Médicale de Paris, Oct. 10, 1835.
[3] Orfila, Toxicologie, ii. 221.
[4] Dublin Journal of Med. Science, March, 1845, p. 55.
[5] Treatise on Poisons, Amer. edit. p. 665. Phila. 1845.
[6] An Inquiry into the Physiology and Medicinal Properties of the Aconitum Napellus, &c. Lond. 1845.

from anæmia or chlorosis, and wherever there is a torpid or paralytic condition of the muscular system, and, *Fourthly*, Its properties suggest its employment in convulsive or spasmodic diseases.

From its action on the circulation he infers, *First*, that it is a powerful antiphlogistic. *Secondly*, it is calculated to be of great value in all cases where there is inordinate activity of the circulation. *Thirdly*, it is contra-indicated when there is obvious mechanical impediment to the passage of the blood, particularly through the heart or lungs: it is requisite, therefore, in every case before commencing its use, to ascertain that no such obstruction exists; and *fourthly*, it is contra-indicated whenever there is irritability of the circulation, with great diminution of power, such as occurs after severe hemorrhage.

Its results on the respiratory system led him to the inference, *First*, that it will probably be found a highly advantageous antiphlogistic in pneumonia, pleuritis, &c. *Secondly*, it seems calculated to be serviceable in spasmodic asthma. *Thirdly*, it is contra-indicated in difficulty of breathing, arising from any other cause than inflammation or spasm; and *fourthly*, in cases of advanced bronchitis, with excess of secretion, it would prove highly injurious by diminishing still farther the power of expectoration.

Dr. Fleming has not met with any convincing evidence that it is a cumulative remedy; although in two cases he was induced to suspect it. The individuals were affected with general tremors, severe pain in the head and eye-balls, constant lachrymation, intense photophobia, heat of skin, quick pulse, and great restlessness. In many other instances, however, where the administration of the remedy was continued for weeks, and even months, no such effects were observed.

The diseases in which Dr. Turnbull chiefly employed aconitia externally, were of the *neuralgic* kind; but he used it as well in *gouty* and *rheumatic cases;* and its success, he remarks, fully answered his anticipations. He employs it either in the form of solution in alcohol, in the proportion of one or more grains to the drachm,—or of ointment, made according to the following formula:

R. Aconitiæ gr. ij.
Alcohol. gtt. vj. Tere optime et adde.
Adipis ʒj. ut fiat unguentum.

The alcohol is added to prevent the aconitia from forming a thick compound with part of the lard, so as to render it difficult to make a proper ointment. In one case of tic douloureux, of extreme severity, as much as eight grains was prescribed in the ointment with the most marked benefit. The best mode of applying it is simply to rub a small portion of it over the whole seat of the affection, until the pain is either for the time removed, or until the full effect, described above, is induced on the cutaneous nerves;

and the friction should be repeated three or four times, or more frequently, during the day, according to the effect on the disease; the proportion of the aconitia being increased at every second or third rubbing.

Dr. Turnbull found, in the case of aconitia—as well as in that of veratria and delphinia—that unless the friction occasioned a full development of the peculiar impressions caused by it when rubbed on the skin, no benefit whatever was to be looked for from its employment; and he observes, that if there be the slightest abrasion of the skin, an application of such activity should not be resorted to; and that it should be carefully kept from coming in contact with any of the mucous membranes.

Aconite and its alkaloid have been used internally and externally in *neuralgia*, with marked advantage by Jahn, Téalier, Hufeland, Wildberg, Fleming[1] and others; but Drs. Copland, A. T. Thomson and others have prescribed it in several cases without success. By many, the external application of the remedy is considered to be more likely to be beneficial; whilst others give a preference to its internal use. Mr. F. C. Skey[2] details two cases which were cured by it. It was rubbed down into an ointment with lard, in the proportion of one grain of the former to one dram of the latter, and applied in a small quantity by the forefinger over the track of the painful nerve, and was gently rubbed or rather smeared over the surface for half a minute or longer, once or twice a day, according to the degree of pain.

The observations of Turnbull and Skey have been confirmed by Drs. Roots, Sigmond, Fleming and others.[3] In *neuralgia of the heart*, Dr. Copland[4] found it highly serviceable.

Aconitia is not much used. The extravagance of its price, which is said to have been in England 3s. 6d. or upwards of three quarters of a dollar per grain,[5] would necessarily limit its use, had it proved to be more advantageous than it has. It would appear, that all its powers are possessed by the tincture of aconite or by the alcoholic extract.

Dr. Turnbull likewise advises the external application of an AMMONIATED EXTRACT OF ACONITE, which is made by evaporating very carefully, and at a low temperature, the tincture of the dried root of the plant, prepared as directed in the process for obtaining aconitia, to the consistence of an extract. To every dram of this, eight or ten drops of *liquor ammoniæ* should be added, and after the mixture has stood a short time in a very gentle heat, to drive

[1] Op. cit. p. 56. [2] London Med. Gaz. Nov. 5, 1836.
[3] Dr. Cowan, Provincial Med. and Surg. Journ. May, 1843; cited in Braithwaite's Retrospect, Amer. edit. viii. 26. New York, 1844.
[4] Dictionary of Practical Medicine, vi. 893.
[5] Pereira, Elements of Mat. Med. and Therap. 2d Amer. edit. p. 757. Phila. 1846.

off the excess of ammonia, it may be used in the form of an ointment, according to the following prescription:

Unguentum extracti aconiti ammoniati.
Ointment of ammoniated extract of aconite.

℞ Ext. aconit. ammon. ʒj.
Adipis ʒiij. Misce ut fiat unguentum.

When this ointment is rubbed upon the skin, it occasions sensations in the part similar to those produced by the aconitia ointment: they are, however, rather more pungent.

In less severe cases, Dr. Turnbull advises the simple saturated tincture of the dried root, with or without the addition of a little ammonia. The external use of this tincture of aconite has been recommended in *neuralgia* and *chronic rheumatism* by Dr. Pereira,[1] and Mr. Jos. Curtis;[2] and in *hemicrania*[3] by Dr. Fleming.

The *alcoholic extract of aconite*—Extractum aconiti alcoholicum—which is officinal in the last edition of the Pharmacopœia of the United States, 1842—has likewise been advised by Drs. Lombard of Geneva,[4] Busse, J. B. Watkins,[5] and others, in *articular rheumatism*. Dr. Lombard gives it in doses of half a grain every two hours, and gradually augments the dose to six or nine grains in the same period. A case of poisoning by five grains of this extract—from which, however, the patient recovered—has been published by M. E. L. Pereyra, of Bordeaux.[6]

The applications of the different preparations of aconite to therapeutics have been given elsewhere.[7]

VIII. ACUPUNCTU'RA.

Synonymes. Acupuncture, Acupuncturation.
German. Die Akupunktur; der Nadelstich.

Although acupuncturation is really an ancient therapeutical agent, attention to it has been so much revived of late years, and its use has been so largely extended, that it may be looked upon as constituting one of the novelties of therapeutics. It consists in the introduction of needles into different parts of the body with a view of removing or mitigating disease; and appears to have been entirely unknown to the Grecian, Roman, and Arabian physicians.[8]

[1] Elements of Materia Medica, 2d edit. ii. 1808. Lond. 1842.
[2] Lond. Lancet, June 26, 1841. [3] Op. cit. p. 60.
[4] Gazette Médicale, Juin 28, 1834. See, also, Sigmond, in Lancet for August 5, 1837. [5] Philad. Med. Examiner, No. 33.
[6] La Lancette Française, No. 37, Mars 26, 1839.
[7] General Therapeutics and Materia Medica, i. 374. 4th edit. Philad. 1850.
[8] V. A. Riecke, Die neuern Arzneimittel, u. s. w. S. 12, Stuttgart, 1837.

From the most ancient times, however, it has been in use with the Chinese and Japanese, by whom it was regarded as one of the most important of remedial agencies. By these people it was systematically taught on appropriate phantoms or *mannekins*, called *Tsoe-Bosi*, and the practice of the operation was permitted to those only who were able to pass a rigid examination thereon. In Europe, it was first known about 170 years ago, from the writings of a Dutch surgeon, Ten-Rhyne, who wrote in 1683;[1] and attention was subsequently drawn to it by Kämpfer;[2] but after this it was almost forgotten, until Berlioz, in 1816, drew attention to its employment. His example was soon followed by Béclard,[3] Bretonneau,[4] Haime,[5] Demours,[6] Sarlandie,[7] Pelletan, Ségalas, Dantu, Velpeau, Meyranx,[8] Dance, in France; by Churchill, Scott, Elliotson,[9] and others in England; by Friedrich,[10] Bernstein[11] L. W. Sachs, Heyfelder, Michaelis,[12] Gräfe,[13] and others, in Germany; by Carraro,[14] Bergamaschi,[15] Bellini, and others, in Italy; and by Ewing,[16] E. J. Coxe,[17] F. Bache,[18] and others, in this country. M. Jules Cloquet had much to do in reviving its employment in his own country and elsewhere, by his treatise on the subject published at Paris, in 1826, where it was for a long period a fashionable article in the hospitals; so much so, it is affirmed, that attempts were even made to heal a fractured bone by it without the application of any appropriate apparatus; and, at one time, it is said, the patients in one hospital actually revolted against the *piqueurs médecins!* [19].

MODE OF ADMINISTRATION.

In the operation of acupuncture, needles are employed, which are very fine, well polished and sharp pointed. They are usually from two to four inches long, the length being adapted to the depth it may be desired to make them penetrate. If steel needles are

[1] Mantissa schematica de Acupunctura ad dissert. de Arthritide. London, 1683.
[2] Amœnitat exotic. politico-physico medic. p. 583. Lemgov. 1712; and History of Japan, vol. ii, Appendix, sect. 4, p. 34.
[3] Mém. de la Société Médic. d'Emulation, viii. 575.
[4] Journal Universel des Sciences Méd. xiii. 35. Paris, 1817.
[5] Journal Genèr. de Médec. tom. xiii., and Journal Univers. des Sciences Médic. tom. xiii. 1819.
[6] Ibid. tom. xv.
[7] Mem. sur l'Electropuncture. Paris, 1825.
[8] Archives Générales de Méd. tom. vii. Paris, 1825.
[9] Med. Chir. Trans. xiii. 467. Lond. 1827; and art. Acupunture, in Cyclop. Pract. Med. Amer. edit. Philad. 1845.
[10] Translation of Churchill's work in German, p. 40.
[11] Hufeland's Journal, lxvii. Berlin, 1828.
[12] Gräfe und Walther's Journal, B. v. St. 3, S. 552.
[13] E. Gräfe, in art. Acupunctur, in Encyc. Wörterb. der medicinisch. Wissenschaft. B. i. S. 312. Berlin, 1828.
[14] Annali Universali d'Omodei, 1825.
[15] Ibid. 1826.
[16] N. Amer. Med. and Surg. Journal, ii. 77. Phila. 1826.
[17] Ibid. ii. 276. Phila. 1826.
[18] Ibid. i. 311. Phila. 1826; and art. Acupuncture, in Cyclop. of Pract. Med. i. 200, Phila. 1833.
[19] Riecke, Op. cit. S. 13.

selected, they are heated to redness, and allowed to cool slowly, in order that they may be less brittle. At the blunt extremity of the needle a head of lead, or sealing wax is attached—to prevent it from being forced entirely into the body. This is the simplest method of acupuncturation, and it is as effectual as any other. By various acupuncturists, needle-holders or handles of ivory have been devised, to some of which the needle is permanently attached. Perhaps the *porte-aiguille* or 'needle-holder' recommended by Dr. F. Bache,[1] is as good as any that has been invented. The needle, with its *porte-aiguille*, consists of a handle with a steel socket to receive the end of the needle, which may be fixed securely, after having been inserted, by the pressure of a small lateral screw. By this construction, the operator can at pleasure fix in the handle a needle of the length he may desire, and after inserting it he is enabled to detach the handle by relaxing the screw. After all, however, needles prepared in the simple manner mentioned above are adequate to every useful purpose.

Besides common steel needles, those of gold, silver and platinum have been used, but it does not appear that one metal is preferable to another.

To introduce the needles, the skin is stretched, and the needle inserted by a movement of rotation performed in opposite directions, aided by gentle pressure. As a general rule, the seat of pain will indicate the place where the needle should be introduced; but where the feelings of the patient do not point out the spot, it must be suggested by our knowledge of anatomy and physiology. From the experiments of Béclard, Brétonneau, Ségalas, Dantu, Velpeau, and others, it would appear, that perforation of arteries, nerves, and even of important viscera with very fine needles, has not been followed by any injurious results; yet, at times, accidents have been produced thereby; and, therefore, it may be laid down as a rule, that the greater nerves and arteries of a certain size, should be avoided. Prudence would likewise suggest, that important viscera, as the heart, stomach, intestines, &c., should not be penetrated.

The number of needles to be used varies according to the extent of the parts affected. In the opinion of many experienced physicians, we ought not to be afraid of the number, but rather insert too many than too few, and not at too great a distance from each other. The length of time, during which they should be suffered to continue in the part, differs: no fixed rule can be laid down. Some suffer them to remain for an hour and a half, or two hours: at times, a period of five minutes is sufficient. In other cases, they have been kept in for two or three days. It appears to be by no means settled what medicinal influence is exerted by their longer or shorter continuance in the parts.

[1] Cyclop. p. 202.

EFFECTS ON THF ECONOMY.

Allusion has already been made to the impunity with which, in the generality of cases, acupuncturation may be practised even on important organs.

As respects the nerves, Cloquet has seldom or never seen the puncture of them give rise to so much pain as to render it necessary to withdraw the needles: the pain was generally trifling and speedily passed away. He inserted needles into the brain and spinal marrow, and into the crural nerve of a cat, without any evidence of severe suffering or of change of function. Similar experiments were made by E. Gräfe with the same results.[1] Nor was inconvenience found by Delaunay, Béclard and Cloquet to be sustained on puncturing the arteries and veins. A few drops of blood perhaps issued, but the flow was readily stopped by pressure with the finger. The slight ecchymosis which at times supervened, disappeared rapidly of itself. In Gräfe's experiments, he never found much bleeding ensue, although he properly esteemed it advisable to keep clear of the nerves and blood-vessels, in order to avoid any unnecessary pain or mischief.

As regards the fasciæ and periosteum, Gräfe found, that the insertion of needles into them was always very painful, and he recommends, therefore, that the operation should be performed with care on those parts. Should, however, the needles be introduced, and much pain be experienced, it rapidly ceases, when they are withdrawn.

Lastly—MM. Haime, Bretonneau, Velpeau, and Meyranx instituted several experiments on dogs by passing needles into the brain, heart, lungs, stomach, &c., and little or no inconvenience, as remarked above, was experienced, provided the needles were extremely fine. Cloquet passed his needles so deeply into the chest of an animal as to leave no doubt, that they had penetrated the lungs, and he subsequently pierced the liver, stomach, and testicles without the supervention of any unpleasant result, and Bellini[2] affirms, that he has repeatedly passed them into the stomach, liver and intestines without injury.

The pain occasioned by acupuncturation is generally easily tolerated; but at times it is so violent, that the patients cry out; the violence, however, usually passes away either when the needle is drawn out or forced in deeper. It would seem, that the operation is, as a general rule, most successful when it occasions the least pain. Cloquet asserts, that a kind of electric shock is sometimes experienced in the surrounding parts at the moment of the introduction of the needle; in other cases, a tremulous motion is observable in the fibres of the muscles penetrated. Almost always,

[1] Art. Acupunctur. in Encyc. Wörterb. u. s. w. S. 317. Berlin, 1828.
[2] Cited in Brit. & Foreign Medico-Chirurg. Review, for July, 1848, p. 232.

some time after the entrance of the needles, a more or less regular aureola or halo of a red colour, and without tumefaction, is perceptible around them, which soon disappears after they are withdrawn; but when they are suffered to remain long in the part it may persist for hours.

When the operation is productive of benefit, relief is speedily experienced.

The extraction of the steel needles is ordinarily accompanied by more pain than their insertion, especially if they have penetrated deeply, and been retained in the flesh for a long time. The difficulty is owing to their having become oxidized, and consequently rough on the surface. In withdrawing them, it is advisable to give them a movement of rotation, and at the same time to press upon the skin surrounding them with the thumb and index finger.

In the hospitals of St. Louis, La Pitié, and the Hôtel Dieu of Paris, acupuncturation was practised some thousands of times, and in every case, according to Guersent, without the occurrence of any thing unpleasant. Pelletan, however, affirms, that he saw it on four occasions followed by slight faintness at the hospital St. Louis, but none of the cases assumed the characters of full syncope. Gaultier de Claubry has frequently seen faintness, febrile movements, spasm, and insupportable pain produced by it, and Heyfelder saw it followed by convulsions and fainting. Béclard has related a case where the needle penetrated to the bone, and occasioned intense pain. The patient remained a long time faint, and afterwards violent delirium ensued, which gradually ceased in the course of the day, and was followed by great debility. Subsequently, an abscess formed in the part on which the operation was practised.

As to the *modus operandi* of acupuncturation, we cannot conceive its effects to be any thing more than a new nervous impression produced by the needle on the parts which it penetrates. The needles having been found oxidized, especially at the point, it has been supposed by some, that the oxidation is connected with the remedial agency, and it has been even affirmed, that in some diseases they oxidize more readily than in others.[1] It is a sufficient reply to this view, that beneficial results are obtained from the use of needles made of metals that do not become oxidized, and that the steel needles oxidize in the sound, as well as in the diseased body, and even in parts that have been removed from the body, and placed in warm water; for in the cold dead body, it is affirmed, the phenomenon is not observed. Cloquet and Pelletan think, from their experiments, that the effects of acupuncturation are a consequence of the development of the nervous fluid

[1] Gräfe, loc. cit. S. 319.

—which they liken to the galvanic—around the needles; a view which is denied by Pouillet and Béclard, but adopted in a modified form by Dr. Bache,[1] who throws out the conjecture "that in many cases of local pain this accumulation of the nervous (electrical) fluid depends upon the altered state of the various fasciæ or condensed sheets of tissue, giving them the power, to a certain extent, of insulating the parts which they serve to embrace."

The explanation is ingenious, but we do not think it necessary, if adequate, to explain the phenomena. We have no doubt, that the effects are owing to a concentration of the nervous power towards the part transfixed by the needle, so that a derivation of the nervous influx is induced towards the seat of pain, or towards the nerves particularly concerned in the production of the pain; but farther than this we know not.

There is one phenomenon which is dependent on the oxidation of the needle. When the free extremity of an inserted needle is connected with the ground by means of a conducting substance, or is put in connexion with a soft part of the patient's body, it becomes the seat of a galvanic current, which is exhibited by the multiplier of Schweiger. That this phenomenon is dependent upon the oxidation of the metal, is proved by the circumstance that it does not take place when an unoxidizable metal is employed.[2]

Acupuncturation has been used by Berlioz[3] in *gouty* and *rheumatic* cases; by Haime in *rheumatic*, *spasmodic*, and *convulsive affections*, and by Demours in *amaurosis* and *ophthalmia*, the needles being inserted into the temples; Finch advised it in *anasarca*, practised on the feet; he also discharged, in this way, the fluid of *ascites*.[4] Pipelet[5] employed it advantageously in a violent *convulsive affection*. The needles did not remove or markedly diminish the symptoms, but they postponed their recurrence. Michaelis[6] cured a case of *rheumatism* by it, but he did not find it so serviceable in *œdema of the feet*, as the fluid would not flow readily through the minute apertures. Friedrich proposed, in cases of *asphyxia*, when every other remedy had been employed unsuccessfully, that the cavities of the heart should be penetrated by a needle to excite its contraction, and this plan was subsequently advised by Carraro,[7] who found, from his experiments on cats, that they could in this way be resuscitated after drowning, when every manifestation of vitality had ceased. His experiments, however, when repeated by Dr. E. J. Coxe,[8] of Philadelphia, were not found to succeed. J. Cloquet obtained the happiest results from acupuncturation in *neuralgia*, *rheumatism*, *muscular contractions*,

[1] Op. citat. p. 305.
[2] Riecke, S. 16.
[3] Op. citat. Paris, 1816.
[4] Lond. Med. Repos. Mar. 1823.
[5] Journal Complém. du Dict. des Sciences Médic. t. xvi. Paris, 1823.
[6] Gräfe und Walther's Journal, B. v. St. 3.
[7] Annal. univ. di Medicin, 1825. See, also, Provincial Med. and Surg. Journ., May 15, 1841.
[8] North Amer. Med. and Surg. Journ. ii. 292.

spasms, pleurodyne, cephalalgia, ophthalmia, toothach, epilepsy, gout, gastrodynia, contusions, lumbago, periodical amaurosis, diplopia, paralysis, &c. A case of *neuralgia,* after amputation, has been reported as cured by it.[1] The patient was attacked by agonizing pains, not only in the stump, but also in the opposite thigh, accompanied by convulsions and fainting. In this state, two needles were planted in the course of the sciatic nerve. These produced no effect, but as soon as the third was introduced, the patient exclaimed, "The doctor has struck the toe of my foot." The needle was then pressed still deeper, so as to pass through the nerve, and the pain immediately ceased. After the needles had remained in half an hour, they were removed, and the patient enjoyed a sound sleep and awoke free from pain. About twenty days afterwards, the pain recurred; the needles were again applied, and relief as instantaneously followed.

Several cases of *neuralgia,* removed by it, have been published by Prof. Riberi, of Turin.[2]

A case has been recently published by Dr. Seller,[3] in which it was employed with beneficial results in *protracted lockjaw,* connected with attacks of suppurating sore throat, and accompanied with hysterical and also inflammatory symptoms. The needles were usually inserted to the depth of half an inch, and sometimes an inch: most commonly, one was placed on each side of the mesial line, between the chin and hyoid bone; whilst sometimes two or three were introduced, one above another, as near as possible along the mesial line in the same region, and were kept in about a minute.

It is in *rheumatic affections* that its success has been most marked. Dr. Elliotson[4] cured 30 out of 42 cases by it in St. Thomas's hospital. In *sciatica* its efficacy has been evident.[5]

By Velpeau it has been proposed to cure *aneurism* by acupuncturation. In performing some experiments on animals, he found that arteries punctured by the needle became the seat of a coagulum, and were ultimately obliterated. In 1830, he read a paper before the *Académie des Sciences,* of Paris, proposing the operation in the cases in question.[6] He found, in his experiments, that whenever the needle remained three days in the flesh, the transfixed artery was completely obliterated.

M. Bonnet, Chirurgien-en-chef to the Hôtel Dieu at Lyons,[7]

[1] Bulletino delle Scienze Medich. Ottobre, 1838, cited in Brit. and For. Med. Review, Jan. 1840, p. 252. [2] Medico-Chirurg. Rev. April, 1841, p. 501.

[3] Northern Journal of Medicine, April, 1845, cited in Braithwaite's Retrospect, Amer. edit. xi. 189. New York, 1845.

[4] Art. Acupuncture, Cyclop. Pract. Med. Amer. edit. by the author, Philad. 1845.

[5] Renton, in Edinb. Med. and Surg. Journ. for 1830, xxxiv. 100; and Graves, in Lond. Med. Gaz. July, 1831, and Lond. Med. and Surg. Journal, April, 1833.

[6] Lond. Med. Gaz. cited in Amer. Journal of Med. Sciences, Aug. 1831, p. 510.

[7] Bulletin Général de Thérapeutique, cited in Dunglison's American Medical Intelligencer, for Dec. 1, 1837, p. 317.

treated eleven cases of *varicose veins* by introducing pins through their cavities, and allowing them to remain there some time. Nine of these cases were cured. The same treatment was applied to *herniary sacs*. He passed three or four pins through the herniary envelopes close to the inguinal ring; and in order that they might exert a certain degree of compression, as well as of irritation, on the sac, he twisted the points and heads upwards so as to give them a circular direction. The inflammation and pain usually commenced on the third or fourth day after the operation, and the pins were removed a few days afterwards. M. Bonnet had treated four cases of inguinal hernia by acupuncturation. In two, the hernia was small, and three weeks sufficed for the cure: the third was more troublesome. Caution is of course requisite not to injure the spermatic cord.

In a subsequent communication, M. Bonnet inculcates the necessity of causing the obliteration of the veins in several places separated from each other by short spaces.[1]

Acupuncturation has been revived[2] in the treatment of *hydrocele* by Mr. Lewis, Mr. King,[3] and others. It consists in carrying a common sewing needle—of the size used for sewing a button to a shirt—through the skin, the dartos and cremaster, into the bag containing the fluid, so that a drop of the fluid follows the instrument as it is withdrawn. It is executed in nearly the same manner as the ordinary method of tapping with a trocar, except that the needle, which should be oiled, cannot be plunged in so easily as that instrument. Mr. King suggests that the needle should be fixed in a handle, by which means it can be made to enter with comparative facility. After the operation, a compress, moistened with a discutient lotion, may be kept on the scrotum, and the patient may walk about or remain at rest, as may best suit him. The phenomena which present themselves in a few hours are as follows:—the swelling begins to be less circumscribed, and to lose its tenseness, and the areolar tissue of the scrotum becomes gradually more and more infiltrated with the fluid, which before distended the tunica vaginalis, and which, in the space of from twenty-four to forty-eight hours, will, according to Mr. King, have entirely changed place. In five or six days, the infiltration disappears, and the patient is cured. Mr. Lewis first introduced the method as a palliative, but he has seen cases where a radical cure was effected by it.[4] He considers the principle of puncturing with a fine pointed needle not only applicable to promote the absorption of the fluid in hydrocele, but in every case of *encysted dropsy*.[5]

[1] Archives Générales de Médecine, Mai, 1839. See, also, Dodd, in Medical Gaz., Dec. 20, 1839.

[2] Travers, in Lond. Med. Gazette, Feb. 1837, p. 737. Lewis, Ibid. Feb. 1837, p. 788. Mr. Robert Keate, Ibid. p. 789. [3] British Annals of Medicine, No. 1, p. 13.

[4] Davidson, in Edinb. Med. and Surg. Journ. for Jan. 1838.

[5] Lancet, May 7, 1836, and Jan. 14, 1837. See a case of Ovarian Dropsy, in which

Reference has already been made to the use of acupuncturation in *anasarca*. The author has used it advantageously to drain off the fluid from the areolar membrane. In such cases larger needles are needed; some prefer them to be of the size of an ordinary glover's needle, and of a triangular shape; a puncture of this kind being less likely to close.[1]

In the mass of cases, it need scarcely be said, this course can act merely in a palliative manner,—the cause of the dropsical accumulation persisting. Still, as Dr. Graves has remarked, under favourable circumstances, and in a good constitution, the simple operation of evacuating the fluid by punctures made through the skin, has been, of itself, sufficient to effect a cure. In a lady, under his care, general anasarca came on after fever, and resisted every form of treatment he could devise. When he had made many fruitless attempts to produce absorption by means of internal remedies, another practitioner was called in, who practised acupuncturation of the lower extremities, and succeeded completely.

Mr. Vowell[2] has published a case in which acupuncturation was successfully employed for the removal of a *ganglion*. A young lady under his care had been affected with a ganglion of considerable size on the extensor tendons of the foot, which produced not only disfiguration, but some uneasiness. Mr. Vowell applied blisters, and afterwards iodine ointment and pressure, for above a month, without benefit. He then inserted the tambour *porte-aiguille* of his patient. Pressure was applied, and within a week the tumour had completely disappeared.

M. Wiesel,[3] has narrated a case of *fracture of the two bones of the forearm*, in which, reunion of the bones not having taken place at the end of nine weeks, he had recourse to acupuncture with full success. He introduced between the two moveable fragments of the ulna two needles, sufficiently long to traverse the false articulation from side to side, and kept them in that position for the six following days, after which he withdrew them, because they had excited by their presence considerable swelling of the part and severe pain. Fifteen days afterwards, he traversed in the same manner the false articulation of the radius, with two other needles, which, at the end of a few days, caused sharp pain and slight suppuration. He then applied a simple bandage to the limbs, and in the space of six weeks complete consolidation had taken place.

When acupuncturation is conjoined with electricity or galvanism, it constitutes *electro-puncture*, and *galvano-puncture*.

it was employed by Robert D. Thompson, in Lancet, May 25, 1839, p. 344; and one of Ascites, by Mr. Campbell, Lond. Med. Gaz. Nov. 1838.

[1] Graves, Lond. Med. Gaz. Oct. 1838. See, also, King, Ibid. Oct. 7, 1837, and Nov. 25, 1837.

[2] Lancet, Aug. 25, 1838, p. 770.

[3] Gazette des Hôpitaux, Dec. 1843, cited in Braithwaite's Retrospect, Amer. edit. ix. 186. New York, 1844.

IX. ÆTHER HYDROCYANICUS.

Synonymes. Æther Prussicus, Hydrocyanic, or Prussic Ether, Hydrocyanate of Etherine, Cyanuret of Ethyle.
French. Ether Hydrocyanique.
German. Cyanäther, Cyanwasserstoffäther, Hydrocyanäther.

This preparation was discovered some years ago by Pélouze,[1] and, according to Magendie,[2] it resembles in its effects hydrocyanic acid, without being so violent a poison, and, consequently, he esteems it worthy of regard as an addition to the materia medica.

METHOD OF PREPARING.

Equal parts of *sulpho-vinate of baryta* and *cyanuret of potassium* are mixed intimately together; put into a glass retort, to which a tubulated receiver is adapted, and exposed to a moderate temperature. By distillation, a colourless, or slightly yellowish fluid is obtained, which separates into two distinct strata. The lighter consists chiefly of hydrocyanic ether, which is not pure, however, but mixed with water, alcohol, sulphuric ether, and hydrocyanic acid. In order to purify it, it must be strongly shaken, and, with four or five times its bulk of water, must be exposed for some time to a temperature of 60° or 70° centigrade; it must be again agitated with a little water, decanted, suffered to remain in contact with chlorinated lime for twenty-four hours, and then distilled. The ether thus obtained is pure. It is a colourless fluid, of a penetrating, disagreeable garlicky odour. Specific gravity 0.78. It boils at 82° centigrade; is very slightly soluble in water, but soluble in every proportion in alcohol and sulphuric ether. In its pure state, it does not disturb a solution of nitrate of silver. It inflames very readily, and burns with a blue light. Potassa decomposes it with difficulty, and only when highly concentrated.

EFFECTS ON THE ECONOMY.

Six drops of this ether placed in the throat of a dog, occasioned, in a short time, deep respiratory efforts: the animal fell on its side, and convulsions succeeded, with considerable motion of the paws. This condition continued for four minutes, after which the effects gradually disappeared, and in the course of half an hour ceased. Six drops injected into the jugular vein rapidly caused death, with symptoms similar to those induced by hydrocyanic acid. According to Magendie, these experiments were frequently repeated by him with different modifications after which he ventured upon its administration in disease. He added six drops of the ether to a

[1] Journal de Pharmacie, xx. 399. Paris, 1833. [2] Formulaire:—dernière édition.

mucilaginous linctus, and prescribed it to a patient labouring under *hooping-cough*, who, in the course of a few days, derived signal benefit from it, and without complaining of its penetrating, disagreeable odour. The same good effects happened to several patients to whom he gave it in the Hôtel Dieu. But although the results were favourable in cases in which the hydrocyanic acid was indicated, he found it often necessary to discontinue it, on account of the invincible nausea which its smell induced. Magendie advises it in those diseases in which mixture of hydrocyanic acid have been found of service.

ÆTHER SULPHURICUS.

Synonymes. Æther Vitriolicus, Naphtha Sulfurica, Oleum Vitrioli dulce, Vitriol Naphtha, Sulphuric Ether, Letheon.
French. Ether Sulfurique.
German. Schwefeläther.

It is only within the last few years, that a class of agents has been introduced into the Materia Medica, which have received the name of *Anæsthetics*, a term used by Dr. Pereira[1] synonymously with narcotics, anodynes and paregorics, as "agents which diminish sensibility or relieve pain;" but he adds, that the term is commonly applied to agents which diminish common sensibility, or sensibility to pain. As remarked elsewhere,[2] however, it is most generally employed to designate such agents, when received into the lungs in the form of vapours or gases; and the vapours most used are those of ether and chloroform.

It has been long known, that the vapour of ether would cause exhilaration and intoxication when breathed from a bladder, a practice which, as the author has been informed, was a popular diversion thirty or forty years ago in Philadelphia. As long ago as the year 1805, it was used to relieve the distress in the last stage of pulmonary inflammation in the case of a gentleman in Boston: in like cases it has been frequently prescribed since, and it was so prescribed in the year 1812, to a member of Dr. J. C. Warren's family, who experienced great relief from it. The mode of applying it was by moistening a handkerchief and placing it near the face of the patient. It was not, however, until October, 1846, that it was brought forward prominently as an anæsthetic in surgical operations. Dr. W. F. G. Morton, a dentist of Boston, about the middle of that month, informed Dr. Warren, that he had possession of a means for accomplishing the object;—that he had made trials of its efficacy in the extraction of teeth, and was desirous

[1] The Elements of Materia Medica and Therapeutics, 3d edit., i. 203. Lond. 1849.
[2] General Therapeutics and Mat. Med., 4th edit., i. 344. Philad., 1850.

that Dr. Warren should test its power in surgical operations.[1] Accordingly, at the Massachusetts General Hospital, its merits were tested by Drs. Warren and Hayward, and the results being satisfactory, the trials were soon repeated there and elsewhere, in this country and abroad; and very speedily "etherization"—as it was termed—came to be regarded as one of the most important gifts presented by science to humanity. Although, however, it was first promulgated at the period above described, it is affirmed by Dr. C. W. Long,[2] of Jefferson, Jackson co., Georgia, that as early as the 30th of March, 1842, he removed a tumour from a patient who inhaled the vapour of ether from a towel, without any pain being experienced.[3]

METHOD OF PREPARING.

The officinal sulphuric ether of the pharmacopœias is usually employed for inhalation. The specific gravity of that of the Pharmacopœias of the United States and London is .750; of the Dublin, .765; and of the Edinburgh, .735, or under. The last is the best for the purpose. The article employed by Dr. C. T. Jackson was prepared as follows. The strongest and purest rectified sulphuric ether, which can usually be obtained from the druggists, is agitated with water for the purpose of removing all acid. It is then freed from the water it may have taken up by chloride of calcium. The specific gravity of the product is about .725.[4]

EFFECTS ON THE ECONOMY IN HEALTH.

The effects of all anæsthetics are essentially alike; and since their recent introduction numerous experiments have been made with them by distinguished physiologists and surgeons,—as by a committee of the Surgical Society of Ireland,[5] by Flourens,[6] Longet,[7] Amussat,[8] Holmes Coote and Thomas Taylor,[9] Ville,[10] Gruby,[11] Thomas Wakley,[12] Gérardin and Verrier,[13] Snow,[14] Chambert,[15] Buchanan,[16] Black,[17] Schuh, Jörg, Von Bibra, Harless[18] and others,

[1] Etherization, with Surgical Remarks, by John C. Warren, M. D., p. 4, Bost., 1848. See, on the origin of the inhalation of ether as a means of preventing pain in surgical operations, the Report of the Board of Trustees of the Massachusetts General Hospital, Boston, 1848. [2] Southern Medical and Surgical Journal, Dec. 1849.

[3] On the history of ether inhalation, see Dr. Ranking, in Half-Yearly Abstract, Amer. edit. v. 328, Philad. 1847, and Report of the Committee on Surgery in Transactions of the Amer. Med. Association, i. 179, Philad. 1848.

[4] Warren, Op. cit. p. 93. [5] Dublin Medical Press, Feb. 10, 1847.

[6] Lancet, April 17, 1847. [7] Archives Générales de Médecine, Mars, 1847.

[8] Comptes Rendus, 22 Févr. 1847. [9] Lancet, June 19, 1847.

[10] Ibid. July 10, 1847. [11] Lond. Med. Gazette, Dec. 24, 1847.

[12] Lancet, Jan. 1, 1848. [13] Comptes Rendus, 27 Dec., 1847.

[14] Lond. Med. Gazette, Jan. 1848.

[15] Bouchardat, Annuaire de Thérapeutique, pour 1848, p. 36.

[16] Lond. Med. Gaz. April, 1847. [17] Provincial Med. and Surg. Journ. May 5, 1847.

[18] Canstatt und Eisenmann, Jahresbericht, u. s. w., im Jahre, 1847, iv. 159, Erlangen, 1848.

and the results have been carefully noted.[1] All of them, when received into the lungs, readily enter the pulmonary blood vessels, and proceed to the great nervous centres, to exert on these their appropriate agency. As a general rule, perhaps, the intellectual and moral manifestations first exhibit their influence through the excitant action of the anæsthetic on the great cerebral and cerebellar ganglia, so that a kind of intoxication supervenes, with imperfect power of regulating the movements. The sensory ganglia become subsequently or simultaneously affected, and sensation and motion are suspended; and ultimately, if the quantity inhaled be sufficient, the medulla oblongata has its action suspended or destroyed; respiration ceases, and death is the consequence. Yet great irregularity occurs in the supervention of these phenomena, as in the hysteroid condition induced by the animal magnetizer. At times, the intellect appears to be but little affected, whilst ordinary sensation is obtunded; and, at others, morbid sensation or pain is blunted, whilst ordinary feeling persists. The supervention of anæsthetization is known by closure of the eyelids, if they have been previously open; failure to respond to questions, and muscular relaxation. Whilst the patient is under the influence, the pulse and the respiration must be carefully attended to. If they fail, or if the pupil, after having been contracted, becomes dilated, the inhalation must be immediately discontinued, and the face be sponged with cold water, ammonia be applied as an excitant to the nostrils and throat, and frictions to the extremities; and M. Ricord[2] recommends, in cases of threatened death from chloroform, the immediate inflation of the lungs, by applying the mouth to the patient's lips.

It would appear from the experiments of Mr. Nunneley, M. Jules Roux[3] and others, that the local application of anæsthetics, as of narcotics in general, deadens the sensibility and power of motion of a part, whilst the nervous centres, and the nerves distributed to other parts of the body, may be unaffected. Mr. Nunneley instituted an extensive series of experiments on animals, and found, that by immersing a limb in a small quantity of the fluid, or by applying the vapour topically for a limited period, it might be rendered perfectly incapable of motion and feeling, and be fixed in any desired position.

It was but natural to suppose, that the indiscriminate employment of so potent an agent, should, in some cases, give rise to unpleasant, and even fatal results. Yet when we reflect on the immense number of persons who have been subjected to the inhalation of ether, the surprise is, that so few examples of injurious consequences should have been recorded.

[1] See H. J. Bigelow, Anæsthetics, their mode of exhibition, and physiological effects, in Transactions of the Amer. Med. Association, ii. 197, Philad. 1848.

[2] Ranking's Half-Yearly Abstract, xi. 191. Amer. edit. Philad. 1850.

[3] Gazette des Hôpitaux, 7 Nov. 1848.

The most remarkable ill effects noticed by Dr. Warren,[1] were of two kinds; *first*, those caused by the exclusion of oxygen; and *secondly*, those from excessive etherization of the nervous centres, —the principal morbid effect from the latter cause being general convulsions—at times, so violent as to threaten life; but generally by suspending the inhalation, and employing the free affusion of cold water, the convulsions ceased. Cases in which distressing nervous and other phenomena supervened are related by Dr. Warren, Mr. South, Professor Syme,[2] Professor Murphy,[3] Mr. Lawrence of Montrose,[4] Mr. Copeman,[5] Dr. Bennett,[6] Mr. Eastman,[7] Dr. H. J. Bigelow,[8] Dr. N. R. Smith,[9] and others. Accidents have, however, been ascribed to it on no foundation. Thus, Dr. Pickford[10] states, that a medical friend in Dublin informed him, that of thirty fatal cases following operations in which ether had been employed in the various hospitals of that city, eight were found to be the subjects of recent tubercles of the lungs,—the undoubted product, it was believed, of inhalation,—a statement which Mr. Macdonnell[11] denounces as altogether groundless.

Professor Syme, Dr. Roberts[12] and others, witnessed inconvenient effects from the inhalation of ether, and the editor of the Monthly Journal of the Medical Sciences observed great excitement, cough, with expectoration of pus, hæmoptysis, and convulsions. In some cases, erotic feelings, and even nymphomania occurred in females: in others, hysterical symptoms, or those of depression, or intense headach, which continued several days; and similar phenomena have presented themselves to the author. Fatal cases, too, have occurred, which have been ascribed to the inhalation, by M. Jobert, M. Roux, Mr. Nunn, Dr. Maclagan, Mr. Robbs, M. Blandin,[13] M. Piédagnel,[14] Dr. Paul F. Eve,[15] Dr. J. W. B. M'Clellan,[16] and others. Fatal cases are, however, much more rare than they were some time ago; and this is probably owing to more care being taken in its administration, and in the discrimination of cases for which it is adapted.

It is proper to remark, that from tables published by Professors Simpson and Malgaigne, showing the mortality of surgical operations in the British and French hospitals, where anæsthetics had

[1] Op. cit. p. 24. [2] Monthly Journal of Med. Science, Aug. 1847.
[3] Lancet, Nov. 27, 1847. [4] Monthly Journal, June, 1847.
[5] Provincial Med. and Surg. Journal, Feb. 10, 1847. [6] Monthly Jour., June, 1847.
[7] Lond. and Edinb. Monthly Journal, June, 1847.
[8] Transactions of the American Medical Association, i. 209, Philad. 1848.
[9] Ibid. ii. 214, Philad. 1849. [10] Edinb. Med. & Surg. Journ. July, 1847.
[11] Provincial Med. and Surg. Journ., July 14, 1847.
[12] Monthly Journal of Medical Science, April, 1847.
[13] Gazette des Hôpitaux, 23 Nov. 1847. See, also, the details of a case at the Hôtel Dieu, of Paris, in Journ. des Connois Medico-Chirurg., cited in Ranking's Half-Yearly Abstract, Amer. edit. vii. 191. Philad. 1848.
[14] Cited in the Amer. Jour. of the Med. Sciences, April, 1848, p. 558.
[15] Southern Med. and Surg. Journ. June, 1849.
[16] Transactions of the Amer. Med. Association, i. 192, Philad. 1848.

been used, and where they had not, it would appear that the mortality was decidedly greater where they were not employed; and hence it has been inferred, that where the employment of chloroform has sacrificed one life, it may have preserved a hundred.[1]

During the inhalation of ether, the blood has been observed to lose its florid colour by Mr. Pring,[2] M. Amussat, Dr. Ranking,[3] and numerous others. M. Lassaigne,[4] however, states that such was not the result of his observations.

The morbid appearances presented by animals killed by the inhalation of ether have been similar to those observed in asphyxia; fluidity of the blood; accumulation of that fluid on the right side of the heart and large veins, with engorgement of the internal viscera. In a fatal case, seen in the Royal Infirmary of Edinburgh, there were found double pneumonia, bronchitis, and secondary purulent deposits in the joints. In a case recorded by Mr. Nunn, cerebral congestion, engorgement of the lungs posteriorly, and uniform fluidity of the blood, were found. In another case there was no great congestion; but the blood was fluid throughout. The observations of MM. Amussat and Lassaigne showed, that in every case it loses its power of coagulation, although, with the exception of the presence of a minute quantity of ether, its chemical characters are unchanged.[5]

From a careful comparison of the effects produced on the economy by different anæsthetics, Dr. Hayward[6] decidedly prefers sulphuric ether to either chloric ether or chloroform,—its great advantages being, in his opinion, "its entire safety, the ease with which it is administered, and the slight inconveniences which follow its administration."

EFFECTS ON THE ECONOMY IN DISEASE.

It was in severe surgical operations that anæsthetics were first employed in the way of inhalation; and until the discovery of chloroform, sulphuric ether was used almost solely, and generally with the most gratifying results. As soon as the intelligence reached Europe it was at once laid hold of by the most distinguished surgeons, by Messrs. Liston, Key, Ferguson, Lawrence, Skey,[7] and others, in England; by MM. Malgaigne, Velpeau, Roux, Robert, Paul Guersant, Leroy d'Etoilles, and others,[8] in France; and by Blumhardt, Dieffenbach, Schuh, Heyfelder, and others, in Germany.

[1] Report of the Committee on Surgery, Dr. N. R. Smith, Chairman, in Transact. of the Amer. Med. Association, ii. 215. Philad. 1849.
[2] Lancet, May 1, 1847.
[3] Half-Yearly Abstract, Amer. edit. v. 335. Philad. 1847.
[4] Cited in Provincial Med. and Surg. Journ., May 5, 1847.
[5] Monthly Journal of Medical Science, April, 1847.
[6] Remarks on the Comparative Value of the Different Anæsthetic Agents. Boston, 1850.
[7] Amer. Journal of the Med. Sciences, April, 1847, p. 506.
[8] Bouchardat, Annuaire, 1848, p. 35.

Not long after its introduction in this country, nineteen cases of surgical operations performed on patients rendered insensible by it were recorded by Dr. J. Mason Warren,[1] of Boston; and since then the testimony in its favour has been so overwhelming and numerous, that it is impracticable even to enumerate the different authorities. Mr. Wells, of the English navy, soon reported the favourable results of one hundred and six cases.[2] Fractures and dislocations were happily arranged under its influence, by Dr. Warren, Dr. Parkman,[3] Mr. Dehane,[4] J. Caunt,[5] and others. Mr. Lawrence[6] reported that it had been used in St. Bartholomew's Hospital in all descriptions of operative procedures between two and three thousand times without a single unpleasant result. Dr. Snow,[7] too, appears to have been most fortunate in his cases; for with the exception of headache on one or two occasions, the only unpleasant effects he had witnessed were sickness and vomiting, and these only occasionally. Mr. Humphrey,[8] in several hundred cases in which ether or chloroform had been inhaled, saw serious neuropathic phenomena in only four or five cases; and beyond these never witnessed more than headache, sickness, and giddiness, lasting for a few hours; and these symptoms supervened but occasionally; whilst in one hundred and six cases Mr. Wells[9] saw no serious ill effects in any.

There is scarcely a painful operation practised by the surgeon, oculist, or dentist, in which ether inhalation has not been employed. Among the earlier recorded cases were an *amputation of the thigh* by Dr. J. M. Warren; *extirpation of a tumour of the mamma* by Dr. J. C. Warren; an *operation for necrosis of the tibia* by Dr. Townshend; *reduction of strangulated hernia* by Dr. J. M. Warren,[10] and Dr. Hosack;[11] *sounding for stone*, and *lithotrity*, by Dr. J. C. Warren; *stricture of the urethra, with fistulous openings*, by Mr. Liston; *lithotomy*, by Mr. Tatum; an operation for *fistulous sinuses by the side of the rectum*, by Mr. Keate;[12] the removal of *tumours in various parts*, by Mr. Syme;[13] *extirpation of the mamma*, by Dr. Jas. Bryan;[14] *amputation of the thigh*, by Dr. Mütter;[15] *extirpation of the eye*, by Mr. Lawrence and M. Velpeau;[16] and it has been inhaled in all cases of removal of tumours and plastic operations on the eyelids; but in operations, such as strabismus,

[1] Boston Med. and Surg. Journal, March 24, 1847.
[2] Lond. Med. Gazette, Sept., 1847. [3] Warren, Op. cit., pp. 44 and 46.
[4] Provincial Med. and Surg. Journal, Sept., 1847. [5] Lond. Med. Gaz., June 4, 1847.
[6] Amer. Journ. of the Medical Sciences, April, 1848, p. 551.
[7] On the Inhalation of the Vapour of Ether in Surgical Operations, &c. Lond., 1847.
[8] Provincial Med. and Surg. Journ., Aug. 9, 1848. [9] Lond. Med. Gaz., Sept., 1847.
[10] J. C. Warren, Etherization, with Surgical Remarks, p. 53. Boston, 1848.
[11] Boston Med. and Surg. Journ., Aug. 11, 1847.
[12] Snow, Op. cit., and Ranking's Half-yearly Abstract, Am. Ed., vi. 97, Philad., 1848.
[13] Monthly Journal of Medical Sciences, Aug. 18, 1847.
[14] Med. Exam., June, 1847, p. 332. [15] Ibid., Jan., 1848, p. 14. [16] Ranking, vii. 248.

which require, at times, the exercise of volition, anæsthetics are not indicated; and in those for cataract, artificial pupil, &c., Mr. Wilde[1] considers the amount of pain does not demand their use.

The following list, drawn up by Klencke,[2] will give a view of many of the operations in which it is recorded to have been used in the year 1847:

1. Extirpations:—Of *encysted tumours*, by Schuh, Strodel and Hörnig.

Of *cancer and similar tumours*, by Schuh, Pitha, Heyfelder, Opitz, Haller, Hayward, Pereshaw, Clement, Velpeau, Malgaigne, Landouzy, Ricord, Roux, Sédillot. Of *cancer of the lip*, by Pitha, Heyfelder, Maison-neuve. Of *ranula*, Heyfelder.

Of *condylomata*, by Thomson, Fergusson, Bruns, Mikschik, Flor, Schubert and Kraus, and Von Brunner.

Of *telangiectasis*, by Schuh and Pitha.

Of *nasal polypus*, Schulz.

Of *glands.—Mammary gland*, by Liston, Leblanc, Brookes, Bouchacourt, Goyrand. *Parotid gland*, Heyfelder. *Tonsils*, Roux.

2. Herniotomy.—Key, Partridge, Schuh, Pitha, Von Riffel, Heyfelder. *Radical operation* (after Gerdy), Kraus, of Prague.

3. Lithotomy.—Morgan, Guersant, Balassa, Lithotrity, Leroy d'Etiolles.

4. Strictures.—Fergusson. *Operations for fistulæ*, Pitha, Heyfelder.

5. Urethrotomy.—Pétrequin.

6. Phimosis.—Fergusson, Thomson, Schuh, Sigmund, Opitz, Reisinger, Balassa, Von Riffel.

7. Castration.—Sigmund and Bonnet.

8. Hydrocele.—Ricord, Jobert, Opitz, Schuh, and Balassa.

9. Harelip.—Heyfelder, Pitha.

10. Ligature of the Crural Artery, by Von Riffel.

11. Amputations.—*Of the thigh*, Hayward, Lansdown, Coleman, Liston, Malgaigne, Jobert, Th. Bell, Chiari, Raymonet, Duncan, Schuh, Pitha.

Of the leg. Hawkins, Leblanc, Sédillot, Haller, Pitha, Dumreicher, Opitz, Reisinger.

Of the arm. Velpeau, Schuh, Sigmund.

Of the forearm. Liston.

Of the hand. Velpeau, Goyot, and Duval.

Of the finger. Pétrequin, Kraus, Martin, Heyfelder, Pitha, Sigmund.

Of the teeth. Fairbrother, Tracy.

12. Exarticulations.—*Of the foot-joint*, Pitha. *Of the teeth*, Pitha, Sigmund, Opitz. *Of the finger*, Guersant, Voille-

[1] Dublin Quart. Journ. of Med. Science, May, 1848.

[2] Canstatt und Eisenmann, Jahresbericht, u. s. w., im Jahre, 1847, iv. 163.

mier, Macmurdo, Von Riffel, Liston, Cooper, Velpeau, Maisonneuve, Pitha, Opitz, Kraus of Prague, Sigmund, Kahler.

13. Resections.—*Removal of sequestra*, Miller, Pitha, Sigmund, Dumreicher, Sédillot. *Of the shoulder*, Nelaton. *Head of the humerus*, Pitha, Heyfelder. *Of the ulna*, Pitha. *Of the head of the os femoris*, Sigmund. *Of the tibia*, Sédillot. *Of the ankle-bone*, Pitha. *Of the lower jaw*, Wattmann, Pitha, Tracy.

14. Cartilaginous Concretions in the Joints.—Sigmund.

15. Myotomy and Tenotomy.—Dumreicher, Schuh, Sigmund, Pitha, Behrend, Heyfelder.

16. Rhinoplasty.—Dieffenbach. *Stomatoplasty*, Liston.

17. Operations on the Eye.—*Blepharoplasty*, Sédillot, Brett. *Extirpation of a tumour*, Bigelow, Jüngken, Hammer. *Cyst in the Orbit*, Monod. *Strabotomy*, Brett, Malgaigne, Lorinser, Heyfelder, Hammer.

Cataract, Brett, Cotton. *Extirpation of the bulb*, Lawrence. *Staphyloma*, Arlt. Arlt also operated for *Trichiasis*, *Blepharophimosis*, and *Fistula lachrymalis*.

Of the bloodless operations—unblutige Operationen—the following were performed under the narcosis induced by ether:

1. *Reduction of incarcerated hernia*, by Pitha, Opitz, and Hörnig.

2. *Reduction of Luxations*, by Velpeau and Dumreicher.

3. *Introduction of the Catheter and Bougies*, Fergusson.

The list of patients who inhaled ether or chloroform for surgical operations in the Massachusetts General Hospital to April 1st, 1848, as reported by Dr. H. J. Bigelow,[1] numbered 154; and included 9 amputations of the thigh, 11 of the leg, 4 of the arm, and 12 of the breast. Thirty-seven cases are reported by Dr. Watson,[2] as having been treated in the First and Second Surgical Divisions of the New York Hospital; 13 cases at the Clinic of the University of Pennsylvania are reported by Dr. H. H. Smith;[3] and 45 at the Clinic of the Jefferson Medical College by Dr. Mütter.[4] In 32 of these ether was employed; in the remainder chloroform.

When the practice had been followed less than a year, Mr. Lawrence reported, that the trials with ether in a single London hospital amounted to between two and three thousand cases. One dentist in that city, up to the middle of July, 1848, had administered anæsthetics more than three thousand times.

The physician has recourse to etherization in all cases which require the employment of other powerful narcotics and antispasmodics. It was found especially valuable in all the

Neuroses, by Kalinsky.[5]

[1] Transactions of the American Medical Association, i., 215. Philad., 1848.
[2] Ibid., p. 218. [3] Ibid., p. 220. [4] Ibid., p. 221.
[5] Canstatt und Eisenmann, Jahresbericht, u. s. w., iv. 167. Erlang, 1849.

Tetanus.—It has been employed successfully for the relief of *tetanic spasm;* but, as properly remarked by Dr. Warren,[1] whilst it may mitigate the distress of the muscular contractions, it cannot be expected to overcome the morbid condition of the spinal membranes, or the medulla they envelop, which he—in the absence of adequate evidence and of probability—considers to be inflammatory. In cases related by Dr. W. H. Ranking[2] and M. Roux,[3] of Cherburg, it appeared to act injuriously; and in another in which it was tried in France, death—it was conceived—was unquestionably hastened by it; whilst in others, reported by Dr. Brady[4] and Mr. Broughton,[5] it did not avert the fatal result. Cases are, however, recorded of its successful administration in tetanus, by Dr. Pertusio and Mr. Hawkesworth;[6] but they are regarded by Dr. Ranking[7] as by no means satisfactory. In cases related by Mr. Bransby Cooper,[8] Dr. Crawford,[9] and Dr. T. L. Ogier,[10] although it afforded temporary relief, it did not arrest the progress of the disease towards a fatal termination. A case, however, is related by Mr. Hopgood,[11] in a boy nine years of age, which was successfully treated by it; another by Mr. Chalmers;[12] another by Dr. Theobald,[13] of Baltimore; and another by Dr. Isaac Parrish;[14] and one of *Tetanus rheumaticus*, by Reichert.[15]

Hydrophobia.—A case is recorded by Mr. Allen,[16] in which the spasms were temporarily relieved by ether inhalation, without, however, the fatal event being averted.

Convulsions in a boy eleven years of age, were much relieved by it under the direction of Dr. Wyatt;[17] and a case in a child, five months' old, was completely cured by Dr. Sabin.[18]

Delirium tremens. A case is related by Dr. Upham,[19] in which sleep and quiet were induced by it; and similar cases are recorded by Dr. Anderson.[20] Dr. Stedman, too, used it with good effect.[21]

Insanity. Ether has been inhaled under the direction of M. Cazenave, of Pau, and of M. Jobert[22] and Dr. Boyd; and it ap-

[1] Etherization, with Surgical Remarks, p. 54. Boston, 1848.
[2] Provincial Medical and Surgical Journal, April 21, 1847.
[3] London Medical Gazette, Sept., 1848.
[4] Dublin Med. Press, cited in Ranking's Half yearly Abstract, v. 340. Philad., 1847.
[5] Provincial Medical and Surgical Journal, May 5, 1847. [6] Ibid, May 19, 1847.
[7] Half-yearly Abstract. Amer. Edit., v. 341. Philad., 1847.
[8] Lond. Med. Gaz., Aug. 6, 1847.
[9] British American Journal of Medical and Physical Science, Dec., 1847.
[10] South. Journ. of Med. and Pharm., Nov., 1847. [11] Med. Times, Jan. 15, 1848.
[12] Provincial Medical and Surgical Journal, June 30, 1847.
[13] Amer. Journ. of the Med. Sciences, Jan., 1848.
[14] Transactions of the College of Physicians of Philad., vol. ii., No. 4.
[15] Canstatt und Eisenmann, Jahresbericht, u. s. w., im Jahre 1848, iv. 177. Erlang, 1849. [16] Lancet, Oct. 15, 1847. [17] West. Journ. Med. and Surg., Ap., 1848.
[18] Boston Medical and Surgical Journal, April, 1848.
[19] Prov. Med. and Surg. Journ., Dec. 15, 1847. [20] New York Annalist.
[21] J. C. Warren, Etherization, with Surgical Remarks, p. 83. Boston, 1848.
[22] Cited in Med. Gaz., May, 1847, and Brit. and For. Med. Rev., April, 1847.

pears to have occasionally tranquillized, without any evil consequences.[1]

Neuralgia. Its good effects in this disease have been deposed to by Kalinsky,[2] especially in *hemicrania;* and by Morris,[3] Semple,[4] Honoré, Christison,[5] and others.

Hysteria. A case in which the inhalation of ether proved successful in subduing hysteric symptoms after every kind of treatment had been used for four days without effect, is related by Mr. Wilkinson; and another fortunate case by Ducros.[6]

Asthma. Dr. Willis[7] and Mr. Cantrell[8] have employed it successfully. The latter states that he had long used it prior to its recent introduction as an anæsthetic. In

Obstinate Hiccough, it was prescribed with advantage by Dr. Christison;[9] and in

Hooping-cough, it is spoken favourably of by Dr. Willis[10] and Max. Simon.[11]

Laryngismus stridulus. A very severe case was materially benefited by the use of a sponge saturated with ether. Dr. Ranking[12] saw the case with Mr. Image, who reports it. It has also been used successfully in

Colica Pictonum, by M. Bouvier;[13] and in *flatulent colic* by Höring.

Renal Calculi. In the intense suffering attending the passage of a renal calculus—*nephritic colic*—inhalation of ether has been prescribed with signal advantage by Dr. Ware[14] and Dr. Griesinger; and in

Dysmenorrhœa, by Dr. Griscom.[15]

Ophthalmia. In violent cases, M. Guersant[16] has employed at the Hôpital des Enfans Malades, of Paris, a collyrium composed of one part of nitrate of silver, and four parts of water, with great advantage. The pain is often, however, so great, that he has had recourse to the inhalation of ether with marked success to enable him to make the application. Dr. Mackenzie[17] advises the inhalation in many forms of ophthalmia, especially where there is much photophobia; but the duration of the ophthalmia did not seem to be curtailed; and Dr. Smith,[18] of Cheltenham, by its agency, was

[1] Drs. Ray and Bell, cited in Trans. of the Amer. Med. Assoc., iii. 79. Philad., 1850.
[2] Canstatt und Eisenmann, Jahresbericht, u. s. w., iv. 167. Erlang., 1849.
[3] Medical Times, cited in Ranking's Half yearly Abstract. Amer. Edit., v. 341. Philad., 1847.
[4] Lancet, March 27, 1847.
[5] Dispensatory, Amer. Edit., by R. E. Griffith, p. 152. Philad., 1848.
[6] Lancet, July 3, 1847.
[7] Ibid., March 20, 1847.
[8] Prov. Med. and Surg. Journ., May 19, 1847.
[9] Op. cit.
[10] Op. Cit.
[11] Canstatt und Eisenmann, Jahresbericht, u. s. w., im Jahre, 1848, iv. 177. Erlangen, 1849.
[12] Half-yearly Abstract, &c., Amer. Edit., v. 342. Philad., 1847.
[13] Canstatt und Eisenmann, Op. cit. iv. 177.
[14] Boston Med. and Surg. Journ., May 1, 1847.
[15] Transactions of the College of Physicians of Philadelphia, April, 1849.
[16] London Medical Gazette, June, 1847.
[17] Ibid.
[18] Wilde, Report on Ophthalmic Surgery, in Dublin Quarterly Journal of Medical Science, May, 1848.

enabled to examine and manipulate on the eyes of young children affected with *strumous ulcerations of the eye.*

Intermittent Fever. It is affirmed that Mr. J. W. Freer,[1] a pupil in the Chicago Hospital, employed ether in this malady with the most delightful results. Two or three inhalations invariably arrested the paroxysm instantaneously during the cold stage; brought on diaphoresis; and in cases where there was no unusual exertion, the paroxysms did not recur.

Phthisis. In the last stage of this fatal malady the inhalation of ether has been prescribed by Dunker,[2] and it has exerted a manifestly soothing influence: it has been ably and forcibly urged, too, by one[3] who has had much to do with the introduction and promulgation of anæsthetics in the treatment of disease, that in incurable affections, when the melancholy termination approaches, it may be highly desirable to administer them with the view of rendering death easy,—of inducing *euthanasia.*[4]

Feigned diseases. Ether inhalation has been employed to detect them. M. Baudens[5] records two cases—one of simulated, the other of real infirmity—in which it detected the fraud. If volition be overpowered by it, the deception can no longer be maintained. M. Bayard,[6] however—and the Editor of the Medico-Chirurgical Review for October, 1849, accords with him—is of opinion, that owing to the occasional results which follow the use of anæsthetics, especially of chloroform, and the uncertainty of the revelations obtained through their aid, they ought not—and the remark applies especially to chloroform—to be employed for the detection of simulated disease.

The obstetrician has largely employed the inhalation of ether and other anæsthetics to relieve the intense suffering that accompanies severe labour; and experience seems to have shown, that whilst it effects this, and aids in the relaxation of the parts, it does not materially—or at all—diminish the parturient efforts. Professor Simpson,[7] of Edinburgh, was, perhaps, the first to employ the inhalation of ether in this relation, and was a strong advocate for its use until he had tested the virtues of chloroform, which he now employs exclusively. His opinion of the value of ether is supported by the testimony of Paul Dubois,[8] Professor Siebold,[9] M. Roux,[10] of Toulon, Dr. Channing,[11] Dr. Parkman,[12] M. Chailly,[13]

[1] Illinois and Indiana Med. and Surg. Journ. for Oct. and Nov., 1847.
[2] Canstatt und Eisenmann, Jahresbericht, u. s. w., im Jahre, 1848, iv. 177. Erlangen, 1849. [3] J. C. Warren.
[4] Etherization, with Surgical Remarks, p. 69. Boston, 1848.
[5] Comptes rendus, 8 Mars, 1847. [6] Annales d'Hygiène, xlii. 165—201.
[7] Monthly Journal of Medical Science, March, 1847; and Notes on the Inhalation of Sulphuric Ether in the Practice of Midwifery. [8] Lancet, March 6, 1847.
[9] Lond. Med. Gaz., June 11, 1847. [10] Gazette Médicale de Paris, 9 Octobre, 1847.
[11] A Treatise on Etherization in Child-birth. Boston, 1848.
[12] American Journal of the Medical Sciences, April, 1849, p. 343.
[13] Archives Générales de Médecine, Avril, 1847.

Dr. Lloyd,[1] Mr. Lansdown,[2] Dr. Protheroe Smith,[3] Dr. Jonathan Clark,[4] Dr. Lindsly,[5] Dr. Trask,[6] and numerous others. Objections have been brought against its use, many of which do not merit much notice. The strongest, perhaps, is the one urged by Drs. Radford,[7] Meigs, and others, that in instrumental deliveries more especially, "as in lithotomy and lithotrity," the sensibility of the patient is a safeguard against injury of the soft parts; but the argument is more specious, perhaps, than solid, as a careful operator could scarcely perpetrate such a blunder.[8] It has been very largely and successfully employed in instrumental and complicated labours. Two cases of *placenta prævia* were treated under its agency by Dr. Protheroe Smith;[9] and examples of its value where turning was required, are recorded by him as well as by Mr. Gordon,[10] Mr. Pickens,[11] and others. In numerous cases of *puerperal convulsions*, and in *forceps* and *craniotomy* cases, its value has been manifested.[12]

MODE OF ADMINISTRATION.

Various forms of inhaling apparatus have been devised. Many are referred to by Dr. Ranking;[13] and some of them by the author[14] in another work, with figures representing them. The vapour is most conveniently inhaled from a soft sponge, hollowed out on one side, to receive the projection of the nose, and saturated with the purest ether. The sponge, thus prepared, is applied over the nostrils, through which the inhalation must be made, leaving the mouth free to receive atmospheric air, and thus prevent the danger of asphyxia.

The time required to produce etherization is usually from three to five minutes, and the quantity generally found necessary, is about two fluidounces; but the effects must be carefully watched. Dr. Warren[15] remarks, that after careful inspection of two hundred cases of both sexes, of all ages, in a great variety of conditions of health and disease, etherized through a sponge, without reference to quantity, he has seen no immediate or consequent symptoms,

[1] Medical Times, March 27, 1847. [2] Lancet, June 5, 1847.
[3] Lancet, May 1, and July 31, 1847.
[4] Medical Examiner, October, 1847, p. 489, and March, 1848, p. 153.
[5] Transactions of the American Medical Association, vol. i., Philad., 1848; and Medical Examiner, June, 1848, p. 339.
[6] American Journal of the Medical Sciences, October, 1850, p. 341.
[7] Lancet, April 7, 1847.
[8] Answer to the Religious Objections advanced against the Employment of Anæsthetic Agents in Midwifery and Surgery, Edinburgh, 1848; and Anæsthesia, or the Employment of Chloroform and Ether in Surgery, Midwifery, &c., by J. Y. Simpson, M. D., &c., Philad., 1848; and a Correspondence between Professors Simpson and Meigs, in Medical Examiner, March, 1848, p. 145—April, 1848, p 205—and May, 1848, p. 269. [9] Lancet, July 31, 1847. [10] Ibid., July 14, 1847.
[11] Provincial Med. and Surg. Journ., Sept. 23, 1847. [12] Channing, Op. cit.
[13] Half-yearly Abstract of the Medical Sciences, v. 330, Amer edit Philada. 1847.
[14] General Therapeutics and Materia Medica, 4th edit. i. 383. Philad. 1850.
[15] Etherization, &c. p. 77. Boston, 1848.

which would lead him to embarrass the patient and the surgeon with a complex apparatus; and similar views are entertained by Dr. Hayward.[1] The irritability of the parts," the latter remarks, "with which the ether comes in contact, is by degrees overcome; then the sponge may be applied directly to the face, and, if necessary, compressed in some measure so as to exclude to a greater degree the atmospheric air. When the desired effect is produced, which is usually in from three to five minutes, the patient has no control over the voluntary muscles; he cannot speak; he cannot open his eyes, when directed to do so; his muscles become completely relaxed, and the pulse, which, at the beginning of the inhalation, is frequent, and often rises during the process to one hundred and forty beats in a minute or more, becomes slower, and I have very often known it fall to sixty. The patient is then insensible, and unconscious; and the surgeon may begin his operation with great confidence that he will inflict no suffering. The sponge should then be removed, and reapplied, from time to time, as circumstances may require. If the ether is not pure, longer time is necessary to produce the desired effect: the brain and nervous system are more excited, and the patient is occasionally violent for a time, and with difficulty controlled. Before using the ether, the sponge should be dipped in warm water, and then strongly compressed, leaving it slightly damp. The evaporation seems to go on better in this way, than when a sponge is used that has not been previously moistened. In the first instance, the ether should be poured over the inside of the sponge: about two ounces is enough. When more is required, it should be applied to the outside, as it is best not to remove the sponge from the face."

It has likewise been administered *per anum*, and M. Pirogoff,[2] of St. Petersburg, thought that the anæsthetic effects of the vapour were produced more speedily and with much less trouble to the patient. He found, that in from two to four minutes the odour of the vapour was perceptible in the breath, and the wonted effects supervened in from three to five minutes. The quantity of ether used varied from half an ounce to two ounces. Similar experiments were made by MM. Roux and Parchappe; and according to M. Velpeau, the former preceded M. Pirogoff.

[1] Remarks on the Comparative Value of the Different Anæsthetic Agents. Boston, 1850.

[2] Gazette Médicale de Paris, 8 Mai, 1847.

XI. ALU'MINÆ SALES.

Synonymes. Salts of Alumina.
French. Sels d'Alumine.
German. Thonerdensalze.

In making experiments on the agency of various substances as antiseptics, M. Gannal[1] discovered that the aluminous salts are alone possessed of the property of preserving animal matters,—"their bases combining with geline to form a special compound, the acid being set free." He found the aluminous deliquescent salts to be, of all saline substances, those that afford the most satisfactory results. The ACETATE of ALUMINA and CHLORIDE of ALUMINIUM succeeded perfectly. A mixture of equal parts of chloride of aluminium at 20° Beaumé (s. g. 1.161,) and of the acetate of alumina at 10° (s. g. 1.075,) proved as good an injection as we possess for the preservation of dead bodies.

The preservation of animal substances appears to depend upon the combination of geline with alumina: but the acid sulphate does not possess enough of the preservative element; and hence M. Gannal was driven to the employment of the salts of alumina that are richer in alumina, and more soluble in water. Of all these, the SULPHATE of ALUMINA was found to merit the preference, owing to its being of simple preparation and moderate price.[2] It may be made by the direct combination of *alumina* and *sulphuric acid;* and contains 30 *per cent.* of the former to 70 *per cent.* of the latter. A kilogramme—about two pounds, eight ounces, and a dram and a half troy—dissolved in two quarts of water, and costing twenty cents, M. Gannal found to be sufficient, in winter, to preserve a body fresh by injection for three months. To preserve it for a month or six weeks, it was not even necessary to inject the blood-vessels,—an enema of one quart, and the same quantity injected into the œsophagus being sufficient for the purpose. In hot weather, the solution must be stronger, or in greater quantity, and it should be injected into the carotids.

The acetate of alumina, of which M. Gannal made use, was prepared by the addition of *acetate of lead* to *sulphate of alumina and potassa.* The acetate of alumina, thus prepared, at 18° of Beaumé's areometer, and in the quantity of five or six quarts, was sufficient to preserve a body for five or six months. This salt of alumina is, however, too costly; and, therefore, cannot be employed in amphitheatres, where large quantities are required.

In the report on M. Gannal's memoir presented to the Institute of France, the commission adduce, in favour of his plan, the

[1] History of Embalming, &c. by J. N. Gannal. Paris, 1838, translated by R. Harlan, M. D., p. 203. Philad. 1840. [2] Ibid. p. 233.

experience of MM. Serres, Dubreuil, Bourgery, Azous, Velpeau, and Amussat. "In the month of June, 1836," says M. Serres, "in the amphitheatre of the hospital, the body of a man, 22 years of age, was injected. Left to the open air, in a room exposed to the south, and upon a wooden table, it was preserved until the month of September, and was ultimately mummified. In the month of July, eight bodies were injected for dissection, and kept fifteen days. During the months of August and September, sixty subjects were injected. They were kept for twenty days." From these experiments, M. Serres concluded, that the liquid furnished by M. Gannal, permitted the dissection of bodies during summer, which had not been practicable in the anatomical schools of the hospitals of Paris; and that it gave to the instruction in operative medicine a development which it had not previously enjoyed; for, during the months of August and September, they were enabled to have thirty bodies at a time on the tables as in the middle of winter, so as to enable them to repeat before the students all the operations required in a regular course of operative surgery. For his discovery the Institute of France awarded M. Gannal the grand Monthyon prize of 1600 dollars, which was established for the discovery of any means calculated to remedy the unwholesomeness of any art or profession.

A useful application of M. Gannal's process is said to have been made by the police of Paris, in preserving bodies for many weeks in the Morgue or dead-house, where suspicions of murder required an unusual retention of the body above ground.[1]

Specimens of pathological anatomy, preserved in the liquid of the injection, were not exempt, according to Dr. Harlan, from the usual inconvenience attached to similar preparations in a solution of chloride of sodium and other salts,—being equally liable to incrustations, so as to require a change or renewal of the solution.

The salts of alumina have been used in this city with the view of temporarily preserving the dead; and a case has been published in which the acetate was employed; but the corrosive chloride of mercury was used along with it, which was unnecessary. In the afternoon of the day on which the individual died, the abdominal aorta was injected upwards and downwards with a saturated solution of corrosive chloride in alcohol; and on the following day, a saturated solution of acetate of alumina was thrown in, "which," says Dr. Sharpless,[2] "had the immediate effect of giving the whole body a manifest rose colour, making it resemble life in a remarkable degree."

The salts of alumina have been chiefly employed to prevent putrefaction in the dead body; but they might be used with eminent advantage as external applications in cases that require the topi-

[1] Harlan, Appendix to Gannal, Op. cit., p. 254.
[2] Medical Examiner, Aug. 13, 1842, p. 513.

cal use of antiseptics. At the author's suggestion, they were so used at the Philadelphia Hospital, and were found to have an excellent effect in *ulcers* requiring antiseptic and detergent applications.[1] Two drams of the sulphate to half a pint of water is a good wash in such cases; but it may be made much stronger than this. Dr. George Johnson, of Georgia, used an injection of the sulphate with the happiest results in cases of *fetid discharges from the vagina*.[2] After handling pathological specimens, the author has found a saturated solution of the salt remove the offensive odour from his hands more speedily and effectually than any other antiseptic.

XII. AMMO'NIÆ PHOSPHAS.

Synonymes. Ammonium phosphoricum, Phosphate of Ammonia.
French. Phosphate d'Ammoniaque.
German. Phosphorsäures Ammonium.

Phosphate of ammonia has been recommended in some of the unofficial pharmacopœias and formularies, as an excitant, diaphoretic and discutient;[3] but it could scarcely be said to be employed in medicine, when it was brought forward by Dr. Thomas Buckler, of Baltimore, on chemical considerations, as "a new remedy for *gout* and *rheumatism*, as a solvent of *uric acid calculus*, and for diseases, acute and chronic, connected directly with the *lithic acid diathesis*."[4]

METHOD OF PREPARING.

Neutral phosphate of ammonia may be made by saturating a somewhat concentrated solution of *phosphoric acid* with *ammonia*, applying heat, and setting the solution aside, that crystals may form. Or, it may be formed by saturating the *excess of acid* in *superphosphate of lime* by *carbonate of ammonia*. Phosphate of lime will be precipitated, and phosphate of ammonia obtained in solution, which, being concentrated by a gentle heat, affords, on cooling, the salt in crystals.

EFFECTS ON THE ECONOMY.

From the facts of the frequent existence of lithuria in gout and rheumatism, and the sudden elimination of uric acid,—and that when chemists have examined the structural thickenings in those diseases, they have found a variable abnormous per centage of earthy matter, consisting for the most part of soda and lime,—and from other considerations, Dr. Buckler infers, that uric acid exists in the blood,—not in a free state, or it would be passed continu-

[1] M. J. Pennypacker, Med. Ex., April 1, 1843, p. 63. [2] Ibid. May 27, 1843, p. 112.
[3] Mérat and De Lens, Dict. Univ. de Mat. Med. &c., édit. de Bruxelles, 1, 115. Bruxelles, 1838. [4] American Journal of Medical Sciences, Jan., 1846, p. 108.

ously, but in a state of combination with soda or lime, or both. The predominance of lithic acid in the urine, he considers, generally heralds recovery from an acute attack of gout or rheumatism. "Taking into account," he observes, "these two prominent facts, namely, the excess of lithic acid found in the urine at the period of convalescence from an attack of gout or rheumatism, and the subsequent deposit of soda and lime in the white tissues, it occurred to me, that during the existence of these diseases, the lithic acid might exist in the blood in a state of combination with soda and lime, in the form of insoluble compounds, which the kidneys and skin refuse to eliminate. If, then, any agent could be found capable of decomposing the lithates of soda and lime existing in the blood, and of forming in their stead two soluble salts, which would be voided by the kidneys and skin, we should thereby get rid of the excess of fibrin in the blood, the symptomatic fever and the gouty and rheumatic inflammation, wherever seated, which have been excited by the presence of these insoluble salts: it occurred to me that phosphate of ammonia might be the agent, provided it could be given in doses sufficient to answer the end, without producing any unpleasant physiological symptoms. If our theory were true, phosphate of ammonia seemed to be the proper reagent, for it would form, in place of the insoluble lithate of soda, two soluble salts, the phosphate of soda, which is remarkably soluble, and the lithate of ammonia, which is also soluble, and both capable of being readily passed by the skin and kidneys. The excess of uric acid would thus be got rid of in the form of lithate of ammonia, and the soda floating in the round of the circulation, instead of being deposited, as it were, like an alluvial formation in the substance of the fibrous and cartilaginous tissues, would be taken up by the phosphoric acid and eliminated from the circulation."

With such views Dr. Buckler administered the phosphate of ammonia, and found that *thickening of the white tissues*, of long standing, disappeared under its continued use; that it was decidedly serviceable in attacks of *gout* and *acute rheumatism*, and that in many old hospital cases of *chronic rheumatism*, the patients, without a single exception, declared themselves better, and begged for a continuance of the medicine. In every instance, in the cases reported, it was found that where lithic acid was present in the urine, it at once disappeared under the use of the phosphate of ammonia. From this rapid disappearance of the acid from the urine, in every case, he was led irresistibly to the conclusion, that the phosphate of ammonia must prove the best agent for dissolving *uric acid calculus;* but he had had no opportunity for testing its efficacy in this respect.

The cases adduced by Dr. Buckler do not demonstrate to us, so strongly as they do to him, the marked efficacy of phosphate of

ammonia in the cases in question. It is proper also to remark that, according to the analysis of Berzelius, this salt exists in the urine in health, and we have no reason to believe that it is not present in gouty and rheumatic diseases also. Moreover, although there may be generally a predominance of uric acid in the urine, in gout and rheumatism, it is by no means clear that these diseases are dependent on contamination of the blood with undischarged urea and uric acid, as has been maintained by many.[1] "Several considerations," say Messrs. Ballard and Garrod[2]—able chemists —"prevent our subscribing fully to this doctrine, which we are not aware to be established upon aught but hypothetical grounds." Phosphatic deposits are frequently, indeed, observed in conjunction with gouty affections, and in many instances, it would seem, that tophaceous concretions contain no urate of soda, but in its stead phosphate of lime. In numerous cases of gout, the phosphatic predominance is indeed marked.[3] Keller,[4] again, in animadverting on the views of Mr. A. Ure, referred to under Acidum Benzoicum, remarks, that Mr. Ure "is certainly too hasty in recommending benzoic acid as a remedy for the gouty and calculous concretions of uric acid. He seems to suppose that the uric acid has been employed in the conversion of benzoic acid into hippuric acid; but as his observations were made on a gouty patient, it may be supposed that the urine, even without the internal use of benzoic acid, would have been found to contain no uric acid."

M. Mattei[5] of Bastia, has published some cases which appeared to him to exhibit the valuable agency of the phosphate in *gout* and *rheumatism* in the dose of about 30 grains; and Dr. S. Edwards,[6] confirms its advantages in diseases which appear to depend upon the presence of an *excess of lithic acid* or *lithates* in the blood. In *chronic articular rheumatism*, it appeared to be especially beneficial. As a solvent of lithic calculi his experience does not enable him to pronounce upon it, but his observations lead him to depose positively as to its powers to arrest the increase and perhaps the formation of them. In *lithic acid gravel*, he has frequently used it; and experience has taught him, that it creates a very rapid decrease and disappearance of the red crystalline sediment.

Sufficient time has not elapsed for experiments to have been made on a great scale, to test the qualities of the phosphatic salt in the cases described by Dr. Buckler. It has been already seen, that

[1] Williams, Principles of Medicine, Amer. edit. by Clymer, p. 131. Philad. 1844.
[2] Elements of Mat. Med. and Therap., p. 352. Lond. 1845.
[3] A. Ure, Provincial Med. and Surg. Journal, Feb. 11, 1843; cited in Braithwaite's Retrospect, vii. 47. Lond. 1843.
[4] Liebig's Animal Chemistry, Amer. edit., p. 315. Cambridge, 1842.
[5] Revue Médico-Chirurgicale, Dec. 1847.
[6] Provincial Med. Journal, Nov. 17, 1847; and Amer. Journ. of the Med. Sciences, Jan. 1, 1848, p. 239.

in the case of the benzoic acid, examples were not wanting to prove its efficacy in lithuria; although no one now can believe that it could have exerted any efficacy in the manner suggested. So far as the phosphate of ammonia has been given, it does not seem to have generally fulfilled the expectations excited by Dr. Buckler. In a trial made with it by Dr. C. Voigt,[1] in the dose of only about three grains, a series of alarming and highly irritative phenomena succeeded, caused, he thinks, by the violently irritating action of the salt on the stomach; yet Dr. Voigt had good reason to suppose that the preparation employed was pure.

In commenting on this case, Dr. Ruschenberger,[2] of the United States Naval Hospital, New York, states that he has employed phosphate of ammonia in nine cases in doses of ten grains, repeated every four hours. In no case was the article used for less than a week, and in several it was continued three, four, and even six weeks. The urine was tested before the medicine was prescribed, and during its use; but no change in its constitution was detected by reagents, nor was there any modification in its quantity or specific gravity. In one case only did any amelioration occur in the symptoms after the use of the salt; but whether this was owing to it he could not decide. Inasmuch, however, as no perceptible effects were induced in any of the other cases, his impression was that the phosphate is useless in the treatment of chronic rheumatism.

Since then Dr. H. Hartshorne, resident physician at the Pennsylvania Hospital,[3] has reported some cases of *rheumatism* in which the phosphate was prescribed by Dr. Pepper. The smallest dose given to an adult was ten grains, and in several cases it reached thirty grains, continued three times daily for a number of days. In two or three, in doses of twenty grains, it disordered the alimentary canal. Several of the cases recovered; but additional treatment was generally used—as Dover's powder at night, the warm bath, cupping, blisters dressed with morphia, mercurial ointment combined with narcotics, veratria ointment, &c. These, Dr. Hartshorne considers, may perhaps claim much of the credit of the cures, which were mostly very slow. The phosphate, he says, has been used by his father, Dr. Joseph Hartshorne, with such results as to incline him to think that it may be a valuable addition to our means of treatment of rheumatism.

MODE OF ADMINISTRATION.

The dose of the phosphate of ammonia is from ten to twenty grains, which may be given, dissolved in water, three times a day.

[1] Med. Examiner, May, 1846, p. 289. [2] Ibid. June, 1846, p. 342.
[3] Ibid. July, 1846, p. 397; and January, 1849, p. 49.

XIII. ANTHRAKO'KALI.[1]

SYNONYME. Lithanthrakokali.
German. Steinkohlenkali.

This article was first proposed by Polya, of Pesth, in the year 1837.

METHOD OF PREPARING.

Two forms are employed, the SIMPLE and the SULPHURETTED. The former is prepared by dissolving *carbonate of potassa* in 10 or 12 parts of *boiling water*, and adding as much *slaked lime* as will separate the potassa. The solution thus obtained contains only caustic potassa. The filtered liquor is placed on the fire in an iron vessel, and suffered to evaporate until neither froth nor effervescence occurs, and the liquid presents a smooth surface like oil. To this is added the *levigated coal* in the proportion of 160 parts to 192 parts of potassa. The mixture is stirred and removed from the fire, and the stirring is continued until a black homogeneous powder results. This powder is kept in a dry place.

To obtain the SULPHURETTED ANTHRAKOKALI, 16 parts of *sulphur* must be mixed accurately with the *coal*, and the mixture be dissolved in the *potassa* as directed above.

EFFECTS ON THE ECONOMY IN DISEASE.

Polya affirms, that Anthrakokali exerts its influence on the skin generally, and especially on *chronic cutaneous affections*. It has also been given beneficially by Felsach in *scrofula* and *chronic rheumatism*.

The dose of the simple and sulphuretted preparations is 10 centigrammes (gr. iss.) three times a day.

M. Gibert employs it externally in *chronic cutaneous affections*, in the form of ointment, which may be made of one drachm of the anthrakokali to from one to three ounces of lard.[2]

FULIGOKALI is an analogous substance.

XIV. AQUA AMYGDALA'RUM CONCENTRA'TA.

SYNONYMES. Water of Bitter Almonds.
French. Eau d'Amandes Amères.
German. Bittermandelwasser.

The water of bitter almonds has been received into many of the modern Pharmacopœias;—into those of Bavaria, Paris, Ferrara, Hanover, Hesse, and Prussia for example.

[1] From ἄνθραξ, 'coal,' and kali, 'potassa.' See MM. Jacobovics, in Gazette Médicale de Paris, Nos. 9 and 12; and Riecke, Die neuern Arzneimittel, u. s. w. 2te Auflage, S. 37, Stuttgart, 1840; also, Duhamel, American Journal of Pharmacy, Jan. 1843.

[2] Aschenbrenner, Die Neuern Arzneimittel, u. s. w. S. 23, Erlangen, 1848.

METHOD OF PREPARING.

The Pharmacopœia of Prussia directs it to be prepared in the following manner.—Take two pounds of *bitter almonds*, bruise them well, and add—whilst triturating them—ten pounds of *spring water*, and four ounces of highly *rectified spirit of wine*. Let the mixture rest for twenty-four hours in a well closed vessel, and then distil two pounds. The product must be kept in a well stopped bottle. Giese found the quantity of hydrocyanic acid contained in the product of the above formula half less than that in cherry laurel water; and Jörg, from his experiments upon himself and others, proved it to be much weaker and more uncertain.

Neither this preparation, nor the distilled aqua lauro-cerasi, is much employed in this country, or in Great Britain.

The inequality in the strength of the *Aqua lauro-cerasi* and of medicinal hydrocyanic acid suggested this preparation, which was extolled by Hufeland for its uniformity. Its effect is entirely like that of *Aqua lauro-cerasi*, but its greater regularity in strength and action has not been confirmed. Owing, indeed, to the uncertainty in strength of both these preparations, Liebig thinks, that physicians would act very judiciously were they to discard them, and substitute a certain amount of amygdalin dissolved in water, and mixed with emulsion of sweet almonds; as the remedy, prepared fresh every time when it is to be administered, will always possess the same composition. Seventeen grains of amygdalin yield one of anhydrous hydrocyanic acid; consequently, by mixing 34 grains of amygdalin with 66 grains of emulsion of sweet almonds, so that the total amounts to 100 grains, a fluid is obtained corresponding to the medicinal hydrocyanic acid of the Prussian Pharmacopœia (2 per cent.) A third of a grain of amygdalin corresponds to one grain of medicinal acid: the solution of one grain of amygdalin in three fluidounces of emulsion of sweet almonds contains, consequently, one grain of medicinal acid in every fluidounce of the mixture.[1]

Water of bitter almonds has been used by Dr. Hodgkin[2] as a means of allaying distressing itching, as in *prurigo senilis*. In some cases, it produced immediately a beneficial effect; in others, it was of no benefit, and caused smarting and irritation. Mr. May keeps a solution of *oil of bitter almonds* in the proportion of one part to seven of alcohol. This he uses as a substitute for hydrocyanic acid for internal administration; he gives about half a drop for a dose. Externally, he employs it of the strength of a drop of the solution to an ounce of water.

[1] Ranking's Half-yearly Abstract of the Medical Sciences, pt. ii., vol. 1, p. 346. Amer. edit. New York, 1846.

[2] Pharmaceutical Transactions, Sept. 1841; and Amer. Journ. of Pharmacy, Jan. 1842, p. 352.

XV. AQUA BINELLII.

Synonymes. Aqua Balsamica Arterialis.
Italian. Acqua Binelli, Acqua Balsamica Arteriale.
French. Eau de Binelli.
German. Binellisches Wasser.

Many years ago, this Italian nostrum was vaunted throughout Europe as a styptic in every kind of *hemorrhage*, both when employed internally and externally. By several Italian physicians—Cotugno, Antonucci, Santoro and others—it was found highly serviceable; and Von Gräfe[1] thought that he had observed good effects from it. This opinion was confirmed by the observations of Kosch, Vrolick, Metzger,[2] and Lesser. Subsequently, however, not only Von Gräfe, but Simon,[3] Dieffenbach,[4] and Dr. John Davy[5] found that it was not possessed of more efficacy than simple cold water.[6] This hæmastatic received its name, *Acqua Binelli*, from Dr. Fideli Binelli, the inventor. The first public trials to test its efficacy were instituted at Turin, in 1797, by order of the government; the results of which were esteemed favourable. Soon after this Binelli died; the secret of the composition and of the mode of preparing the nostrum were, however, communicated before his death to Gaetano Pironti, and Andrea Ferrara, who carried on a profitable trade with it for some time. The secret appears to have been lost; but in the years 1829, and 1830, it was affirmed to have been rediscovered, and fresh experiments were instituted, and over and over again repeated in Germany. Various blood-vessels were divided on animals,—the femoral and carotid arteries, and the jugular veins,—and the cuts were made in every direction,—longitudinally, obliquely, and completely across; and in all cases the hemorrhage yielded as soon as charpie or lint steeped in the Acqua Binelli was applied and pressed gently against the wound for five or ten minutes. Encouraged by these experiments, the liquid was tried on man and with seeming advantage; but it was soon found, that the results were not owing to any properties of the liquid, but rather to the cold, moisture, and appropriate pressure.

The author has given at length in another work[7] the results of the experiments and observations of Dr. Davy. They convey interesting information as regards the physiology, pathology, and therapeutics of wounded vessels, and impart a useful lesson to the

[1] Gräfe's Journal, Bd. xvii. S. 650.
[2] Ibid. Bd. xxvii.
[3] Horn's Archiv. 1833, Sept. und Oct. S. 926.
[4] Hecker's Literarische Annalen, 1833, S. 486.
[5] Edinb. Med. and Surg. Journ., July, 1833, or Researches Physiological and Anatomical, Amer. Med. Library edit. p. 379. Philad. 1840.
[6] E. Gräfe, Art. Kreosot, in Encyclopäd. Wörterbuch der Medicin. Wissensch. Bd. xx. S 536. Berlin, 1839.
[7] General Therapeutics and Mat. Med. 4th edit. ii. 112. Philad. 1850.

inquirer,—not to deduce inferences from inadequate data, without having investigated every collateral circumstance that may bear upon a question. The results of Dr. Davy's experiments show how hemorrhage from wounding a large artery, which would be speedily fatal, may be arrested by moderate compression with several folds of linen or cotton moistened with plain water; and they further show how, under this moderate compression, the wound in the artery may heal, and the vessel remain pervious, without the supervention of aneurism. Dr. Davy lays great stress on moderate pressure, such as may allow the blood to continue to pass through the artery.

At the meeting of the British Association in 1839, Dr. Macartney, of Dublin,[1] in alluding to the powers which nature possesses to repress hemorrhage, provided the surfaces be treated as an open wound with cold applications, related a case in which, after amputation of the hand of a child, the stump was dressed with lint kept wet with cold water, and in which no ligature was applied or required. This Dr. Macartney believed to be the first case on record in which amputation had been performed without the application of a ligature.

The Acqua Binelli is a perfectly transparent fluid, almost tasteless, and having a slightly empyreumatic odour; but neither the presence of salt, alkali, earth nor acid could be detected by the senses. It has been generally considered to be indebted for its fancied hæmastatic property to creasote in some form; but Dr. Davy's explanation appears to be sufficient to account for the phenomena.

M. Bouchardat[2] gives the following complex formula for the *Acqua Binelli* or *Acqua Monterossi*, of which, he says, great use is made in the civil and military hospitals of Naples. Take of the roots of *calamus aromaticus*, *bistort*, *consolida officinalis*, and *tormentilla*—each 250 parts; *oak bark*, *log wood*, of each 500 parts; *leaves of greater plantain; eupatorium* of Avicenna; *athanasia maritima; European sanicle; alchemilla vulgaris; sumac;* and *nettle;* flowering tops of *rosemary*, and *sage;* of each 1000 parts; flowering tops of *teucrium marum; dittany of Crete*, *peppermint*, of each 250 parts; flowering tops of *pennyroyal*, *catmint*, *lesser centaury;* and *achillea millefolium*, of each 1000 parts; *balsamide*, 250 parts; *Cyprus nuts*, 1000 parts; *white agaric* and *black pitch*, of each 500 parts. All the ingredients must be cut into small fragments, and be macerated in a sufficient quantity of water for twenty-four hours. When the liquid is wholly absorbed, a fresh quantity is added, so that the mass may be covered with water to the height

[1] London Athenæum, Aug. 31, 1839, or Med. Intelligencer, Oct. 15, 1839, p. 217.
[2] Annuaire de Thérapeutique, &c., pour 1843, p. 227. Paris, 1843.

of about four or five inches. It is then distilled so as to draw over about two thirds of the fluid employed.

The product of this distillation is, however, possessed of more marked properties than those of the Acqua Binelli described above. It is said to be astringent, and to corrugate bleeding and injured tissues, causing the formation of coagula, which prevent a farther discharge. It coagulates albumen. It is also employed internally in the various *profluvia*.

A substitute for the Acqua Binelli prepared by Professor Schultz is the following.[1]

Acqua Binellii factitia.

Factitious Acqua Binelli.

R. Ol. empyreumat. tabaci f ʒij.
—— animal. Dippel. gtt. xij.
—— Aq. destillat. f ʒviij. M.

Used externally only.

XVI. AQUA BROCCHIE'RII.

Synonymes. Brocchieri, or Brocchiari water.
Italian. Acqua Brocchieri.
French. Eau de Brocchieri ou Styptique de Brocchieri.
German. Brocchierisches Wasser.

This water strikingly resembles the Binelli water, both in sensible properties and action; and the same discordance of sentiment in regard to its virtues has existed amongst observers. It was largely used in Paris upwards of fifteen years ago; and the profession generally appear to have decided at that time that it was devoid of efficacy. Dr. Paris[2] examined it, but it appeared to him to be nothing more than water perfumed by some vegetable essence. "This supposed styptic," he remarks, "has made much noise in Paris, and is said to be even capable of arresting the flow of blood from a divided carotid artery! The method of applying it is to saturate tow with the liquid, and slightly press it upon the bleeding vessel, where it is to remain for fifteen or twenty minutes: the rapidity with which a coagulum is said to form, and the tenacity of it, are attested to be most extraordinary. In order to ascertain the fact, having procured a supply of it from Paris, through the kindness of my friend, Dr. Badham, I proceeded to the Veterinary College, and with the assistance of the professional gentlemen of that establishment, I made a very careful experiment upon an ass without the least effect."

[1] Bouchardat, p. 229.
[2] Pharmacologia, Amer. edit. from the 9th London edit. by Lee, p. 122. New York, 1844.

A few years ago, a gentleman who had visited Paris brought it over to this country, and it was again subjected to various trials, and whilst some deposed most strongly to its potency as a hæmastatic, others considered it to possess slight power; and others, again, denied that it had any styptic virtues whatever. Experiments, it is affirmed, were instituted before MM. Blanqui, Amussat, Lisfranc, and others,[1] of Paris, in which the effusion of blood from the carotid artery of a sheep was speedily arrested by it. Similar experiments were tried in New York by Dr. Barrabino, of the United States navy, and others; and in Charleston, by Dr. J. Lawrence Smith, and S. D. Sinkler, editors of the Southern Journal of Medicine and Pharmacy.[2] These last gentlemen thought it certain, that it arrests hemorrhage in a most marked manner, without either being styptic or cauterizing in its action. They considered that both it and ergotin "operate by a peculiar action upon the blood, or upon the walls of the artery. In the case of the Brocchieri water, nothing decisive is yet known, although it is stated, that the caliber of the artery is restored to its natural integrity," and they add:—"The composition of this water is unknown. It is colourless; of very slight acid reaction, very little taste, and this not astringent. Its odour is aromatic, and the only idea we are yet capable of forming of its nature, is, that it is water containing the volatile principle of some plant, over which it has been distilled."

In a subsequent communication, however,[3] after having experimented farther with the Brocchieri water, as well as with ergotin and creasote, they arrive at the following conclusions:—*First.* When Brocchieri water, ergotin, or a watery emulsion of creasote is applied to the wounded artery of a sheep, it depends greatly, if not altogether, upon the manner in which the lint is applied to the wound of the artery whether the hemorrhage is arrested or not. If it be placed immediately upon the orifice of the cut vessel, the success is certain; if, however, the vessel shrink from contact with the lint, the animal is almost certain to bleed to death. *Secondly.* By a small pledget of simple lint placed immediately upon the incision made into the carotid artery of a sheep, the hemorrhage is arrested in a few moments: and after a lapse of from twenty to thirty minutes, the animal may be let loose, without any apprehension of the return of the hemorrhage. If the lint be applied so as not to touch the wound in the artery, all effort to arrest the hemorrhage will be ineffectual. "From these results, it will be seen how many difficulties often attend the simplest experiments; and how important it is to leave no point, not the most apparently trivial, without close examination: it is true, it requires both time and trouble, but both are more than compensated for, by a know-

[1] Boston Medical and Surgical Journal, Jan. 14, 1846, p. 480.
[2] See the No. for March, 1846, p. 158. [3] Ibid. July, 1846, p. 406.

ledge that we become in possession of truths that are important to ourselves and to others." *Thirdly*. The sheep is an unfit animal to try the hemastatic powers of substances as regards the human subject; for although sheep will bleed to death by a wound in one of the larger arteries, still, by the application of a small pledget of lint, sustained with a little pressure immediately upon the wound in the vessel, the hemorrhage will cease, and the animal survive. The same, they are convinced, may be said of all the like experiments upon the lower classes of animals, as in many of them the hemorrhage from a large vessel will be arrested spontaneously. This is true—they say—of the dog, and so far as their knowledge extends, the sheep is more ready to bleed to death than any other quadruped. "Furthermore, the blood of an animal is more plastic, coagulating with far greater rapidity than that of man; and as the arresting of the hemorrhage in these experiments is dependent upon the formation of a clot around the opening, and in the cavity of the vessel, it ought, therefore, to happen more readily in them than in man." *Fourthly* and *lastly;* they conclude, that if the hæmostatic virtues of the agents, which they employed, are to be correctly ascertained, it is only by experiments upon the human subject; and no value, they think, should be given to those made in any other way. Whether the Brocchieri water, ergotin, and creasote will stand the test, they are not as yet prepared to say, owing to the discordant character of the results of experiments. They have no doubt that these substances hasten the coagulation of the blood, and that they may, under some circumstances, arrest hemorrhage from the smaller arteries; but in the case of the larger vessels, they are of no manner of use, at least not more so than the lint without them. The experiments made on the human subject that have come to their notice are:—wound on the hand; oozing for some time after the operation for hydrocele; oozing from a tumour on the back tried with Brocchieri water. In the first case there seemed to be no effect; in the last two some slight effect: the oozing in the case of the hydrocele, although diminished, could not be arrested. Hence they think, there is no danger of the ligature of vessels being supplanted by it.

Professor Mott, in a clinical lecture delivered on the 10th of January, 1846,[1] has the following remarks:—"I knew M. Brocchieri when I was in Paris: he is an uneducated man, and a perfect charlatan. When his discovery was made known in Paris, it created some stir; and I made several experiments with it, in connexion with several other gentlemen, one of whom was engaged in the preparation of the water. The subjects of the experiments were strong and healthy sheep, upon whose carotid arteries we operated, and we found that its power to stop hemorrhage was next to nothing, and where the bleeding was arrested, it was prin-

[1] New York Medical and Surgical Reporter.

cipally from the pressure made by the large quantities of lint, with which the wound was filled. Therefore, I say, as the result of my experience, that the styptic powers of this preparation are not to be relied upon for a moment; that it is infinitely less useful than an infusion of rhatany or tannin, and that it can never take the place of needles and ligatures. The other qualities that have been ascribed to it of curing disease, and arresting hæmoptysis are equally non-existent."

The Acqua Brocchieri was brought to the notice of the Medico-Chirurgical Society of Louisiana, at its sitting in March, 1846, by a communication from one of the venders of the nostrum, accompanied by some bottles of the article, with the request that the Society would examine and report upon its styptic powers. The Society, on the ground that it would be setting a bad precedent, declined the proposition. Several of the members, however, determined to avail themselves of the earliest opportunity to test its properties, and Dr. A. Mercier has published the result of his experiments.[1] After detailing two cases of wounds, on which it was used as a hæmastatic, he remarks:—"The pain which these two patients experienced from the application of the Eau Brocchieri, a pain incomparably greater than that from the application of strong salt and water, or any other styptic solution, together with its utter inefficacy in cases of hemorrhage, have induced me to abandon any farther trials with it, except, perhaps, in cases of hemorrhage from mucous membranes, as from the nose, rectum, &c. &c., which are so common in this country."

With the same view of testing the virtues of this famous fancied hæmastatic, the author's friend and colleague, Professor Mütter, in the presence of the late Dr. Kearney of the United States Navy, Dr. King of the Army, Dr. J. W. Wallace, and several other medical gentlemen, conducted a series of experiments on some ten or twelve sheep, the results of which were as follows:

"When the carotid artery," says Professor Mütter, in a letter to the author, "was opened, especially if the incision ran parallel to the long diameter of the vessel, and the Acqua Brocchieri was freely applied, the hæmorrhage ceased in the course of ten, fifteen, or twenty minutes; and the sheep, recovering speedily from its prostration, would eat with avidity. On examining the wound, it was found filled with a coagulum, but there was no adhesion between it and the walls of the vessel, and of course no organization could be detected. Similar results were obtained with several other styptics, such as creasote, tincture of chloride of iron, oil of turpentine, &c. &c. On the whole I was led to consider this agent a tolerably good styptic, but not better than those already in daily use. To test the *vis medicatrix naturæ*, Dr. Wallace

[1] New Orleans Medical and Surgical Journal, May, 1846, p. 816.

divided completely both carotids, and applied nothing to the wound; yet recovery took place in the course of 30 minutes, the animal walking about and eating with the others. When the vessel was partially divided, so as to prevent contraction and retraction, death speedily ensued."

It is proper to add, that the first experiments of Drs. Smith and Sinkler satisfied them, "that a sheep would bleed to death with his carotid cut, and that no application of water, even in the form of ice, could arrest the hemorrhage." With this conviction on their minds, they considered themselves "fully prepared to form just conclusions concerning the two experiments" which they made on sheep. Yet in Dr. Wallace's case, it will be observed, the sheep recovered after *both carotids* had been divided; and without any application whatever.

A committee of the Medical Society of Virginia, consisting of Dr. C. P. Johnson, G. G. Minor and R. W. Haxall[1] appointed to investigate the qualities of the Acqua Brocchieri, reported, as the results of their experiments, *First*, that it has no power of coagulating blood. *Secondly*, that it has no power of producing contraction of the coats of an artery. *Thirdly*, that it does not arrest hemorrhage from an incised wound sooner than the unaided power of nature would accomplish the same result. *Fourthly*, that in the case of incised arteries, its application is no more to be depended upon to arrest the hemorrhage than that of simple cold water. The committee are of opinion that the true and only cause of the arrest of the hemorrhage in their experiments, "as in all of the cases which have been reported, is *pressure*, the pressure being continued for a sufficient length of time to allow a coagulum to form which will be firm enough to resist the impulse of the blood from the orifice in the vessel."

On the whole, the remarks made on the Acqua Binelli apply equally to the Acqua Brocchieri. Neither, it would seem, is possessed of the hæmastatic virtues that have been ascribed to it.

According to M. Martius,[2] Brocchieri water may be made as follows:—Macerate for twelve hours *pine wood* (*bois de sapin*) cut small and bruised, in double its weight of water. Then distil until a product is obtained equal in weight to the wood employed. Leave this distilled water at rest for twenty-four hours; after which the volatile oil that collects on the surface must be separated. Before using the water it is necessary to shake it.

M. Deschamps has proposed the following substitute for it. Take of *turpentine*, 500 parts; *water*, 600 parts. Boil for a quarter of an hour,[3] then add a sufficient quantity of water to obtain 1000 parts of turpentine and water. Let it become cold, and filter.

[1] American Journal of the Med. Sciences, July, 1846, p. 146.
[2] L'Abeille Médicale, Février, 1846, p. 54.
[3] Bouchardat, Nouveau Formulaire Magistral, 3e édit. p. 291. Paris, 1845.

Another hæmastatic water, under the name *Eau hémastatique de Tisserand*, has been experimented with in Paris, and M. Frémy, *Interne* at the Hotel Dieu, reports several cases in its favour. M. Récamier has also used it, and considered it to be possessed of the same properties as the Acqua Brocchieri: he esteems it to be even more advantageous, and affirms that he has succeeded with it in cases of *hæmoptysis*, *intestinal hemorrhage*, and *dysentery*. The following formula is given by M. Bouchardat[1] for a hæmastatic water which may be substituted for the *Eau hémastatique de Tisserand*.

R. Sanguin. Dracon.
Terebinth (*des Vosges*,) āā ℥iij.
Aquæ Oij.

Digest for twelve hours, and filter.

XVII. AQUA PICIS LIQUIDÆ.

Synonymes. Aqua Picis seu Picea, Infusum Picis Liquidæ seu Picis Empyreumaticæ Liquidæ, Potio Picea, Tar Water.
French. Eau de Goudron.
German. Theerwasser.

This preparation, at one time so much extolled, and recommended on the authority of the celebrated Bishop Berkeley, but which had almost fallen into total disuse, has been revived, more especially since it has been found to contain creasote. It was first employed extensively in England about the middle of the last century, and was drunk not simply as a therapeutic but as a prophylactic agent, so that Riecke facetiously remarks, almost as much tar-water was consumed by the inhabitants of London, as beer and other drinks.[2]

As commonly happens in such cases, practitioners passed from one extreme to the other, and as they gradually found that tar water was not capable of accomplishing *all* that had been ascribed to it, they ultimately neglected it altogether. Still formulæ for its preparation exist in many Pharmacopœias—in those of Dublin, Bavaria, Brunswick, Paris, Russia, Saxony, Sweden, and Wirtemberg, for example.

Water takes up from tar a small portion of acetic acid, creasote, and resinous matter. Tar-water was formerly much praised as a remedy in *pulmonary consumption*, and as a diuretic; its virtues, however, appear to rest almost wholly on the contained creasote. Some years ago, Arnheimer, of Duisburg, recalled the attention of practitioners to it as a remedy in many *chronic cutaneous affections*, especially of the herpetic kind; and asserted, that he found no remedial agent more valuable when its use was perse-

[1] Op. cit. [2] Die neuern Arzneimittel, S. 38. Stuttgart, 1837.

vered in for one or two months to the extent of a pint or two daily. Arnheimer directed patients to prepare it for themselves in the following manner. A pound of *tar* was put into a deep porcelain dish, and a quart of *water* was poured upon it; for half an hour it was stirred with a spoon; the mixture was then allowed to stand for twenty-four hours; the tar remaining on the surface of the water was skimmed off, and the clear fluid put into well stopped bottles. He advises, that a large quantity should not be prepared at once, as the water in time becomes ropy, and its golden yellow colour is changed to a darker hue. It is generally taken without any repugnance. The process in the Dublin Pharmacopœia is the following:—Take of *Tar*, two pints; *Water*, a gallon: mix, and stir with a wooden rod for fifteen minutes; then, when the tar has subsided, filter the liquid, and keep it in well closed jars.

Since the discovery of creasote, tar-water has received fresh consideration, and it is not improbable that it may come again into more general use, as it appears, from experiments, that there are cases where it would seem to merit a preference over creasote. M. Pétrequin has made some trials with both, in *chronic catarrh*, and in different stages of *phthisis*.[1] The number of cases reported by him is twenty-three; of these seven were of *chronic catarrh*, in which creasote was given: generally the cough was mitigated by it, but in two no effect was produced on that symptom. The expectoration was usually diminished or facilitated; in two cases, however, no advantage was derived from it, and in one case the sputa were bloody. In the majority, the dyspnœa ceased: in others, it continued; and in the same number of cases the pain in the breast was relieved. As to its effects on the digestive organs, it several times excited thirst; but the most marked result was the sensation of burning, which it caused in the majority of cases, in the digestive tube, or in the breast. In two cases, it exhibited no influence on an existing diarrhœa, whilst in two others, it appeared to diminish the number of the evacuations. In two, it excited vomiting, and commonly produced nausea. On the whole, in the greater number, it appeared to render good service, but in one it was of no avail, and in another it seemed to aggravate the affection.

In four cases of *incipient phthisis* treated with creasote, M. Pétrequin obtained the following results. Although, in one instance, the cough was aggravated, in the majority the opposite was the fact. The expectoration was facilitated, but diminished in quantity: the dyspnœa was more or less improved, and in two cases the pain in the chest was relieved. In this disease, also, creasote excited burning in the epigastrium or chest, and in one instance fugitive sensations of heat and creeping in the limbs. In

[1] Gazette Médicale de Paris, No. 45, Nov. 5, 1836.

one case, the benefit was striking; in two, the improvement was to a less extent, and in one the disease was augmented. Four other cases were of *advanced phthisis*. In most, the cough was more or less improved,—never increased; the oppression remained much the same, but in one case it became more severe. As regards the effects upon the digestive organs, they were much the same as in the first class of cases. The improvement in one case was insignificant; in two others but slight, and in the fourth the affection was aggravated.

M. Pétrequin directs tar water to be prepared by digesting an ounce of *tar* in a quart (*pinte*) of *water* for eight days, and then filtering. It is taken mixed with milk to the extent of from eight to twelve ounces in the day. With this preparation, he treated three cases of *chronic catarrh*. The cough was always improved by it; the expectoration diminished or facilitated; the dyspnœa alleviated or removed, and the pains in the chest were improved or dissipated. In two cases, it appeared to act beneficially on *vomiting* which accompanied the cough. The appetite was improved, and in one case *diarrhœa* seemed to be diminished, whilst in two others existing *constipation* yielded during its use. In all the cases, sleep was restored. On the urinary secretion it exerted no influence, and it neither excited thirst nor nausea like creasote. In three cases of *incipient phthisis*, its action was more beneficial than that of creasote. The cough was always ameliorated, the expectoration facilitated or diminished, and the dyspnœa and thoracic pain relieved. In one case, it seemed to act favourably on accompanying emesis, and in another to quench thirst. It excited or improved the appetite, and aided digestion. In one case of *advanced phthisis*, the alleviation produced by tar water was beyond all expectation, but in another the disease had proceeded so far that it was wholly unsuccessful.

So far, then, as M. Pétrequin's experiments go, they would seem to show that advantage may be derived, in the cases in question, from the administration of creasote and tar water; and that the latter is perhaps possessed of properties which the other has not—to the same degree at least. The cases are, however, too few to enable us to deduce any thing entirely satisfactory. Fresh experiments will doubtless be instituted, which may enable us to infer positively on matters that must as yet be considered involved in doubt.[1] The author has administered it freely in *phthisis*, as well as in *chronic bronchitis*. In the latter affection, it has relieved cases in which the accustomed excitant expectorants are found to be serviceable. The same has been the fact in the former disease; but farther than this no advantage has accrued from its administration.

In a French periodical,[2] some cases are published from the

[1] Deslandes, Dict. de Médec. et de Chirurgie Prat. xi. 233.
[2] La Lancette Française, 8 Avril, 1837.

records of the hospitals for 1829 and 1830, during the attendance of the late Professor Dupuytren, in which injections of tar water were successfully administered in *catarrhus vesicæ*, along with the use of pills of turpentine. The tar water was made by infusing in the cold, for a night, a pound of *tar* in ten pounds of *spring water*, filtering and warming the solution before using it. Large quantities of this were injected through an elastic gum catheter, which was forthwith withdrawn and the patient directed to retain the injection as long as possible. The injection was repeated daily, and Venice turpentine was administered internally in the form of pill.

A SYRUP OF TAR may be made by dissolving sugar in tar water.[1]

XVIII. ARGEN'TI PRÆPARA'TA.

SYNONYMES. Preparations of silver.
French. Préparations d'Argent.
German. Silberpräparate.

Of the preparations of silver, the nitrate is the only one that has been much used, and this chiefly as an external application. The attention of physicians has, however, been directed to the internal use of many of those preparations, and especially by M. Serre,[2] professor of surgical clinics at Montpellier. This gentleman commenced his first trials in May, 1835, in the civil and military hospital of St. Eloi. At that time, there was an unusual number of *syphilitic* patients in the wards, of which the most severe and appropriate were selected for treatment by the preparations of silver—the chloride, cyanuret, and iodide. Trials were also made with divided metallic silver, oxide of silver and chloride of ammonia and silver. At first, they were administered iatraleiptically; the chloride, the cyanuret, and the iodide in the quantity of one-twelfth of a grain; the chloride of silver and ammonia in the quantity of one-fourteenth of a grain; and the oxide of silver, and the divided silver, in the dose of one-eighth, and one-quarter of a grain, respectively. M. Serre soon found that these doses were generally too small: he, therefore, raised that of the chloride and iodide to one-tenth, and to one-eighth of a grain, without the slightest inconvenience resulting. The other preparations were also increased in the same proportion, with the exception of the chloride of silver and ammonia, which requires more precaution than any of the other preparations. M. Serre did not restrict himself to the iatraleiptic administration of these substances, but

[1] Soubeiran, Journal de Pharmacie, Janvier, 1842, p. 70.
[2] Bulletin Général de Thérapeutique, 1836.

employed them internally in the form of pill, and externally as local applications.

M. Serre describes several cases of *syphilis* in which the preparations of silver were administered. The first patient was a soldier, 26 years old, of athletic constitution, who, at the time of his admission into the hospital, had several extensive *chancres* on the prepuce, so close to each other as to seem to form one large circular ulceration, five or six lines in diameter. After a few days' rest, and the use of baths, M. Serre ordered the chloride of silver in friction on the tongue in the quantity of one-twelfth of a grain. The ulcers were treated with simple cerate (*ceratum Galeni*) spread on lint. After the second rubbing, the patient experienced violent colicky pains, which were not severe enough, however, to induce a discontinuance of the remedy. Scarcely had a grain of the chloride been employed, when the secretion from the ulcerated parts became less; the surface of the chancres lost the kind of grayish border which they possessed, and cicatrization proceeded rapidly. The frictions were continued, and the condition of the patient went on improving. At the end of two months, he left the hospital. In the five subsequent cases, the same plan of treatment was pursued. The chloride was used exclusively according to the iatraleiptic method. The symptoms were various; in addition to *chancres*, there was in one case a *suppurating bubo;* in another, *syphilitic vegetations* at the margin of the anus; and in a third, *fissures* in the same part. In the seventh case, in which there were *chancres*, *gonorrhœa*, and extensive rugous *blotches* on the nates, the chloride of silver was rubbed on the tongue, and applied topically in the form of ointment. The eighth patient, who suffered with large *condylomata*, as well as with *ulcers* in the neck, took the chloride in pills to the extent of nine grains in the course of the treatment: frictions with the ointment of silver were also applied to the affected parts.

M. Serre deduces from all his experiments the following amongst other conclusions. *First*. The preparations of silver have this great advantage over those of mercury, that they never occasion salivation, nor do they induce in the intestinal canal or in the respiratory organs the disagreeable effects that are too often caused by mercury. *Secondly*. Should their therapeutical agency be confirmed by experience, and they be introduced into hospital practice, great advantage will be derived as respects the purity of the wards, and the cleanness of the bed-clothes, &c. *Thirdly*. Patients can be treated by them in secret as well as when travelling, without fear of detection. *Fourthly*. The preparations of gold are to be preferred in these respects; but gold has the disadvantage of exciting too much, and cannot, therefore, be exhibited to those of a nervous and impressible temperament, or who have weak and delicate chests. In such cases the

preparations of silver merit the preference. *Fifthly.* The preparations of silver are much cheaper than those of gold, and are, therefore, more available in practice amongst the poor, and in large hospitals; and, moreover, they are more easily prepared, which is a consideration of some moment as regards the *pharmaciens* of small towns. *Sixthly,* and *lastly.* There are cases in which mercurial and gold preparations fail, and where preparations of silver might be of advantage.

The observation of others has not confirmed the assertions of M. Serre. M. Ricord[1] employed the various preparations, made after the formulæ given by M. Serre, in the same doses; but not being able to observe any effect that could be fairly ascribed to these agents, he ventured upon considerably larger doses—as much, for example, as twelve grains a day of the iodide and cyanuret,—but without any marked results.

In this country, the preparations of silver have been but little, if at all, used in *syphilis;* nor do they appear to merit special favour.[2]

XIX. ARGEN'TI CHLO'RIDUM.

Synonymes. Argentum Muriaticum seu Salitum seu Chloratum, Chloruretum Argenti, Chloride, Chloruret or Muriate of Silver.
French. Chlorure d'Argent.
German. Salzsaures Silber, Chlorsilber, Hornsilber, Silberchlorür.

Chloride of silver is prepared by the decomposition of a solution of *nitrate of silver* by an excess of a solution of *chloride of sodium.* The resulting product or chloride of silver appears under the form of a flaky, clotted, very thick precipitate: it must be washed repeatedly with *boiling water,* and be exposed to the heat of a sand-bath, so that it may dry as speedily as possible.

Chloride of silver, prepared in this way, is of a white colour, devoid of taste, and not soluble in water, but soluble in ammonia. In the light it speedily changes, especially when much divided, or when moist; and assumes a somewhat dark violet hue, as the chlorine is given off. It suffers no decomposition when united with vegetable matters. It must be dried and kept protected from the light.[3] Its uses have been referred to under the head of the preparations of silver.

As nitrate of silver is probably always converted into chloride of silver by meeting with the chlorohydric acid in the stomach, it

[1] J. J. L. Rattier, La Lancette Française, No. 122, Oct. 13, 1836.
[2] W. P. Johnson, Medical Examiner, Nov. 23, 1839, p. 743.
[3] On the mode of forming the various preparations of silver, see Chamou, in Bulletin Général de Thérapeutique, No. xvi. Aug. 30, 1836.

occurred to Dr. Perry,[1] at the time resident physician of the Philadelphia Hospital, to administer the chloride, which he did with advantage in *epilepsy*, *chronic dysentery*, *chronic diarrhœa*, and other affections in which nitrate of silver is prescribed internally. Twelve grains given daily for three months produced no unpleasant symptoms; and in no case did discoloration of the skin succeed. In epilepsy, three grains, given four or five times a day, produced effects similar to those of nitrate of silver, but more marked. In chronic dysentery, half a grain to three grains, taken three times a day, produced immediate diminution in the number of the evacuations, and relieved the tormina; inducing, at the same time, an improvement in the character of the stools and other symptoms. Similar testimony is afforded by Kopp, and others. The author has very frequently prescribed the chloride; and on the whole it has appeared to him to be equal to the nitrate of silver in the cases mentioned by Dr. Perry.

It has been affirmed that a combination with iodine will prevent the discoloration of the skin; and that the use of iodine will remove it where it has already occurred; but farther experience is necessary to establish this. See ARGENTI IODIDUM, (p. 98.)

Pulvis argenti chloridi.

Powder of chloride of silver.

R. Argent. chlorid. gr. j.
Irid. florent. pulv. gr. ij.

Reduce to a fine powder, and divide into eight or ten portions; to be rubbed on the tongue. *Serre.*

XX. ARGEN'TI ET AMMO'NIÆ CHLO'RIDUM.

SYNONYMES. Argentum Muriaticum Ammoniatum, Chloruretum Argenti et Ammoniæ, Chloride or Chloruret of Silver and Ammonia, Ammoniochloride of silver.
French. Chlorure d'Argent et d'Ammoniaque.
German. Silbersalmiak, Salzsaures Silberammonium.

This preparation is obtained, when we saturate, by the aid of heat, *liquid ammonia*, with freshly precipitated and carefully washed *chloride of silver*. The operation must be accomplished at such a degree of heat, that the fluid shall boil once; for if the boiling be continued a few moments and in the open air, no crystals will be deposited on cooling. If the fluid, whilst in full ebullition and preserved from the light, be filtered, very regular crystals will be deposited on cooling, which may be dried between blotting paper, and should be kept in a well stopped bottle.

[1] American Medical Library and Intelligencer, Feb. 1841.

Chloride of silver and ammonia has a bluish white colour, the peculiar smell of ammonia, and a burning, almost caustic, taste. In the air, it gradually exhales ammonia, and acquires all the properties of simple chloride of silver, without, however, losing the form of the original composition. If the crystals be kept in the ammonia in which they were formed, they do not experience the slightest change in their colour from the influence of light. When treated with distilled water, the chloride is decomposed. A portion saturated with ammonia is again dissolved; yet a much greater portion remains undissolved; this contains only a small quantity of ammonia. It experiences the same decomposition through the influence of heat, as when it is exposed to the open air, except that the decomposition takes place more rapidly. It displays nothing extraordinary when rubbed with organic matters.

This remedy, as before remarked, has been used with advantage by Serre in cases of *syphilis*.

Another preparation, *Liquor argenti muriatici ammoniati*, has been long recommended by Kopp, in cases of *chronic nervous affections*. It is prepared according to the following formula:—

R. Argent. nitrat. fus. gr. x.
Aquæ destillat. f ℥ij.

Soluto filtrato instilla liquoris natri muriatici, (Sodii chloridi,) q. s. ad præcipitandum. Præcipitatum sedulo ablutum solve in liquoris ammon. caust. ℥iss: adde acidi muriatici ʒiij. vel q. s. ut præcipitatio evitetur et argentum muriaticum in statu solutionis permaneat. Pondus fluidi filtrati æquale sit unciis duabus cum dimidiâ.[1]

This preparation is transparent; but, under the effect of light, it suffers black flakes to be deposited. It is therefore necessary to preserve it in small bottles, painted black, in a dark place. In using it, acid substances should be avoided.

Kopp found the *liquor argenti muriatici ammoniati* of great efficacy in *St. Vitus's dance*. It may be given to children of about ten years of age, morning, noon, and night, in doses of three drops, gradually raised to six, in a spoonful of distilled water.

Pilulæ argenti et ammoniæ chloridi.

Pills of chloride of silver and ammonia.

R. Argent. et ammon. chlorid. gr. j.
Irid. florent. pulv. gr. ij.
Conservæ flor. tiliæ q. s. ut fiat massa in pilulas xiv. dividenda.

For external use. *Serre.*

[1] "Take of fused nitrate of silver, ten grains; distilled water, two ounces:—Into the filtered solution drop enough of a solution of chloride of sodium to precipitate. Dissolve the carefully washed precipitate in an ounce and a half of caustic liquid ammonia; add three drams of muriatic acid, or enough to avoid precipitation, and that the chloride of silver may remain in a state of solution. The weight of the filtered fluid should be equal to two ounces and a half."

XXI. ARGEN'TI CYANURE'TUM.

Synonymes. Argenti Cyanidum, Argentum Cyanogenatum seu Cyanicum seu Hydrocyanicum, Cyanuretum Argenti, Cyanide or Cyanuret of Silver.

French. Cyanure d'Argent.

German. Blaustoffsilber, Cyansilber, Cyansaures Silberoxyd.

Cyanuret of silver is obtained by permitting a weak solution of *hydrocyanic acid* to act on a solution of *nitrate of silver*.[1] The very light white precipitate, formed thereby, must be repeatedly washed with *distilled water*, and be reduced to dryness in a moderately heated oven. In the preparation of the cyanuret of silver, as of the iodide, it is essential to pour on only so much of the fluid in the formation of the precipitate as may be required for the complete decomposition of the nitrate of silver. If too much hydrocyanic acid be used, a part of the precipitate will be separated in the form of hydrocyanate of silver. If, instead of hydrocyanic acid, hydrocyanate of potassa be used, the latter, if added in too great proportion, will unite with the cyanuret of silver, and form a soluble double salt.

Cyanuret of silver is of a white colour, devoid of taste, not soluble in water, but soluble in ammonia. In the air, the surface very soon becomes of a dark violet hue, similar to that of the chloride of silver under like circumstances. It is dry, and should be kept preserved from light. It experiences no decomposition when mixed with neutral vegetable matters.

From experiments made by Dr. Letheby,[2] he concludes, that it is a local irritant, producing great vomiting and a congested state of the vessels of the stomach;—that when it has been dried before its introduction into the system, no other ill effects follow: but if it be administered in a moist state, it is then capable of being absorbed and perhaps decomposed, "for an albuminous solution has the property of dissolving the cyanide, and, moreover, the contact of it with any of the chlorides of the systemic fluids would produce a double decomposition, and the formation of a soluble cyanide, whose effects would be similar to that of cyanide of potassium."

The dose capable of killing a dog is five grains: its specific action appeared to Dr. Letheby to be on the brain, producing occasional convulsions, always coma, paralysis, a peculiar sighing respiration; a fluttering, irregular, and tumultuous action of the heart, and it ultimately kills by a gradual exhaustion of the involuntary acts, death taking place in from one to three hours after its administration.

[1] Pharm. of the United States, p. 77. Philad. 1842.
[2] London Med. Gaz. Jan. 9, Feb. 4 and 17, 1845.

Its use in disease has been referred to under the preparations of silver.

XXII. ARGEN'TI IO'DIDUM.

SYNONYMES. Argentum Iodatum, Ioduretum Argenti; Iodide or Ioduret of Silver.
French. Iodure d'Argent.
German. Iodsilber, Silberiodür.

Iodide of silver is obtained by mixing a solution of *nitrate of silver* with one of *iodide of potassium*. The yellowish flakes, produced by the admixture of the two fluids, are then washed several times with distilled water, and dried in an oven. In this preparation, also, it is important, that only so much of the reagent should be added as is necessary for the complete decomposition of the salt of silver. A surplus of the iodide of potassium would form, with the already precipitated iodide of silver a soluble and crystallizable double salt of iodine, whereby the quantity of the product, which it might be desirable to obtain, would be diminished.

Iodide of silver is of a very pale yellow colour; but becomes, under the action of light and air, of a deeper yellow. It has no taste, and is neither soluble in water nor ammonia. The latter property serves to distinguish it from the chloride and the cyanuret of the same metal. Like the chloride, the iodide must be kept in a dry dark place. Neutral vegetable substances appear to exert no action upon it. Its properties have been enumerated under the head of the preparations of silver. It may be added, however, that Dr. Chas. Patterson has been convinced of its decided efficacy in *hooping-cough*.

It has been already remarked that a combination with iodine is said to prevent the discoloration apt to be induced by nitrate of silver.[1] The following form for this purpose is given by Dr. Patterson:—

Pilulæ argenti iodidi compositæ.

Compound pills of iodide of silver.

R. Argenti iodid.
Potassæ nitrat. āā gr. x.
Tere simul ut fiat pulvis subtil. dein adde.
Glycyrrhiz. pulv. ʒss.
Sacchar. ℈j.
Mucilag. acaciæ q. s. ut fiant pil. xl.

Dose.—One, three times a day.

[1] Patterson, Dublin Medical Press, Aug. 25, 1842, and April 19, 1843.

XXIII. ARGEN'TI OX'IDUM.

Synonymes. Argentum Oxydatum, Oxydum Argenti.
French. Oxide d'Argent.
German. Silberoxyd, Oxydirtes Silber.

Oxide of silver is obtained by the reaction of *potassa* on a solution of *nitrate of silver*. The alkaline fluid must be added in excess, and the oxide, which is the product of the decomposition, be washed several times in a considerable quantity of water, and be dried by moderate heat, and preserved from the light.

The following form has been given:[1]—

R. Argent. nitrat. crystallizat. ℥j.
Potassæ ℥vij.
Aquæ ℥xviij.

Dissolve the nitrate of silver in two or three ounces of the water, and the potassa in the remainder: mix the two solutions; stir with a glass rod, and throw the whole upon a filter. Lastly, wash the precipitate from adhering alkali, and dry it carefully.

In the state of hydrate, the oxide is black; when anhydrous, it appears as an olive greenish brown powder: it is tasteless, and capable of absorbing carbonic acid from the air. Under the long continued influence of light, it is blackened; and at a heat below obscure red, it is reduced to the metallic condition. To be kept for a long time in the pure state, it must be protected from the light in a well stopped bottle.

This preparation, which was also recommended by M. Serre, has been used by Van Mons in *syphilis*.[2]

Dr. Lane[3]—under the idea, that nitrate of silver is always decomposed in the stomach by chlorohydric acid, whence results chloride of silver, which enters into the circulation, is conveyed to the cutaneous surface, and is converted into an oxide by the action of light and by its strong affinity for albumen—has administered the oxide of silver, and with advantage, in *diseases of the uterine system*, in which there is undue secretion and great irritation. He gave it for two months, at intervals, without the slightest tendency to discoloration; and Dr. Golding Bird has prescribed it for four months without any bad effects. Dr. Lane found it very beneficial in half-grain doses, twice a day, in *cardialgia* and *pyrosis; gastrodynia; irritability of the stomach*, accompanied by gnawing and constant pain, nausea, &c. It seemed, likewise, to be beneficial in *uterine hemorrhage*, both in the impregnated and unimpregnated state.

Dr. Lane[4] gives the oxide to subdue *undue secretion*, whether of

[1] A. Duhamel, Amer. Jour. of Pharmacy, July, 1842, p. 100.
[2] Riecke, Op. cit. S. 440.
[3] London Lancet, July 10, 1841.
[4] Lond. Med. Gaz., April, 1846, p. 640.

a sanguineous or other character. In *epistaxis* and *hæmoptysis*, especially when they occur in chlorotic females; and in the *profuse purulent expectoration* and *colliquative perspirations* of phthisis he has found its employment of much advantage. He esteems it to be essentially sedative, and employs it both internally and externally. In cases of *irritable ulcer*, its action is highly beneficial; and he thinks it decidedly preferable to the nitrate, when the stimulant caustic action of the latter is not required. In external forms of *ophthalmia*, an ointment, of the strength of a dram to the ounce, often exerts a rapid influence. In *ulceration of the cornea*, with thickening and congestion of the eyelids, it has proved highly beneficial. The ointment of the oxide of silver is softened to the consistence of thick cream by the addition of olive oil, and is applied to the eye by means of a camel's hair pencil. When a patient is taking it for any length of time, he considers it well to suspend its administration for a few days every month.

Sir James Eyre[1] found the oxide uniformly successful in curing *pyrosis;* but he gave at the same time a cathartic pill of the compound extract of colocynth and extract of hyoscyamus every night. He found similar successful results in *hæmatemesis* and *hæmoptysis:* he does not, however, restrict himself to the oxide, but assists it by bleeding, blistering, and other means. Having found the remedy much superior to all other agents during an active professional life of upwards of thirty years, Sir James urges a trial of it. In the cases detailed by him the dose never exceeded three grains a day. Its employment is not advised where febrile action exists.

In addition to its value in *gastrodynia*, *pyrosis*, *hæmoptysis*, *hæmatemesis*, and *menorrhagia*, Sir James says it will be found of infinite benefit in restraining *hemorrhage from the intestinal canal, obstinate chronic diarrhœa, colliquative perspirations, and leucorrhœa.*[2]

Dr. Thweatt[3] confirms the observations of Dr. Lane and Sir Jas. Eyre as to the advantages to be derived from it in *menorrhagia.* He goes, indeed, much farther; and, whilst he does not pretend to claim for it the appellation of a specific, he "is persuaded that, *cæteris paribus*, all that is claimed for mercury in syphilis, or quinine in intermittent fever, can be claimed for the oxide of silver in menorrhagia in its different forms!" He considers it best adapted for those forms of menorrhagia which depend on an undue excitation of the uterine organs, unaccompanied by high inflammatory action.

The ordinary dose of the oxide is half a grain three times a day. Dr. Thweatt combines it with a small quantity of opium or morphia.

[1] Dublin Journal of Med. Sciences, May, 1845.
[2] See, also, Allnatt, Lond. Med. Gazette, May 2, 1845.
[3] Amer. Jour. of the Med. Sciences, July, 1849, p. 69.

Unguentum oxidi argenti.
Ointment of oxide of silver.

R. Argent. oxid. gr. xx.
Adipis ℥j. Misce ut fiat unguentum.

When the iodide or cyanuret is substituted for the oxide of silver, ten or twelve grains of one of these may be added to the ounce of lard. *Serre.*

XXIV. ARGEN'TUM DIVI'SUM.

Synonymes. Metallic Silver, in a state of division.
German. Zertheiltes Silber.

Pure *oxide of silver* is placed in a porcelain crucible, and the fire is increased to dull redness. The product is then allowed to cool, is rubbed in an agate mortar, and sifted through a close sieve or bolting cloth. In this condition, divided silver forms a very fine powder, of a dullish white colour: the air has no influence upon it, unless when impregnated with sulphureous vapours.

Besides the use of this preparation in syphilis, already referred to, it may be remarked, that the filings of silver, *Argentum limatum*, which agree with it in chemical relations, had been administered many years before, in cases of *intermittent fever*, by Dr. Meyer, of Bückeburg.[1]

Notwithstanding the testimony adduced in its favour, it is probably wholly inert, or exerts but a mechanical agency.

XXV. ARGIL'LA PURA.

Synonymes. Alumina pura, Oxidum aluminii, Terra aluminosa pura, Terra aluminis, Terra bolaris seu argillacea pura seu depurata seu hydrata, Pure Argil or Alumina.
French. Alumine factice.
German. Reine Thonerde; reine Alaunerde; gereinigte Alaunerde oder Thonerde.

This substance was known in olden times by the names *Armenian Bole*, *Terra sigillata*, &c., in which forms it was always, however, mixed with lime and iron. It was highly extolled as an absorbent, demulcent, diaphoretic and astringent; was employed in *hemorrhage*, *diarrhœa* and *dysentery*, *phthisis*, *poisoned wounds*, &c., and was also applied externally in cases of *erysipelas*. It had almost fallen into complete oblivion, when its use was resumed by some of the German practitioners. With us, it is scarcely ever, or never, prescribed.

[1] Riecke, Op. cit. S. 436.

METHOD OF PREPARING.

The purest argil is prepared by drying *sulphate of alumina and ammonia*, and exposing it for 20 or 25 minutes to a red heat in a crucible: the sulphuric acid and ammonia are driven off, and the argil remains behind in the form of a white powder. Formerly, it was prepared by dissolving *alum* in water, and precipitating the argil from the solution by means of *carbonate of potassa* or *of soda*, or by *potassa*. It is affirmed, however, that generally, more or less sulphuric acid remains with the earth, so that it requires to be purified by repeated washing, until there is no longer any acid reaction. If a still higher degree of purity be needed, the precipitate is dissolved in muriatic acid, and the argil precipitated by ammonia.

The powder, prepared by these methods, is of a white colour, and devoid of smell or taste; but it communicates to the tongue a feeling of astringency. When breathed upon, it yields a peculiar earthy smell. It is insoluble in water, but attracts moisture greedily from the air, and forms with it a gelatiniform mass.

EFFECTS ON THE ECONOMY IN DISEASE.

Pure argil was highly recommended by Percival in *indigestion attended with predominance of acidity;* and it was in such cases extolled by Ficinus and Seiler.[1] According to the former, it merits a preference over all other absorbents, inasmuch as it forms astringent salts with acids. He found it especially useful in *diarrhœa* and *dysentery*, particularly in children. Seiler recommends it in the *vomiting of infants*, which is usually accompanied by acidity, and in the *diarrhœa* of older children. Neumann[2] found it successful in checking *diarrhœa*, which neither starch glyster, nor opium, nor any other therapeutical agent had succeeded in diminishing. He made a mixture of two drams of *argil*, and four ounces of a *decoction of logwood*, and administered it to children by the teaspoonful. Weese[3] also employed it successfully in several cases of *infantile diarrhœa* where there was evidently a predominance of acid. One of the latest encomiasts of *argilla depurata* is Dürr, who, for several years, administered it in the *diarrhœa* and *cholera of infants*, and found it highly efficacious.

The chemical reasons, urged by Ficinus and others, merit attention. The article is worthy of employment in *affections of the intestinal tube*, in which astringents are indicated. The chlorohydric and the acetic or lactic acid are always in the stomach when any alimentary or other matter is present there; these acids cannot fail, consequently, to unite with the argil, and the resulting compound must possess astringent properties.

[1] Zeitschrift für Natur. und Heilkunde der Dresdner Professoren, B. 1, H. 1, S. 82.
[2] Bemerkungen über die gebräuchlichsten Arzneimittel, von Dr. Karl Georg Neumann, S. 55, Berlin, 1840. [3] Rust's Magazin, B. xii. H. 2, S. 247.

MODE OF ADMINISTRATION.

The dose, in the 24 hours, for a very young child, is from ʒss. to ʒj.; for older children, from ʒj. to ʒij. Small doses are of little or no avail. The vehicle is commonly an emulsion.

The following forms are given by Riecke.[1]—

Mistura argillæ.

Mixture of argil.

R. Emuls. sem. papav. (ex ℥ss. parat.) ℥iiiss.
Argillæ puræ ℈ij.
Syrup. althææ f ℥ss. M.

Dose.—A teaspoonful to a child two years old affected with *diarrhœa.*

R. Argill. pur. ʒss.
Acaciæ ʒj.
Sacch. ʒij.
Aq. fœnicul. f ℥iij. M.

Dose.—The same as the last to a child one year old.

R. Emuls. oleos. cum vitell. ovor. parat. ℥j.
Syrup. alth. f ℥j.
Argill. depurat. ʒss.
Aq. cinnam. simpl. f ʒj.
Extract. conii gr. ij. M.

Dose.—The same as the last two to a child three months old, affected with *cholera infantum.* *Dürr.*

XXVI. AR'NICA.

Synonymes. Arnica Montana seu Plauensis, Doronicum Germanicum, Panacea Lapsorum, Ptarmica Montana, Caltha Alpina, Calendula Alpina, Narda Celtica altera, Doronicum plantaginis folio, Leopard's Bane.

French. Arnique, Tabac ou Bétoine des Savoyards, Tabac de Montagne, Doronic d'Allemagne, Tabac des Vosges.

German. Wohlverlei, Fallkraut.

This plant, which belongs, in the *sexual system,* to Syngenesia polygamia superflua, and to the *natural order* Compositæ Synanthereæ, is in the secondary list of the Pharmacopœia of the United States, but it is not much used in this country; nor does there appear to be any clear appreciation of the cases for which it is adapted.[2] Such, too, appears to be the sentiment of the French practitioners. "It may be concluded," say MM. Mérat and De Lens,[3] "that we have as yet insufficient data to pronounce positively on the affections in which arnica can be unequivocally efficacious; we must, consequently, always bear in mind its heating and active qualities when we prescribe it."

[1] Die neuern Arzneimittel, S. 41. Stuttgart, 1837.
[2] Wood, in Dispensatory of the United States, by Wood and Bache, Art. *Arnica.*
[3] Dictionnaire Universel de Matière Médicale, &c. i. 423. Paris, 1829.

According to Sir George Lefevre,[1] the Germans class arnica among sacred remedies; and its virtues are extolled throughout two pages of the Pharmacopœia Ruthensis. Sir George was much disappointed in its effects. It is much more uncertain than strychnia in its operation, and he has known it given in large doses without producing any sensible results.

In Germany, the flowers and root are much employed in *paralysis*, as an excitant to the nervous system; and it is chiefly to introduce the volatile oil—the *oleum æthereum florum arnicæ*, Germ. Wohlverleiöl, Aetherisches Wohlverleiblunenöl,—to the attention of the profession, that we refer to the arnica at all. This oil is obtained from the flowers, and has been much recommended by Schneider in old cases of *paralysis*, which are the result of the apoplectic condition. He himself often administered it with evident success; the paralytic limbs becoming warmer, more active, and more serviceable under its use. He recommends it also in *indurations*, especially of the abdomen.[2] He mixes four drops of *arnica oil* with half an ounce of *spiritus ætheris sulphurici compositus* or *spiritus ætheris nitrici*, and of this gives, for a dose, from four to twelve drops several times a day. The mixture has an agreeable smell and taste. Four drops of the oil to four ounces of sugar form a good *elæosaccharum*.[3]

XXVII. ARSEN'IAS AMMO'NIÆ.

Synonymes. Ammonium Arsenicum seu Arsenicicum, Arseniate of Ammonia.
French. Arséniate d'Ammoniaque.
German. Arseniksaures Ammonium, Arseniksaures Ammoniak.

This preparation of arsenic has been highly recommended, since the year 1818, by Biett, in several *cutaneous diseases*, and especially in *psoriasis inveterata*.[4]

METHOD OF PREPARING.

It may be prepared by taking *arsenic acid* one part, dissolving it in water, and adding *pure ammonia* or *carbonate of ammonia* sufficient to saturate the acid;—or, as follows:—Take of *arsenious acid*, one part; *nitric acid*, four parts, *muriatic acid*, half a part; saturate the solution with *carbonate of ammonia*, and let the arsenical salt crystallize.

[1] An Apology for the Nerves, p. 292. Lond. 1844.
[2] Aschenbrenner, Die neueren Arzneimittel, u. s. w. Erlangen, 1848.
[3] Riecke, Die neurn Arzneimittel, u. s. w. S. 337. Stuttgart, 1837.
[4] Cazenave, in Dict. de Médec. 2de édit. iv. 33; and Cazenave and Schedel's Practical Synopsis of Cutaneous Diseases, translated by R. E. Griffith. Philad. 1829.

EFFECTS ON THE ECONOMY IN DISEASE.

A grain of this salt may be dissolved in an ounce of distilled water; and of the solution from twenty to twenty-five drops be given daily, gradually increasing the dose until it reaches a dram or more in the twenty-four hours.

There does not seem to be much difference between the effects of this preparation and those of other forms of arsenic, that have been received into the Pharmacopœias. Arsenious acid itself, as well as ARSENITE OF POTASSA and ARSENIATE OF SODA—the officinal solution of the former well known every where under the name of "*Fowler's Solution;*" that of the latter known, in continental Europe especially, under the name "*Aqua Arsenicalis Pearsonii*" or *Solution de Pearson*—are possessed of precisely the same properties as arseniate of ammonia, and, like it, have been found equally efficacious in obstinate diseases of the skin. Nor is the knowledge of the agency of arsenical preparations in *cutaneous affections* new. In India, the efficacy of arsenic in those diseases has been long known: and, in Europe, attention was attracted to it by Fowler,[1] and Girdlestone,[2] and subsequently by Willan,[3] Pearson,[4] and others; but no one administered the arsenical preparations more extensively in these diseases than Biett and Rayer of Paris, whose situations afforded them ample opportunities for testing the virtues of the different articles of the Materia Medica in skin complaints. They succeeded by means of the arsenical preparations, and especially of the one now under consideration, in removing several *inveterate affections of the skin*, that had resisted every other remedy. The author has found equally beneficial results from this practice in his own experience. All chronic cutaneous diseases are dependent upon an alteration in the functions of the capillary vessels, or system of nutrition of the part affected; and there appear to be but two ways in which these can be reached, so that a new action may be impressed upon them;—in the one case, through the medium of the general circulation; and, in the other, through the agency of topical applications, made to come in contact with the diseased surface. Arsenic,—like iodine, mercury in small doses, and certain other alteratives,—acts in the former way, modifying, after a protracted exhibition, the fluid of the circulation, in such manner, that it makes an altered impression on the system of nutrition, and breaks in upon the diseased catenation. In no case, however, have we observed these salutary effects, until the use of the arsenical preparation had been persevered in for several weeks. These diseases are chronic

[1] Medical Reports. London, 1786.
[2] Essays on the Hepatitis, &c., of India. London, 1787.
[3] Description and Treatment of Cutaneous Diseases. London, 1798.
[4] Observations on the Effects of various articles of the Materia Medica in the Venereal Disease, 2d edit. London, 1807.

in their nature, and they require a chronic medication. Time is, indeed, in every case, an element in the cure.

XXVIII. ARSEN'ICI IO'DIDUM.

SYNONYMES. Arsenici Teriodidum, Ioduretum Arsenici, Arsenicum Iodatum, Hydriodas Arsenici, Iodide, Teriodide, or Hydriodate of Arsenic.
French. Iodure d'Arsenic.
German. Iodarsenik, Arsenikiodür, Iodarsen.

Of late years, this preparation has been highly extolled by Biett, in the same class of affections as the last;—applied externally.

METHOD OF PREPARING.

The iodide is prepared, according to Magendie,[1] in two ways: 1. By heating in a glass alembic a mixture of sixteen parts of *arsenious acid* and one hundred parts of *iodine*. The combination sublimes in the form of orange-coloured needles. 2. Thirty parts of pulverized *arsenious acid*, and one hundred parts of *iodine* are boiled in one thousand parts of water. As soon as the liquid becomes colourless, it is filtered, and the filtered solution is evaporated to dryness. If it be thought advisable, this can be sublimed.

A formula, employed by Plisson, is to digest three parts of *arsenious* acid, in fine powder, with ten parts of *iodine*, and one hundred and nine parts of *water*, until the odour of iodine is no longer manifested. The clear liquid is then decanted, and subjected to evaporation. At a certain degree of concentration, the iodide forms in red crystals: or, the solution may be evaporated to dryness, and then sublimed in close vessels without decomposition, when it forms beautiful crystalline scales.

Water, in large quantity, dissolves it wholly; but if it be digested with a small quantity, it is decomposed, hydriodic acid being formed in solution, and white crystalline scales, composed of water, acid, and iodide in variable proportions.[2]

EFFECTS ON THE ECONOMY.

When iodide of arsenic is injected into the veins, it does not exert so strong an action on the heart as might be expected from so poisonous a substance. Dr. Blake[3] twice injected solutions, containing each six grains of this substance, into the jugular vein of a dog, without producing the slightest appreciable effect on the heart. On injecting a solution containing fifteen grains, the action of the heart was immediately arrested.

Professor A. T. Thomson has employed it in several cases of

[1] Formulaire, edit. cit.
[2] A. Duhamel, American Journal of Pharmacy, October, 1840, p. 187.
[3] Edinburgh Medical and Surgical Journal, April 1839, p. 336.

lepra and *impetigo*, with very great success.[1] He begins with one tenth of a grain doses, three times a day, and increases them to a quarter of a grain. In some cases, he had not been able to exceed two-thirds of a grain, as symptoms of poisoning came on, and the medicine had to be given in diminished doses.

Dr. Neligan's[2] experience leads him to place more reliance on the iodide, in these and similar *chronic cutaneous affections*, than in any other preparation of arsenic; but although he found it alone capable of curing many cases of psoriasis and lepra, he considers that its beneficial action is much augmented by combining it with iodide of potassium and iodine.

It has been given with success in a case of *cancerous disease of the breast*, by Dr. F. C. Crane.[3] The dose was an eighth of a grain, which was reduced to one-twelfth, and gradually increased to a third of a grain, beyond which it could not be borne. In a case of inveterate *lepra vulgaris*, it was carried to the extent of one grain for a dose, with the most decided curative effects.

Biett has frequently applied an ointment of it in cases of *phagedenic tuberculous* cutaneous diseases.[4]

MODE OF ADMINISTRATION.

Mr. Erichsen thinks with Dr. A. T. Thomson, that iodide of arsenic is most advantageously exhibited in combination with the extractum conii, which appears to sheathe its irritating qualities, and prevents it from exciting too powerfully the mucous membrane of the stomach. By the addition of red iodide of mercury, a compound pill may be formed, which resembles, in its effects, the iodide of arsenic and mercury, and has been much, and successfully, employed by Dr. A. T. Thomson in the treatment of *lupus* and other diseases of the skin, and which Mr. Erichsen has found of particular service in certain *syphilitic eruptions*, of the squamous kind more especially.[5]

Unguentum arsenici iodidi.

Ointment of iodide of arsenic.

R. Arsenic. iodid. gr. iij.
Adipis ℥j. M.

Biett.

An extemporaneous preparation, which is considered to combine the virtues of both arsenic and iodine, is said to have been employed successfully in Philadelphia.[6] It is formed as follows:

[1] Lancet, Jan. 19, 1839, p. 621.
[2] Dublin Quarterly Journal of Med. Science, Nov. 1849.
[3] Lancet, Aug. 31, 1839.
[4] See, also, Ballard and Garrod, Elements of Mat. Med. &c., p. 387. Lond. 1845.
[5] Lond. Med. Gaz., May 12, 1843.
[6] A. Duhamel, Amer. Journ. of Pharmacy, Oct. 1849, p. 187.

R. Liquor iodin. compos. f ʒi.
——— potassæ arsenit. f ʒiv. M.

When mixed together in these proportions, a change is observed in the appearance of the mixture, which is instantaneously rendered almost colourless. The dose is five drops.

XXIX. ARTEMIS'IA VULGA'RIS.

SYNONYME. Mugwort.
French. Armoise Commune.
German. Beifuss, Gemeiner Beifuss.

Almost all the species belonging to the genus *artemisia* are possessed of bitter and aromatic properties, and several afford "*wormseed.*" Artemisia vulgaris was employed by many of the older physicians, but it had fallen into oblivion, when its use was revived in Germany, by Burdach, a physician at Triebel, near Sorace,[1] who recommended it strongly as a preventive of epilepsy. Since that time, it has been much prescribed in that country, but its employment has not extended much to other countries of Europe, or to this side of the Atlantic. The root is the part preferred:—formerly the herb and the tops were solely used. The root was employed in epilepsy, centuries ago, but it had been neglected, or was only exhibited as a nostrum, when Burdach entered upon his investigation, of which the following is a summary.

The root of the artemisia should be dug up in autumn, after the stalk has become dry, or in the spring before the stalk has shot up; but perhaps the latter half of November is as good a period as any. It must be freed from the adherent earth by shaking. Burdach regards washing to be objectionable, as the root may lose some portion of its efficacy thereby. The old, ligneous, mouldy and damaged parts of each root must be carefully removed, and the fresh young side roots (*fibrillæ*,) which are distinguished by their smell, clear colour, and greater juiciness, must be spread on paper, and dried in the shade, and as soon as they become brittle they must be carefully preserved. Besides the fibrillæ, the soft, sound, and juicy parts of the root, especially the fleshy rind of the thicker roots, must be used.

The period required for drying them varies; in moist weather, it may be two months: but late in the year the desiccation may be aided by the gentle warmth of the sun, or of a stove; the latter must never, however, rise higher than from sixty-four to sixty-eight degrees of Fahrenheit. If put away too early, the root becomes spoiled; if too late, it loses many of its volatile parts. When powdered, it ought not to be kept too long, as the volatile

[1] Hufeland's Journal, B. lviii. St. 4 und 5.

portions escape, and it soon becomes devoid of smell. Even during the process of pulverizing, loss is sustained, and the fresh powder has a much feebler odour than the entire root, so that Burdach advises, for distant patients, that the root in substance should be sent to them, and that they should be recommended to pound it for use in a well covered mortar. By pulverizing, the inner, hard, woody parts are separated from the smaller roots; they must be removed and thrown away, as the powder of the cortical substance of the small radicles has alone been found efficacious. The smell of the well dried root is very strong, pungent and peculiar, especially when we open a vessel in which it has been stored away in quantity. The taste is sweetish, sharp and nauseous.

EFFECTS ON THE ECONOMY IN DISEASE.

It has been already remarked, that Burdach[1] recommends artemisia especially in *epilepsy;* and he affirms that it requires no preparation or special attention. It is most efficacious when given about half an hour before the attack, which it usually prevents; but if this be impracticable, it may be given as soon as the patient comes to. The dose is a heaped up tea-spoonful, (from fifty to seventy grains,) which may be administered in warm beer; the patient should be put to bed immediately, be covered up warm, and allowed warm small beer to drink, so as to occasion diaphoresis—care being taken that he does not expose himself to cold. This course is to be repeated so long as there are any traces of mischief. When the remedy, however, acts favourably, Burdach asserts, that frequent repetition is not often necessary. At times it happens, that when the dose has been raised to a dram and a half, and thrice repeated, no critical sweat follows: Burdach then aids the operation by giving the *liquor cornu cervi succinatus*, (*spiritus ammoniæ succinatus*,) in an infusion of serpentaria, valerian root and arnica flowers; but the effect, he says, was always better when the diaphoresis was produced by artemisia alone. One important advantage in the use of this agent is, that a judgment can be speedily formed of its utility: when much may be expected from it, a marked improvement usually occurs after the first doses. In those cases of epilepsy which recur every day, and sometimes even from three to fifteen times a day, and especially where the paroxysms are so violent and frequent as to leave little interval for the patient to be restored to consciousness, the artemisia has proved more certain in its operation, either in removing or mitigating the disease. In such cases, two doses were given on the first day, and afterwards one tolerably strong dose daily till the third day. In those forms of epilepsy whose attacks recurred twice daily, morning and evening, the artemisia acted very beneficially; the paroxysms soon became somewhat weaker and shorter,

[1] Casper's Wochenschrift, Oct. 22, 1836, S. 675.

and were postponed a day or two. In such cases it is advisable to continue the remedy for some weeks. Infants at the breast bear artemisia especially well. It is equally efficacious in the epileptic attacks of young females from twelve to fifteen years of age, and prior to the establishment of menstruation. Under its use, the catamenia have generally taken place, and the epilepsy has disappeared. On the other hand, it was found to aggravate cases of epilepsy occurring as a disease of growth, (Entwickelungskrankheit,) in young persons from seventeen to twenty-two years old, and as a consequence of great corporeal development. It was equally unfortunate in cases of *epilepsia nocturna*, where the paroxysms came on irregularly at an interval of about five, ten, or fifteen days, and generally about midnight; as well as in that form in which,—after the patient had suffered for six, seven, or eight weeks, under violent symptomatic sweats,—a morbid condition ensued from two to three times every twenty-four hours, consisting of repeated epileptic attacks, with great prostration in the intervals.

These are the main results of the communications of Burdach.[1] The number of his experiments and observations was considerable, and the results appear to have been frequently most happy, especially in the case of females, who seem to have exhibited themselves more beneficially impressed by the remedy than males; the proportion of cures being as three to two. Tosetti[2] gives the proportion of cases in women and children to that of men, as eight to six.

In the Berlin Charité, artemisia is said to have been used with equal success. The German journals contain numerous cases, on the authority of E. Grafe,[3] Wagner,[4] Van Maanen,[5] Wolf,[6] Osann, Bonorden,[7] Schluter, Bird,[8] Lowenhard,[9] Geis,[10] and others.[11] But few physicians, according to Riecke, have been disappointed in it, and, where they have, he ascribes the failure to its having been given in cases for which it was inappropriate, or to the preparation of the artemisia not having been properly attended to.[12]

In consequence of a German physician having recommended *Artemisia absinthium* to Professor A. T. Thomson, Dr. Elliotson[13] was induced to try it in epilepsy. The patient to whom he gave it was a girl, seventeen years of age, who had been af-

[1] Riecke, Die neuern Arzneimittel, u. s. w. S. 49. Stuttgart, 1837.
[2] Diss. inaug. de Radice Artemis. vulg. remed. antiepilept. Berolin, 1827; and Osann in Art. Artemisia, Encyc. Wörterb. iii. 313. Berlin, 1829.
[3] Gräfe und Walther's Journal, B. vi. H. 2.
[4] Hufeland's Journal, lix. S. 6.
[5] Ibid. lxi. 5.
[6] Ibid. lxii. 3.
[7] Ibid. lx. 1.
[8] Ibid. lxv. 3.
[9] Ibid. lxv. 3.
[10] Ibid. lxv. 3.
[11] Richter's Specielle Therapie, B. x. S. 377. Berlin, 1828.
[12] Op. cit. S. 49.
[13] Lancet, July 9, 1836.

fected with epileptic fits for four months—three or four occurring daily. A dram of the powder was given three times a day. This was on the 30th of March. On the 9th of April, the dose was increased to two drams, when the fits became less frequent, but not less severe. On the 16th, the dose was repeated every four hours. She had only one slight fit in the course of twelve days; and, on her dismissal, on the 24th of May, had had no fit for twenty-six days. Dr. Elliotson was of opinion, that the strong infusion would be less offensive to the patient, and quite as effective as the powder.

Besides epilepsy, artemisia has been used with advantage in other diseases, as in *St. Vitus's dance.*[1] Wutzer employed it successfully in the *convulsive diseases of childhood*, and it was recommended by Biermann[2] in *eclampsia infantum*, occurring during the period of dentition. He advised it to be given to children in gradually increasing doses, commencing with half a grain; and giving, an hour afterwards, a grain, and, in two hours, two grains, which is usually the last dose required. The gradual augmentation of the dose he considers advisable, "to prevent the crisis which the artemisia induces from being too turbulent."! Kölreutter, of Carlsruhe, administered artemisia in different diseases, with great success. He prefers the *extractum resinosum radicis artemisiæ vulgaris, German*, Biefusswurzelextract, to the root in substance. This is prepared in the following manner. A quantity of the dried and powdered root is covered with alcohol, and permitted to digest for some time; the filtered liquor is then evaporated in an earthenware vessel, until it has attained the consistence of an extract. Kölreutter employed this advantageously in the *eclampsia of children*, (in certain cases after the application of leeches;) in *tormina*, unaccompanied by inflammation; in the *diarrhœa of children and adults*, in sporadic cases of *cholera morbus*, and in *dysentery*, after the bloody evacuations had ceased; in *gastric fevers*, on their assuming a nervous character; and in *dysphagia, cardialgia, chronic vomiting, scirrhus of the stomach, chronic cephalalgia* and *neuralgia of the face;* in *chlorosis*, and in *obstruction of the catamenia*, as well as in *epilepsy*. The dose, in the twenty-four hours, is from ʒss. to ʒj.; to small children, a few grains.

Such is the chief testimony adduced in favour of artemisia by the German writers mainly. It is to be feared, that the advantages to be derived from it in epilepsy have been exaggerated. Where there is no organic disease of the encephalon, substances, which, like it, are nauseous, bitter and aromatic, may be productive of advantage as tonics and revellents. In one case of this nature it was employed by the author, but the results were not

[1] Gittermann, in Hufeland's Journal, lxii. 1. Bonorden, Op. cit.
[2] Riecke, Op. cit. S. 50.

striking. When aided by other means and appliances, it appears to be powerfully diaphoretic; and, doubtless, therefore, in appropriate cases, especially where there is much nervous impressibility, it may be productive of the good effects ascribed to it by Burdach, Kölreutter, and others. Yet, as Osann has remarked,[1] it must be improper where polyæmia, or a tendency to active hyperæmia, is present. The analysis of Hergt, Hummel, and Jänike afforded, along with traces of volatile oil, some balsamic resin, both of which are excitants to the living economy.

MODE OF ADMINISTRATION.

The following forms for its administration have been adopted by some of the German authorities:—

Tinctura artemisiæ.

Tincture of Mugwort.

℞. Artemis. vulg. rad. concis. ℥v.
Alcohol. dilut. Oij. M.

Digest for three days; express and filter. Dose,—half a drachm to two drachms, four or five times a day, in *epilepsy*.

Rademacher.[2]

Decoctum artemisiæ.

Decoction of Mugwort.

℞. Artemis. vulg. rad. concis. ℥j.
Coque cum aquæ q. s. per semihoram
ad. colat. Oj.

Half a tea-cupful of this may be taken every two hours, in cases of *epilepsy*. *Hildenbrand.*

Pulvis artemisiæ.

Powder of Mugwort.

℞. Artemis. vulg. rad. pulv. ʒj.
Sacch. alb. ℈j. M. et fiat pulvis.

The powder to be administered daily in the evening, in warm beer, in cases of *epilepsy*. *Löwenstein.*

Mistura artemisiæ.

Mixture of Mugwort.

℞. Ext. artemis. vulg. alcoholic. gr. iv.
Acaciæ ℈j.
Sacch. ʒiij.
Mist. amygd. f ℥iij.

A coffee-spoonful[3] to be given every half hour in *eclampsia infantum*. The dose may be gradually raised to two coffee-spoonfuls. *Kölreutter.*

[1] Art. Artemisia in Encyc. Wörterb. iii. 313. Berlin, 1829.
[2] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 37. Erlangen, 1848.
[3] About two ordinary tea-spoonfuls.

XXX. ATROPIA.

SYNONYMES. Atropina, Atropium, Atropinum, Atropine.
French. Atropine.
German. Atropin.

This is the active principle of Atropa belladonna, and was discovered many years ago in the leaves by Brandes. To it is probably owing the whole of the medicinal efficacy of the plant. In 1825, M. Pauquy found it in the root, and affirms, that he detected it also in the stalks of datura, hyoscyamus, and solanum.[1]

METHOD OF PREPARING.

The most approved processes for extracting this alkaloid, according to Dr. Pereira,[2] are those of Mein, Thomson, and Richter. The process of Mein is contained in the *Pharm. Central-Blatt*, für 1833. The following is given in the United States Dispensatory,[3] from the *Journal de Pharmacie*, vol. xx., p. 87.—The roots of plants two or three years old are selected; of these, reduced to an extremely fine powder, twenty-four parts are digested for twelve days, with 60 parts of *alcohol*, of 86 or 90 per cent. The liquid having been separated by strong evaporation, the residue is then treated anew with an equal quantity of *alcohol;* and the tinctures, poured together and filtered, are mixed with one part of *hydrate of lime*, and frequently shaken for twenty-four hours: the copious precipitate which now forms is separated by filtering; and *diluted sulphuric acid* is added, drop by drop, to the filtered liquor till slightly in excess. The sulphate of lime having been separated by a new filtration, the alcoholic liquor is distilled to one half, then mixed with six or eight parts of *pure water*, and evaporated with a gentle heat till the whole of the alcohol is driven off. The residual liquid is filtered, cautiously evaporated to one-third, and allowed to cool. A concentrated aqueous solution of carbonate of potassa is then gradually added, so long as the liquid continues to be rendered turbid, and the mixture is afterwards suffered to rest some hours. A yellowish resinous substance, which opposes the crystallization of the atropia, is thus precipitated. From this the liquid is carefully decanted, and a small additional quantity of the solution of the carbonate is dropped into it, till it no longer becomes turbid. A gelatinous mass now gradually forms, which, at the end of twelve or twenty-four hours, is agitated, in order to separate the mother waters, then thrown upon a filter, and dried by folds of unsized paper. The substance thus obtained, which is atropia in an impure state,

[1] Mérat & De Lens, Dict. Universel de Mat. Méd. Art. Atropine. Bruxelles, 1838.
[2] Elements of Mat. Med. and Therap., 2d Amer. edit. ii. 312. Philad. 1846.
[3] Sixth edition, p. 138. Philad. 1845.

is dissolved in five times its weight of alcohol; and the solution, having been filtered, is mixed with six or eight times its bulk of *water*. The liquor soon becomes milky, or is rendered so by evaporating the excess of alcohol, and, in the course of twelve or twenty-four hours, deposits the atropia in the form of light-yellow crystals, which are rendered entirely pure and colourless by washing with a few drops of water, drying on blotting paper, and again treating with alcohol, as before.

By this process, Mein obtained, from twelve ounces of the root, twenty grains of pure alkali—according to the authors of the Dispensatory,—not quite twelve grains, according to Dr. Pereira.

Atropia crystallizes in transparent silky prisms, is devoid of odour, and is soluble in alcohol and ether; very slightly so in water. It dissolves in acids, with which it unites to form salts. At a temperature of 212° it is volatilized.

As atropia is an expensive article, and therefore very liable to adulteration, Mr. Donovan,[1] to insure its purity, advises that a dram of *commercial atropia* be dissolved in an ounce of *alcohol*. If there be a residuum, it must be separated; and six ounces of distilled water be added, shaking the mixture. No change appears at first; but, after twelve or eighteen hours, the atropia crystallizes in beautiful stellated groups, which adhere to the sides of the vessel. These, after pouring off the liquor, must be collected on bibulous paper, and dried.

EFFECTS ON THE ECONOMY.

Atropia is a most virulent poison. When given to dogs and cats, it causes vomiting, dilatation of the pupil, stupor and death. A tenth of a grain produced, on man, manifestly poisonous phenomena. When Brandes applied a "*minimum*" quantity of the sulphate to the tongue, headache, with alternate chills and flushing, trembling, oppression of breathing, and weakness and smallness of the pulse supervened.[2] An imponderable quantity, applied to the eye, occasions dilatation of the pupil. Reisinger[3] used it for this purpose, dissolving a grain in two scruples of water; and it has been proposed by Mr. W. W. Cooper,[4] surgeon to the North London Ophthalmic Institution, and by M. Bouchardat,[5] as a substitute for belladonna for dilating the pupil in cases of *cataract*, &c. Mr. Cooper affirms that he has used it, with the greatest satisfaction, in a considerable number of cases,—the proportions being two grains of *atropia* dissolved in a dram of *alcohol* and seven drams of *distilled water*. A colourless solution is the result, which—Mr. Cooper affirms—is equally efficacious in its

[1] Ranking's Half-Yearly Abstract, July to December, 1848, Amer. edit., p. 215.
[2] Oesterlen, Handbuch der Heilmitellehre, S. 784. Tubingen, 1845.
[3] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 41. Erlangen, 1848.
[4] London Lancet, June 8, 1844.
[5] Annuaire de Thérapeutique, &c., pour 1847, p. 19. Paris, 1847.

action as, and much more elegant than, the ordinary preparations of belladonna,—a full drop placed in the eye producing speedy and complete dilatation of the pupil in the generality of cases, although, in some instances, a stronger solution may be required. He has never seen ill effects from its use, although he has tried it in the proportion of four grains to the ounce; but, he thinks, two grains will be found to answer every purpose. He directs a drop to be used night and morning, where he is desirous of keeping up the dilatation of the pupil. An objection, which does not seem to be a very forcible one, has been made to this preparation,—that it involves the necessity for the addition of alcohol. Mr. J. Lloyd Bullock[1] proposes, therefore, to substitute the salts of atropia, which are neutral and soluble in distilled water. Dr. Jacob[2] considers it more effective and convenient than any extract or tincture of belladonna.

In experiments made with it by Messrs. Bouchardat and Stuart Cooper,[3] they found it, in the dose of a *centigramme*—gr. .1543, produce on man all the severe symptoms of the active solanaceæ—as delirium, coldness of the surface, syncope, depravation of sight, and aphonia; yet they consider it, owing to the facility of administering it and of regulating the dose, to be a most valuable agent in every case in which belladonna and other solanaceæ are beneficial.

Its dose is about one-twelfth of a grain; or it may be employed endermically.

Tinctura atropiæ.

Tincture of atropia.

(*Gouttes ou Teinture d'Atropine.*)

℞. Atropiæ gr. xv. (1 *gramme.*)
Alcohol. 85 per cent. ℥x. (40 *grammes.*) M.

Dose—one to five drops.

Unguentum atropiæ.

Ointment of atropia.

(*Pommade d'Atropine.*)

℞. Atropiæ gr. iv. (25 *centigr.*)
Adipis ℥j. and ℈j. (5 *grammes.*) M.

The size of a pin's head to be introduced, night and morning, between the eyelids, in cases of *adhesion of the iris to the lens.*

Bouchardat.[4]

An ointment, composed of five grains of atropia to three drams of lard, has been much used in *neuralgia.*[5]

Atropia is so lethiferous, that it is not much employed internally.

[1] Lond. Lancet, June 15, 1844, p. 393.
[2] Dublin Medical Press, cited in Med. Examiner, October, 1848, p. 652.
[3] Bouchardat, Annuaire de Thérapeutique, pour 1848, p. 10; and Ibid. pour 1849, p. 7.
[4] See, also, Cunier, in Bouchardat, Annuaire pour 1848, p. 10, Paris, 1848.
[5] Brookes, Lancet, Jan. 30, 1847.

XXXI. AURI PRÆPARATA.

Synonymes. Preparations of Gold.
French. Les Préparations d'Or, Les Composés aurifères.
German. Goldpräparate.

The administration of gold in medicine is not modern. In the times of alchemy, it was frequently used in *nervous diseases, convulsions, hypochondriasis, mental affections, profuse salivation*, &c. Paracelsus, Horst, and Poterius recommended it, united with corrosive sublimate, in *syphilis*. Its violent effects, however, brought it into discredit, and during the decadency of alchemy it fell into entire disuse.[1] It is probable, too, that many preparations were brought forward as containing gold, which had none of it, and this may partly account for the discredit into which it lapsed.[2] M. J. A. Chrestien[3] was the first who—in more modern periods, (about the year 1810,)—recalled the attention of practitioners to the preparations of gold, and after him many physicians employed them, so that the published results of their observations have furnished us with a considerable amount of evidence in relation to their therapeutical properties, and they have, in consequence, been received into many of the modern pharmacopœias.[4]

As the different preparations agree in their effects on the economy, it may be well to make a few observations which apply to all.

EFFECTS ON THE ECONOMY IN HEALTH.

Orfila made many experiments to discover the action of the preparations of gold on animals. Three dogs, into whose jugular veins he injected a small quantity of the chloride dissolved in water, died speedily—death being preceded by difficulty and rattling in breathing, cough, symptoms of suffocation and slight vomiting; these results supervening immediately after the injection had entered the blood-vessels. On dissection, the lungs were found livid, engorged with blood, and without any crepitating noise when cut into; wrinkled, discoloured, and scarcely lighter than water; the heart was of a violet colour; the left auricle and ventricle full of black blood, and the right cavities empty and contracted. The effect of the salt supervened with such rapidity that the blood of the crural artery—which was opened a few minutes after death—was of a brownish red, almost black, colour.

[1] Richter's Specielle Therapie, x. 504, Berlin, 1828; and Nachet, Art. Or, in Dict. des Sciences Médicales, tom. xxxvii.
[2] Riecke, Die neuern Arzneimittel, S. 53. Stuttgart, 1837.
[3] Recherches et Observations sur les effets des préparations d'Or du Dr. Chrestien, &c. Paris, 1821.
[4] See Art. Gold, in Encycl. Wörterb der Medicinisch. Wissenschaft, B. xv. S. 77, Berlin, 1837.

In two dogs, to which he gave the chloride, a torpid condition was induced, which terminated fatally in a couple of days. The mucous membrane of the stomach was found inflamed and ulcerated.

The effects on man of agents so potent, in appropriate doses, have been investigated by many observers. Experiments on animals had already exhibited the powerful influence which they are capable of exerting on the organs and functions of organic life. One of the most striking effects is said to be, an increase of the various secretions; commonly, the urinary secretion is largely augmented, as well as the transpiration, and the intestinal and salivary secretions. Not unfrequently, under the continued administration of the gold, actual salivation ensues, which differs, however, from that induced by mercury. It is always slow in appearing, and is by no means so exhausting; nor do troublesome ulcers occur; and the saliva is thinner, and not so tenacious. Like mercury, the preparations of gold occasion excitement in the organism, which often ends in a true febrile condition. After they have been taken for some time in moderate doses, there is generally a feeling of increased warmth in the stomach, and an augmentation of the appetite. The pulse is rendered fuller and more active, and the animal heat and vital activity are augmented, so that in such as are predisposed to the affection, hemorrhage is apt to take place. The catamenia recur sooner than usual under their influence, and the quantity lost may be greater.[1] Sooner or later, a regular attack of fever not unfrequently supervenes,—as indicated by shivering, and pains in the limbs, back, and stomach,—which may continue for a few hours, but sometimes lasts for days, and at length ends by sweating, depositions in the urine, and occasionally by salivation.

In very large doses, certain of the preparations of gold are corrosive poisons. The symptoms, caused by their use, when they act as such, are—oppression in the region of the stomach; nausea, vomiting, pains in the abdomen and diaphragm, a metallic taste in the mouth, augmented secretion of saliva, without the teeth or gums being affected, pulse excited, and breathing oppressed.[2] As a general rule, they are not esteemed proper for impressible individuals; on the other hand, in persons of torpid constitutions, they would appear to have exerted an excitant influence even on the generative system. Certain persons, according to Chrestien and Niel, are not susceptible of this action; and, again, there are some, according to Cullerier, junr., who cannot tolerate them in any form.

When too large a dose has been given, the remedy should be entirely discontinued for some time, or the dose be diminished; and the effects will soon disappear. One of the greatest recommen-

[1] Riecke, Op. cit. S. 55. [2] Grötzner, in Rust's Magazin. xxi. 3.

dations of gold over mercury, in the eyes of many, is that it does not act so destructively on the organism, and never induces such a cachectic condition as the latter occasionally does.[1]

EFFECTS ON THE ECONOMY IN DISEASE.

The diseases, in which the preparations of gold have been administered, in modern times, are chiefly the following.

Syphilis.—They have been occasionally used in primary sores, but have been mainly employed in secondary syphilis, especially in old cases, where a doubt often exists, whether more of mercurial cachexia or syphilis be present. They are given, also, where there is a scrofulous complication, and where it is desirable to exhibit some other remedy than mercury; and lastly, their use is indicated where mercury has failed to remove syphilis.[2] Many practitioners doubt whether the preparations of gold should be esteemed much inferior to those of mercury. Numerous experiments instituted, amongst others, by Chrestien,[3] Cullerier, junr.,[4] S. L. Mitchill,[5] Niel, Biett, Lallemand,[6] Wendt,[7] and Legrand,[8] have shown, that their employment has been most advantageous in the different forms of syphilis, and that they have rarely disappointed expectation. Alibert found them especially useful in syphilitic eruptions. It must be borne in mind, however, that when they are given in syphilis, their operation is slow, and that, in the first instance, the symptoms may appear aggravated: they are not, therefore, adapted for cases in which it is important to act speedily, so as to arrest the disease at once, and prevent its farther development.

Gonorrhœa.—In protracted cases of gonorrhœa, several physicians[9] have extolled the preparations of gold; others, as Wendt and Ritter, have advised them for the sequelæ of gonorrhœa (Trippernachkrankeiten:) it is not probable, however, that they could be of much use in gonorrheal affections, which, as is well known, are curable without any mercurial preparations.

Scrofula.—The efficacy of the preparations of gold in scrofula was deposed to by Chrestien, Eberle, Niel, Legrand,[10] Herrmann, and Kopp.[11] According to observation, it would appear that they effect improvement in the mildest cases, and are beneficial where there is much torpor, but that they ought to be avoided in irritable subjects. In *scrofulous ophthalmia*, and in *scrofulous porrigo*, they would seem to have been most efficacious.

The preparations of gold have been employed by M. Baude-

[1] Riecke, Op. cit. S. 56. [2] Eberle, Treatise on the Mat. Medica, 2d edit. i. 247.
[3] Op. Citat. p. 6; see, also, Lettre à M. Magendie sur les préparations d'Or, &c. Paris, 1828. [4] Dict. des Sciences Médicales, Art. Or., tom. xxxvii.
[5] Dyckman's Dispensatory, p. 201, and Eberle, Op. cit.
[6] Journal Universel des Sciences Médicales, t. xxvii.
[7] Rust's Magazin, Bd. xvi. St. 1.
[8] Gazette Médicale de Paris, Oct. 30, 1837. [9] Grötzner, Op. cit.
[10] Bulletin Général de Thérapeutique, No. xv. 15 Août, 1837.
[11] Denkwürdigk. in der ärztl. Praxis, iii. 351.

locque, at the *Hôpital des Enfans Malades*, and by M. Velpeau at La Charité.[1] At the former institution, they were given in enormous doses. M. Baudelocque gave the chloride and the stannate in doses of from ten to twelve grains, without producing any effect on the disease, and without any apparent injury to the constitution of the children subjected to the experiment. The oxide prepared by potassa was carried as high as twenty grains during the day. At La Charité, Velpeau gave fifteen, eighteen, and twenty grains of the chloride and oxide during the day,—and higher doses were not tried, solely on account of the expense of the medicine. These results differ greatly from those of Orfila and Devergie, the former of whom affirms, that the chloride is more active than the corrosive chloride of mercury; and the latter states, that in the dose of one-tenth to one-twentieth of a grain, it produces more or less inflammation of the lining membrane of the stomach and intestines.

Scirrhus and *cancer*.—The utility of the preparations of gold appears to have been most decided in scirrhous induration of the tongue, according to the observation of Wendt, Helm, and others; in such case, they are rubbed on the tongue; this, indeed, is the most common form of administration. H. Hoffmann relates a case of scirrhus of the pylorus, in which the chloride was entirely successful; and frictions with the chloride, or the oxide on the labia pudendi have been reccommended by Hufeland, Herrmann, Meissner, Grötzner, Gozzi,[2] and others, in cases of scirrhus and cancer of the uterus. In the same affections, Krimer has advised them to be applied to the os uteri. Scirrhosities, it is affirmed, have been dispersed through their agency; and even in open cancer marked improvement has been perceptible.

In *tumours of the bones*, and in like affections, the preparations of gold have been employed successfully by some practitioners, and especially when the cases originated in syphilis.

Several forms of *lepra* have been treated with them by Alibert, and A. T. Chrestien, and with the best effects.

In *amenorrhœa*, Carron du Villards employed the cyanuret successfully, beginning before the expected menstrual period.

Lastly.—Wendt, Delafield, and Grötzner have administered them with benefit as diuretics in *dropsy*. With others, however, they have failed. According to Riecke,[3] the results of experience would seem to show, that they are especially adapted for dropsy dependent upon organic disease of some viscus.

None of the preparations of gold are much employed at the present day. Their expense is, indeed, a weighty objection, unless there were striking advantages in adopting them in special cases of disease in preference to other articles of the Materia Medica.

[1] L'Expérience, No. lxxxvii.; and Lancet, March 23, 1839, p. 31.

[2] Sopra l'uso di alcuni remedii aurifici nelle malattie veneree. Bologn. 1817; and Omodei, Annal. Univers. di Medicin., vol. v.

[3] Op. cit. S. 58.

XXXII. AURI CHLO'RIDUM.

Synonymes. Aurum Chloratum seu Muriaticum seu Oxydulatum Muriaticum, Chloretum seu Murias Auri, Aurum Salitum, Chloruretum Auri, Auri Terchloridum, Muriate of Gold, Chloride of Gold, Terchloride of Gold.

French. Chloride d'Or, Muriate d'Or.

German. Salzsaures Gold, Chlorgold, Goldchlorid, Salzsaures Goldoxydul, Hydrochlorsaures Goldoxyd, Goldkrystalle.

This preparation is received into several of the European Pharmacopœias, and is usually formed by digesting one part of *gold leaf* in three parts of *nitro-muriatic acid*, in a sand bath, and evaporating gently to dryness. Magendie,[1] however, recommends the following method, which has been adopted in the French "*Codex.*" Take one part of fine *leaf gold*, divide it into small portions, and put it into a vial of white glass; pour upon it three parts of *nitro-muriatic acid*—formed of one part of *nitric acid*, and two parts of *muriatic acid*—and heat the whole in a small sand bath, so arranged, that in case the retort breaks, the fluid may be recovered without loss. The solution of the gold will soon take place. The fluid must be then evaporated until the smell of chlorine is perceptible. This point can be readily determined, as after the decomposition of the nitro-muriatic acid there is a period during which the nitrous acid is alone given off. The disengagement of chlorine indicates the commencement of the decomposition of the chloride formed. The vessel must now be removed from the fire and suffered to cool. The chloride appears immediately as a crystalline mass, in the form of a multitude of beautiful yellow needles. In this condition, chloride of gold is as pure as it need be: it contains no excess of muriatic acid, and is not deliquescent. It can be preserved in the same vessel in which it has been prepared—by merely stopping it with paper—without any danger of undergoing decomposition.

Chloride of gold, prepared according to Magendie's formula, is very acid, but this property is not owing to its containing any free acid. The taste is also styptic and disagreeable. It only attracts moisture from the air when it contains an excess of muriatic acid, as is the case in Wendt's preparation. It is readily soluble in water, with which it forms a solution of a beautiful yellow colour. Many animal and vegetable substances,—and especially the epidermis—are coloured by it of a purple violet when it is placed in contact with them. Exposed to a moderate heat, it passes to the state of protochloride. When heated to a greater degree in close vessels, chlorine is disengaged and metallic gold left behind.

[1] Formulaire.

The chloride is one of the most active of the preparations of gold. It belongs to the class of corrosive poisons,[1] and greatly resembles the corrosive chloride of mercury in its operation on the economy. It must consequently be administered with caution:—even a tenth of a grain has been known to induce unpleasant irritation of the stomach.[2] It has been given both internally and externally in *syphilis*, *dropsy*,[3] and *glandular affections*.

M. Chavannes, a pupil of M. Pétrequin,[4] of Lyons, has published an account of the great success of the latter in the treatment of the ulcerated form of lupus, *lupus exedens*, by means of this agent, which he has found of great utility in other forms of *cutaneous disease*, when they assume an ulcerated form, as *carcinoma of the face*, *eczema*, *tuberculous syphilide*, &c. It is made of one part of pure *laminated gold*, three parts of *chlorohydric acid*, and one part of *nitric acid*. It produces a temporary, sharp pain, and coagulation of the albuminous matters on the surface of the ulcer, which changes its colour successively from an orange yellow to a purple, violet, and black; a crust forms, and, under it, healing takes place without a cicatrix, unless the parts have been deeply destroyed.

In the form of ointment, it is said to relieve the pain of *rheumatic gout*, often in a truly wonderful manner. The purple stains caused by it are speedily removed by washing the part with a little wine—a fact that was discovered by accident.[5]

The dose is from one-sixteenth to one-twelfth of a grain, once or twice a day, gradually but slowly increased. In the like quantity it has been rubbed upon the tongue and gums. Externally, it has been applied in the form of ointment or watery solution—the latter more particularly in *ophthalmia*, especially of the scrofulous kind, in which Jahn found it very efficacious; and in *chronic granular eyelids*, Dr. W. Clay Wallace[6] found a solution of six or eight grains of it in an ounce of water, vastly superior to the nitrate of silver. In recent cases, however, it was inferior.

The following are some of the forms in which it has been prescribed:—

Boli auri chloridi.

Boluses of chloride of gold.

(*Boli antisyphilitici*, Pharmacopœia Batava.)

Antisyphilitic Boluses.

℞ Auri chlorid. gr. ss. ad gr. ij.
Extract. aconit. gr. vj. ad gr. xij. Fiant boli sex.

Two of these to be taken for a dose, and repeated three times a day.

[1] Orfila, Toxicolog. i. 593.
[2] Magendie, Formulaire.
[3] Wendt, in Rust's Magazin, B. xxv.
[4] Revue Médicale, iii. 45—70, pour 1848; cited in Brit. and For. Medico-Chirurg. Rev. April, 1849, p. 539.
[5] Wilczecoski, in Medicin. Zeitung, cited in Lond. Med. Gaz., Mar. 7, 1845.
[6] Boston Medical and Surgical Journal, Nov. 3, 1847.

Pilulæ auri chloridi.

Pills of chloride of gold.

(*Pilulæ chlorureti auri*, Ph. Amstelodamensis nova.)

℞. Auri chlorid. gr. x.
Glycyrrhiz. pulv. ʒiij.
Syrup. q. s. ut fiant pilulæ cl,

Dose.—One daily, gradually augmenting the quantity.

℞. Auri chlorid. gr. i.
Lycopod. pulv. gr. xv. M. fiat pulv. in part. xvi. dividend.

One of the powders to be rubbed upon the tongue and gums daily. *Chrestien.*

Gradually, the same quantity of the chloride may be divided into twelve, and afterwards into ten parts, and be used in the same way.

Unguentum auri chloridi.

Ointment of chloride of gold.

℞. Auri chlorid. gr. iv.
Misce intimè cum
Ung. rosæ ℥j.

Wendt.

Collyrium auri chloridi.

Collyrium of chloride of gold.

℞. Auri chlorid. gr. ij.
Solve in
Aquæ destill. f ℥vj.
F. collyrium.

To be applied by means of linen compresses, or dropped into the eye. *Jahn & Fischer.*

XXXIII. AURI ET SO'DII CHLO'RIDUM.

Synonymes. Aurum Muriaticum (*Pharmac. Borussic.*) seu Aurum Muriaticum Natronatum seu Chloratum Natronatum, seu Sesquichloratum Natronatum, Sodii Auro-Terchloridum, Perchloruretum Auri et Sodii, Chloretum Auri cum Chloreto Natrii, Murias Aurico-natricum, Chloruretum Auri et Sodii, Chloride of Gold and Sodium, Hydrochlorate or Muriate of Gold and Sodium, Auro-terchloride of Sodium.

French. Chlorure d'or et de Sodium, Hydrochlorate ou Muriate d'Or et de Soude.

German. Salzsaures Goldnatrium, Chlorgoldnatronium, Goldnatriumchlorid, Natriumgoldchlorid, Sodahaltiges Salzsaures Gold, Salzsaures Goldoxynatrium, Chlorgoldnatrium, Figuier's Goldsalz.

This preparation is in the Pharmacopœias of Prussia, Ferrara, Sweden, &c. M. Figuier directs it to be made in the following manner.[1] Dissolve four parts of *gold* in *nitro-muriatic acid*,

[1] Annales de Chimie, Février, 1822, and Riecke, Die Neuern Arzneimittel, S. 63. Stuttgart, 1837.

and evaporate the solution to dryness; add thirty-two parts of *water*, and one part of *chloride of sodium*, and evaporate to one half. On cooling, crystals will form, which consist of 69.3 parts of chloride of gold; 14.1 parts of chloride of sodium, and 16.6 of water. In the French "*Codex*," it is directed to be made by dissolving 85 parts by weight of *chloride of gold*, and 16 parts of *chloride of sodium*, in a small quantity of *distilled water*. The solution is evaporated by a gentle heat until a pellicle forms, and is then put aside to crystallize.

The formula of the Prussian Pharmacopœia is as follows:

R. Auri partes vj.

Solve in

Acidi muriatici q. s.

Acidi nitrici quantum ad auri solutionem requiritur, guttatim addendo. Tunc admisce.

Natri muriatici sicc. part. x.

Et post solutionem leni igne evaporando in pulverem flavum redige.[1]

This preparation has a beautiful yellow colour, and appears under the form of four-sided prisms. It attracts moisture from the air, but to a less degree than the chloride of gold with excess of sulphuric acid.

The *Aurum Muriaticum Natronatum* of the Germans is milder than the preceding preparations, and is more frequently administered, especially in Germany, than any preparation of gold. It is used both internally and externally. The dose is about the same as that of the last preparation, but it may be carried higher.

Kopp[2] affirms, that he has frequently employed it with advantage, in small doses, in *scrofulous tumefaction of the upper lip*. He prescribed daily, and once or twice a day, from one twenty-fourth to one-thirteenth of a grain of it, reduced to powder, with two grains of sugar, and rubbed by means of the finger on the inner side of the affected lip. In cases of *scrofulous, thick, sensible*, and *slightly inflamed nose*, in the adult, Riecke[3] recommends the ointment, described below, to be applied to the nasal fossæ; and three times a day a powder composed of from one-sixteenth to one-twelfth of a grain of the salt of gold to two grains of sugar of milk, to be rubbed on the gums with the moistened finger. The salts of gold, according to Riecke, appear to have a specific action on the organs in the mouth, gums and nose!!

Pulvis et sodii chloridi.

Powder of chloride of gold and sodium.

R. Auri et sodii chlorid. part. iij.
Irid. florent. in pulv. subtil. part. ix.

[1] Take of gold six parts:
Dissolve a sufficient quantity of
Muriatic acid, adding as much nitric acid as is required to dissolve the gold. Then mix ten parts of the dry chloride of sodium; and after evaporating the solution over a slow fire reduce it to a yellow powder.

[2] Op. cit. B. iii. S. 351. [3] Die neuern Arzneimittel, u. s. w. S. 442.

Three grains of this represent three-quarters of a grain of the salt of gold. These three grains are divided into thirty frictions for the weakest doses, and into three for the strongest. Starch may be substituted for powdered orris root. *Legrand.*

Liquor auri et sodii chloridi.

Solution of chloride of gold and sodium.

℞. Auri et sodii chlorid. gr. ij.
Aquæ destillat. f ℥j. M.

Ten drops to be given every two or three hours, in cases of *dropsy*. *Grötzner.*

Pilulæ auri et sodii chloridi.

Pills of chloride of gold and sodium.

℞. Auri et sodii chlorid. in aquæ destillat. q. s. solut. gr. iv.
Extract. aconiti ℈ss.
——— dulcam. ʒj.
Althææ pulv. q. s. ut fiant pilulæ lxxx.

Three pills to be taken three times a day. *Grötzner.*

℞. Amyli. solan. tuberos. gr. iv.
Acaciæ ʒj.
In mort. vitr. exactè mistis adde terendo
Aur. et sod. chlorid.—in ʒj. aq. destillat. solut.—gr. x.
Fiant pilulæ cxx.

Each of these contains about one-twelfth of a grain.
A. T. Chrestien.

Pastilli auri et sodii chloridi.

Lozenges of chloride of gold and sodium.

℞. Auri et sodii chlorid. gr. v.
Sacchar. pulv. ℥j.
Misce exactè in mortar. vitreo et adde.
Mucilag. acaciæ q. s. ut fiant pastilli lx.

Each of these will contain about one-twelfth of a grain of the salt. *A. T. Chrestien.*

Unguentum auri et sodii chloridi.

Ointment of chloride of gold and sodium.

℞. Aur. et sod. chlorid. gr. iij.—iv.
Adipis ℥ss.
Misce exactè. Fiat unguentum.

Used in friction. *Grötzner.*

℞. Aur. et sod. chlorid. gr. iiss.
Adipis ʒiss. M.

The size of a bean to be placed in the nasal fossæ in *scrofulous cases*,[1] along with the iatraleiptic use of the powder before described. *Riecke.*

[1] See p. 123.

XXXIV. AURI CYANURE'TUM.

Synonymes. Auri Cyanidum seu Tercyanidum, Aurum Cyanicum seu Cyanogenatum seu Cyanatum seu Hydrocyanicum, Cyanuretum auricum seu Auri, Cyanuret, Cyanide or Tercyanide of gold.

French. Cyanure d'Or.

German. Blausaures Goldoxyd, Blaustoffgold, Cyangold, Goldcyanid.

The mode of preparing this combination, recommended by M. O. Figuier,[1] of Montpellier, is as follows. He decomposes *chloride of gold* by *cyanuret of potassium*, but states, that many precautions are necessary to procure it in a pure state. The chloride must be as neutral as possible, which can only be effected by recrystallizing the salt several times. The cyanuret must not be alkaline, or contain any formiate or carbonate of potassa, and it is to be added to the solution of the chloride of gold very cautiously as long as there is any precipitate, taking care that there is not the slightest excess of the cyanuret, as this would cause a solution of part of the product, and the formation of soluble double cyanurets. The cyanuret, thus made, is to be well washed with pure water, and dried in a dark place.

The process in the French "*Codex*" consists essentially in adding very carefully a solution of pure *cyanuret of potassium* to a solution of *chloride of gold*, until a precipitate—which is cyanuret of gold—ceases to be formed. The chloride of gold, prior to solution, should be deprived of all excess of acid by heating it in a salt water bath. It is a yellow powder, which is insoluble in water.[2]

In some experiments, Magendie[3] found, that cyanuret of gold is one of the substances that promote the coagulation of the blood. Where, consequently, it is desirable to impress a modification on that fluid in chronic cutaneous, and other affections, its administration might perhaps be found useful. M. Pourché,[4] who has used it successfully in *syphilis* and *scrofula*, recommends its administration—in the form of frictions on the tongue—mixed with powdered orris root, well washed in alcohol, and dried.

Pulvis auri cyanureti.

Powder of cyanuret of gold.

℞. Auri cyanur. gr. j.
Irid. florent. pulv. gr. iij. M.

Chrestien.

[1] Journal de Pharmacie, xx. S. 99, and Amer. Journ. of Pharm. vi. 82. Philad. 1833—4. See, for another mode of preparing it, Deferre, in Bulletin Général de Thérapeutique, Février, 1838.

[2] Pereira, Elements of Mat. Med. &c., 2d edit. i. 686. Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.

[3] Leçons sur le Sang, &c., and Translation, in Lancet, January 20, 1839, p. 636.

[4] Journal de Pharmacie, xx. 599 and 649.

In pills he prescribes it as follows:—

Pilulæ auri cyanureti.

Pills of cyanuret of gold.

℞. Auri cyanur. gr. j.
Ext. mezereon. gr. iij.
Althææ pulv. q. s. ut fiat massa.

Each pill to weigh five grains.

To children, the dose at first should never exceed one-fifteenth of a grain.

Mistura seu Liquor seu Solutio auri cyanureti.

Mixture or solution of cyanuret of gold.

℞. Auri cyanur. gr. iij.
Aquæ alcoholisat. f ℥viij. M.

Dose.—A tea-spoonful twice a day, gradually increasing the dose. *Chrestien.*

XXXV. AURI IO'DIDUM.

Synonymes. Auri Ioduretum, Aurum Iodatum, Iodide or Ioduret of Gold.
French. Proto-iodure d'Or.
German. Iodgold, Goldiodür, Goldiodid.

According to the French Codex, this is made by adding a solution of pure *iodide of potassium* to a solution of *chloride of gold*, collecting the iodide of gold, which falls down, on a filter, and washing it with *alcohol* to remove the excess of iodine, which precipitates with it. M. Meillet[1] recommends the following process in preference. To a solution of *gold* as neutral as possible is added by degrees neutral *hydriodate of ammonia* so long as a precipitate falls. The solution must not be too far diluted. A small quantity of *alcohol* must now be added, not more than about one-third of the whole volume of the liquid. After some hours' rest, this is decanted, when a precipitate of a blackish colour is obtained, composed of iodine and iodide of gold. It is then washed by decantation with a little alcohol; when an almost white and half crystalline iodide of gold is obtained. This is dried in the open air on plates, and is kept free from light in stopper bottles. In this process, the gold is completely precipitated, which never occurs when the iodide of potassium is employed; and the iodide has an invariable composition.[2]

This has been used in the same cases as the other preparations of gold, in the dose of one-fifteenth to one-tenth of a grain.

[1] Journal de Pharmacie, Nov. 1841, p. 665.

[2] For another process for forming the iodide of gold, see M. J. Fordos, Journal de Pharmacie, Nov. 1841, p. 653.

XXXVI. AURI NITROMU'RIAS.

Synonymes. Aurum Nitrico-Muriaticum, Nitromuriate of Gold.
French. Nitromuriate d'Or.
German. Salpetersalzsaures Gold.

Nitromuriate of gold has been recommended, of late years, by Recamier, whose attention was directed to it by accident. A worker in gold had a *cancerous tumour* on the back, which, as it incommoded him, he touched frequently with the hand; this occurred whilst he was dissolving gold in aqua regia; after this the tumour soon presented another appearance, and went away in a short time. Recamier thought it probable that the workman had received some of the solution upon his fingers, which had thus been applied to the tumour. Under such impressions, he employed it in the case of a female, who was affected with an *extensive cancer;* the disorganized parts resumed their natural texture, and completely healed, although the cancerous dyscrasy ultimately proved fatal. In the case of a female, with *fungus of the neck of the uterus*, a complete cure was effected by it; and in *cancer of the uterus* he found it advantageous.

Recamier prepares it by dissolving six grains of pure *chloride of gold* in an ounce of *nitromuriatic acid:* and he applies it like other corrosive agents, taking care to confine it to the parts to be acted upon. When the object is to cauterize, it must be applied to the affected parts, until a whitish scab or crust is formed, which falls off in three or four days; after which the application may be repeated as often as may be necessary. The pain caused by the operation is generally insignificant, and in cases where it is violent it can be allayed by pledgets dipped in laudanum.

XXXVII. AURI OX'IDUM.

Synonymes. Auri Teroxidum seu Peroxidum, Aurum Oxydatum, Oxide of Gold, Peroxide of Gold, Auric Acid.
French. Oxide d'Or.
German. Goldoxyd, Oxydirtes Gold, Goldsäure.

Oxide of gold, prepared by calcination, is the *crocus solis* of the Wirtemberg Pharmacopœia. The oxide is received also into the Pharmacopœias of Ferrara and Hanover.

Magendie[1] recommends the following as one of the modes of preparation. Take any quantity of *chloride of gold*, put it into a flask of white glass and pour upon it six or seven times its weight

[1] Formulaire, &c.

of *boiling water*, to dissolve the chloride; then add *crystallized baryta* gradually, until the liquid is no longer acid, as shown by a strip of litmus paper. The liquid is then boiled, permitted to cool, and filtered. The precipitate is washed several times with *warm water:* the water of the various washings is brought together and evaporated nearly to dryness; the saline mass, when cool, is then dissolved in water, and in this way more and more oxide of gold is obtained, which may be added to the other. The oxide is now washed with boiling water, until the water no longer affords a precipitate on the addition of nitrate of silver. It is then washed once or twice with *water acidulated with nitric acid*, to remove the small quantity of carbonate of baryta formed during the operation, and which may remain mixed with the oxide. These washings are repeated with *cold water*, until the instillation of sulphuric acid occasions no longer any white precipitate, which indicates that it is free from baryta. The oxide is then dried at a heat of from 167° to 190° of Fahrenheit, after which it is kept in a cool and dark place in a well-stopped bottle.

The process recommended by M. Cottereau is the following: An excess of *magnesia* must be boiled with a dilute solution of *chloride of gold*, till the solution loses its colour; the whole is then to be filtered, and the precipitate well washed; the result, which is aurate of magnesia, is to be treated with an excess of *dilute nitric acid*, which removes all the magnesia, and leaves the oxide in a pure state. This is to be again well washed, and dried between sheets of bibulous paper, but without compression or exposure to light or heat.[1]

In the French "*Codex*" it is directed to be prepared by boiling four parts of *calcined magnesia* with one part of *terchloride of gold* and forty parts of *water*. It is then washed, first with *water*, to remove the chloride of magnesium, and afterwards with *dilute nitric acid*, to dissolve the excess of magnesia.[2]

In the condition of hydrate, the oxide of gold is of a yellow colour; when dried, of a blackish-violet. It is never entirely soluble in chlorohydric acid, always leaving behind a small portion which is reduced to the metallic state during desiccation. Neither sulphuric nor nitric acid has any action upon it.

Oxide of gold has been administered by many physicians, and especially by Westring, Niel, Chrestien,[3] and Legrand,[4] in the same diseases as the other preparations.

[1] Amer. Journ. of Pharm. 2d series, ii. 110. Philad. 1837.

[2] Pereira, Elements of Materia Medica, 2d edit. i. 685. Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846. [3] Op. citat.

[4] Op. cit., and De l'Or, de son Emploi dans le traitement de la Syphilis, &c. Paris, 1828.

XXXVIII. AURUM METALLICUM.

Synonymes. Metallic Gold.
French. Or Métallique.
German. Metallisches Gold.

Metallic gold is either administered in the form of *aurum limatum*, "gold filings,"—formed by filing the finest gold with a fine-toothed file—or in that of *pulvis auri*, *aurum divisum seu pulveratum*, (French, *Or divisé*—Germ. Goldpulver, Fein zertheiltes oder präparirtes Gold,) which is obtained by amalgamating gold with quicksilver, and driving off the quicksilver by heat.[1] According to Trommsdorff, a very fine gold powder may likewise be obtained by precipitating the gold from a dilute solution of the metal in *nitro-muriatic acid* by means of *green sulphate of iron*. The precipitate, thus formed, when washed and dried, is of a brownish colour, but when polished, exhibits the most beautiful golden splendour.[2]

It may also be prepared by rubbing *leaf gold* with *sulphate of potassa*, sifting and washing with boiling water to remove the sulphate.[3]

MM. Chrestien and Niel have exhibited metallic gold largely, and, they affirm, successfully; but, according to Wendt, it has no action on the economy. It is not easy, indeed, to conceive, that a substance so difficult of oxidation can have much, if any, effect. The former gentlemen and Gozzi regard it as the mildest of the preparations of gold, but equally efficacious with the others, although more tardy in producing its effects.

It has been administered in the dose of from a quarter of a grain to a grain, three or four times a day, in the form of powder or pill,—the dose being gradually increased; and has been rubbed daily upon the tongue, in the quantity of from one to three grains mixed with starch powder, or powder of lycopodium. Where the condition of the tongue and of the interior of the mouth does not admit of this, Niel advises that a blister should be applied on the side of the neck, and that the denuded surface should be dressed with a mixture of a grain of *gold amalgamated with mercury*, and half a dram of *lard;* gradually augmenting the quantity of gold to two grains. In *syphilitic ulcers* and *excoriations*, metallic gold is applied externally, amalgamated with the proper quantity of mercury, and united with unsalted butter, lard, or cerate, in the proportion of twelve grains to one ounce. In *syphilitic excrescences*, frictions with gold powder mixed with saliva are said to have been serviceable.

[1] Jourdan, Pharmacopée Universelle, ii. 215. Paris, 1828.
[2] Riecke, Die neuern Arzneimit. S. 58. Stuttgart, 1837.
[3] Pereira, Elements of Materia Medica and Therapeutics, 2d edit. i. 682, Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.

The following formulæ are given by Riecke :[1]

Pulvis Auri Compositus.

Compound Gold powder.

℞. Auri divis. gr. vj.
Amyli gr. lxvj.
M. f. pulv. in part. xij. æquales divid.

A powder to be given four times a day.

℞. Auri divis.
Lycopod. āā gr. ij.
M. f. pulvis.

A powder to be rubbed once a day upon the tongue.

Syrupus Auri.

Syrup of Gold.

℞. Auri divis. ℈j.
Syrup. acaciæ, ℥j. M.

Employed to pencil *ulcers of the pharynx*, and as a dressing to *chancres*. *Hôpital de Montpellier.*

Pomatum Auri.

Ointment of Gold.

℞. Auri divis. ʒj.
Adipis ℥ss. M.

To be rubbed on *buboes*, and applied to *blisters*. *Legrand.*

XXXIX. BALLOTA LANATA.

Synonymes. Leonurus Lanatus.
French. Ballote Cotonneuse.
German. Wolliger Wolfstrapp, Wollige Ballota.

This plant belongs to the Natural Family, Labiatæ; Sexual System, Didynamia Gymnospermia. It grows exclusively and commonly in Siberia, in dry mountainous regions. In its native country it has been long administered as a powerful diuretic, especially in *dropsy*. Both Gmelin and Pallas refer to it in this relation in their travels in Siberia. Of late years, its use has extended elsewhere; and it is now frequently employed in Russia, Germany and Italy. It is said to be often adulterated with *leonurus cardiaca*, *ballota nigra*, and *marrubium*;[2] and it is important that the genuine Siberian plant should be used, as the observations of Brera have shown the cultivated plant to be powerless. For medicinal purposes, the whole plant has been employed, with the exception of the root. It contains, according to Orcesi, tannic acid, a bitter, resinoid, aromatic matter—*picro-*

[1] Die neuern Arzneimit. S. 59, Stuttgart, 1837.
[2] Schmidt's Jahrbuch der in-und auslandisch. gesammt. Medicin. B. iv. S. 275.

ballotin—a green, waxy substance, chloride of sodium, nitrate of potassa, and salts of iron and lime.[1]

The diseases in which ballota lanata has been administered abroad—for it has not been employed in this country—are the following:[2]

Dropsy.—Rehmann prescribed it several times with decided advantage; and, where organic disease prevented the cure, the urinary secretion was always largely augmented by it. The chemical condition of the urine was likewise strikingly changed during its use: at first, it was whitish, afterwards darker, and, ultimately, almost black, or of a deep brown, like the darkest beer. At times, when the accumulation of fluid was pretty well removed, a pain would occur in the hypochondres, which indicated that its use should be laid aside. Schilling, in Werchny-Udinsk, asserts, that he cured several cases of dropsy by it. Rupprecht and Muhrbeck administered it with the best effects, and Brera[3] found it extremely serviceable in hydropic conditions, especially where they had been preceded by, or were complicated with, rheumatic or gouty affections. Luzzato prescribed it with equal success; and Heyfelder, who gave it according to the prescription of the Russian physicians, observed the urine to be of a blackish-yellow hue at the commencement, and, afterwards, of a very dark colour. He found, however, that, to keep up the diuresis, it was requisite to combine it with other diuretics, or to change it for other agents.

Rheumatism and Gout.—In these diseases, ballota is administered in Siberia. Brera, as well as his compatriots, Ghidella, Fontebuoni, Santini and Luzzato, have tested its efficacy by repeated trials. The pains generally soon disappeared under its use, and a cure took place, without relapse.

Adiposis.—In a case of this kind, it was exhibited in St. Petersburg, by Dr. Weisse. The fatness was inordinate, and the remedy acted most favourably. It did not, however, occasion diuresis, but under its use a hemorrhoidal flux returned, which had previously been arrested.

MODE OF ADMINISTRATION.

Decoction is the best form for administering the plant; from ℥ss. to ℥j. to ℥viij. of water;—this portion to be divided into two halves, and to be taken in the course of the day. Rehmann boils ℥iss. to ℥ij. of the coarsely *powdered plant* in Oij. of *water*, down to half; to which he adds, according to circumstances, some diffusible excitant, or a few drops of laudanum. Of this mixture, he directs a cupful to be taken morning and evening, gradually increasing the dose.

[1] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 78.
[2] Riecke, Op. cit. S. 68. [3] Antologia Medica, No. 2, Febbrajo, 1835.

XL. BA'RII IO'DIDUM.

SYNONYMES. Barium Iodatum, Barytium Iodatum, Ioduretum Barytii, Iodide of Barium.

German. Iodbaryum, Baryumiodür.

In solution, Barytæ Hydriodas, Hydras Barii Iodati, Baryta Hydriodica, Hydriodate of Baryta.

German. Iodwasserstoffsaure Schwererde; Hydriodsaurer Baryt.

This preparation has been introduced of late years.

METHOD OF PREPARING.

Iodide of barium is obtained by boiling *baryta earth* in a solution of *iodide of iron* in water, (made by taking one part of pure iron filings, and four parts of iodine, pouring upon them from six to eight parts of water, agitating frequently, and applying warmth gently, until the fluid appears clear and almost colourless,) or, what is cheaper, by boiling a solution of *iodide of iron* with *carbonate of baryta*, which must be added in small portions as long as there is any effervescence.

The fluid obtained by either process, after filtering, must be clear and neutral, and yield no bluish or blue precipitate with the ferrocyanuret of potassium: if it yields a precipitate, the decomposition of the salt of iron is incomplete. Should the solution, formed in the first manner, have an alkaline reaction, the excess of baryta must be removed by exposing the mixture to the air, whereby it becomes converted into a carbonate, and falls to the bottom. The solution is then evaporated until a pellicle forms, the heat being gentle; the crystals are placed quickly between printing paper, and kept in a well-stopped glass vessel. They form white radiated plates, which easily deliquesce in the air, and on that account cannot be prescribed in the form of powder, but may be dissolved in some aromatic water.

EFFECTS ON THE ECONOMY.

Jahn instituted several experiments with iodide of barium, on plants, animals and man, in a state of health and disease. In considerable doses, it acts as a poison on the organism, and as one of the acrid class. Administered in very small doses, and with great circumspection, he found it to be serviceable in *scrofulous and similar morbid conditions*, and as an alterative in *morbid growths, hypertrophy, chronic inflammation*, &c., in which conditions it proved equally useful with chloride of barium, mercury or iodine.[1] Jahn's observations, it appears, did not lead him to speak positively regarding its advantages or defects; and he adds the caution—"Cautè, per Deos, incede, latet ignis sub cinere doloso."

[1] Riecke, Op. cit. S. 71.

Jahn's observations were published in 1830, and, according to Riecke, he has been since silent on the subject. Rothamel administered the iodide in a desperate case of *scrofula*, occurring in a patient twenty-one years of age, with great success. He began with one-eighth of a grain three times a day, and increased the dose gradually during a protracted administration of the article, until three grains were taken four times daily.

Biett has administered it frequently in cases of *scrofulous swellings*, and at times externally, according to the following form:—

Unguentum barii iodidi.

Ointment of iodide of barium.

℞. Barii iodid. gr. iv.
Adipis ℥j. M. ut fiat unguentum.

XLI. BEBEE'RIA.

Synonymes. Bebeerina; Bebeerinum; Bebeerine; Bebeerin.
French. Bebeerine.
German. Bebeerin.

A tree known in Demarara by the Indian name *Bebeeru*, and by the Dutch name *Sipeeri*, had been observed by M. Rodie, a surgeon in the British navy, to possess a bitter-tasted bark, which, on examination, was found by him to contain a vegetable alkali, to which he gave the name *Bebeerine*. From this alkali he prepared a sulphate, which he exhibited with success as an antiperiodic. Dr. Maclagan having received some of the bark, and likewise some of the fruit of the plant, subjected them to chemical examination. The bark occurs in large, flat pieces, from one to two feet long, and varying in breadth from one to six inches. It is about four lines thick, of a cinnamon-brown colour, without aroma, pungency, or acrimony, but of a strong, persistent, bitter taste, with considerable astringency. The fruit is a nut, with two plano-convex cotyledons, of the size and figure of a walnut. The plant is unknown. It was supposed, by Mr. Lindley and Sir William Hooker, to whom the fruit was sent, to be lauraceous; but Dr. Maclagan could not discover any genus or tribe of lauraceæ to which it could be referred. Dr. Ranking refers it to Nectandra Rodiei.[1] The timber of the tree is well known by the name of *greenheart*. It is much employed by ship-builders.

METHOD OF PREPARING.

Dr. Maclagan treated the *bark* with water acidulated with *sulphuric acid;* precipitated the alkaloids by *ammonia;* dried the precipitate over a water-bath, and purified them by redissolving,

[1] Half-yearly Abstract of the Med. Sciences, i. 221. Amer. edit. New York, 1845.

by means of *sulphuric acid;* treating with *animal charcoal*, and reprecipitating by *ammonia*. In this way the alkaline matter is obtained in the form of a hydrate, nearly quite white. If this be dissolved in alcohol, it forms a clear orange solution, which, on evaporation, leaves a shining, totally uncrystalline matter, a good deal resembling in appearance a transparent resin. This, however, is not a homogeneous product, for in some parts it seems pale yellow, in others, orange brown, and if agitated with anhydrous ether is separated into two portions, one soluble, the other insoluble in that fluid. Both of these are distinct vegetable alkalies. To the former Dr. Maclagan applied M. Rodie's name—*Bebeerine;* the other he called *Sipeerine*, from the Dutch name of the tree.

As obtained by evaporating its solution in ether or alcohol, bebeeria is in thin layers, in the form of a transparent, yellow, shining film; but when in mass, or powder, it is opaque. The alcoholic solution has a strong alkaline reaction on litmus paper. Its taste is strongly and permanently bitter, with a slight resinous flavour, and it evolves feebly a corresponding odour when united with sulphuric acid. Bebeeria is soluble in five times its weight of absolute alcohol, and dissolves with great facility in alcohol—pure and diluted. Ether takes up a thirteenth of its weight. It is very sparingly soluble in water, requiring 1766 parts of hot, and 6650 of cold water for its solution. It forms, with the sulphuric, muriatic and acetic acids, yellow, shining, uncrystallizable salts, all of which are very soluble in water, and intensely and durably bitter, with a slight degree of astringency on the tongue. *Sipeerine* is that portion of the alkaline precipitate which is insoluble in ether. It is of a dark brown, shining appearance, and forms neutral compounds with acids, some of which are crystallizable. Dr. Maclagan had not, however, obtained it in quantities sufficient to enable him to examine its properties minutely.[1]

Sulphate of bebeerine, according to Messrs. Ballard and Garrod,[2] is an article of commerce, usually found in brown, crystalline scales, soluble in water, sparingly so in alcohol, and possessing an intensely bitter taste. The solutions of the salt are neutral, and ammonia precipitates the alkaloid. Dr. Maclagan was led to institute experiments, with a view of ascertaining how far, in point of cheapness, the salts of the alkalies of bebeeria might be substituted for quinia; and he found that, by a modification of the ordinary processes for sulphate of quinia, he could prepare a sulphate of bebeeria, which could be sold at a price below the average of sulphate of quinia, during late years. The process for obtaining it for medicinal use in Edinburgh is essentially the same as that of the Edinburgh Pharmacopœia for sulphate of quinia. The

[1] Transactions of the Royal Society of Edinburgh, vol. xv., pt. 3, or London and Edinburgh Monthly Journal of Medical Sciences, July, 1843, p. 653.

[2] Elements of Materia Medica and Therapeutics, p. 411. Lond. 1845.

bark is first freed from tannin and colouring matter, by boiling it with carbonate of soda: it is then exhausted by boiling in water acidulated with sulphuric acid, and the alkaline matter is thrown down from the concentrated acid liquor by means of carbonate of soda. The impure bases, thus separated, are washed, dissolved, and neutralized with weak sulphuric acid, and the solution is treated with animal charcoal, concentrated, filtered again, and finally evaporated in thin layers in flat vessels.[1]

Owing to the great improvement in the manufacture of the article for medical use, it is said to be sold at less than half the price of the sulphate of quinia.[2]

EFFECTS ON THE ECONOMY IN DISEASE.

Dr. Maclagan sent some of the sulphate to Demarara, where it was tried with marked success in the treatment of *intermittents*. It appears, indeed, to possess all the antiperiodic properties of the sulphate of quinia, and has, accordingly, been found of great service in *intermittent and remittent fevers*, *neuralgia*, &c. Many such cases are related by Dr. Maclagan as occurring in his own practice,[3] as well as in that of Dr. Watt, of Georgetown, Demarara; of Dr. J. Anderson and Mr. D. Falconer, and of Professor Simpson, of Edinburgh. The last gentleman made trial of it in *periodic neuralgia*, occurring during utero-gestation, and with beneficial results.[4] Dr. Gairdner, of Edinburgh, has also given the particulars of a case of *intermittent headach* occurring in a young, and recently married lady, who, there was some reason to suspect, was pregnant, which was cured by the sulphate of bebeeria. In *strumous ophthalmia*, it has been recommended, by Dr. Llewellyn Williams,[5] as a substitute for sulphate of quinia, not only on account of the moderate price of the drug as compared with the sulphate, but also, because, according to the testimony of Dr. Maclagan and others, it is better adapted to some constitutions and affections than it; not being so liable to excite the circulation, or affect the nervous system. He gave it in the dose of two grains night and morning.

According to Dr. Christison, it is in general use in Edinburgh and other places in Great Britain, and it is said not to produce the unpleasant phenomena that occasionally follow the use of the sulphate of quinia.

Dr. Maclagan states, that a secret preparation, sold under the name of "*Warburg's Fever Drops*," appeared, from chemical examination, to be a tincture of bebeeria,—probably of the seeds of bebeeru; but this is not the conclusion to which a commission of

[1] Christison's Dispensatory, Amer. edit., by R. E. Griffith, p. 969. Edinb. 1848.
[2] Edinburgh Med. and Surg. Journal, April, 1845.
[3] Lond. and Edinb. Monthly Journal, Aug. 1843, p. 685.
[4] Edinb. Med. and Surg. Journal, April, 1845.
[5] Provincial Medical and Surgical Journal, Oct. 18, 1848.

pharmaciens arrived, from a recent examination of it. According to them, its chief constituents are,—sulphate of quinia, aloes, saffron, camphor, zedoary and angelica.[1]

MODE OF ADMINISTRATION.

Sulphate of bebeeria may be given in the same manner as sulphate of quinia. The dose as a tonic is from one to three grains; as an antiperiodic, from five grains to a scruple.

XLII. BERBERI'NA.

SYNONYMES. Berberinum, Berberine, Berberin.
French. Berbérine.
German. Berberin, Berberisgelb, Sauerdornbitter.

The inner bark of Berberis vulgaris is of a yellow colour, and a bitterish, somewhat astringent taste. It is cathartic, and was formerly used in *jaundice;* originally, perhaps, in consequence of the "signature" of the yellow colour.[2] In more modern times, it has been again recommended in the same disease on the faith of experiments.[3]

The bitter principle of the root was discovered a few years ago by Buchner and Herberger, and its properties have been investigated by Brandes.[4] Buchner first recommended, at a meeting of the German Association of Naturalists and Physicians, in the year 1834, that it should be received into the Materia Medica; but hitherto few experiments have been made with it.

METHOD OF PREPARING.

An *alcoholic extract of the root* of berberis vulgaris is prepared, to which *water* is added. This throws down a pulverulent brown substance; the fluid is poured off; and the substance dried; it is then treated with *alcohol*, which takes up the berberin, leaving a small portion undissolved. By evaporating the alcohol, the berberin remains.[5]

Thus prepared, berberin resembles an extract: it is of a brownish-yellow colour, translucent, and smells like the root; its taste is a pure bitter, and it becomes soft in the air. Buchner[6] succeeded in obtaining the bitter principle pure, and in a crystalline form. Its reaction is neither alkaline nor acid; it is soluble in alcohol and water, but not so readily in the latter as in the former. When crystallized, it requires 600 parts of water for its solution; whilst in alcohol, at a medium temperature, it is soluble in 100

[1] Fuchs, cited in Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre, 1849, Bd. V. S. 138.
[2] Ray, Historia Plant. ii. 605.
[3] Lond. Med. Repos., new series, i. 38.
[4] Archiv. der Apothekervereins, ii 29.
[5] Riecke, Op. cit. S. 442.
[6] Journal de Pharmacie, xxi. 309, and Philadelphia Journal of Pharmacy, vii. 328. Philadelphia, 1835.

parts. It approximates the alkaloids in its nature, as with certain acids it forms crystallizable compounds. It is not soluble in ether. The brownish-yellow solution formed by it is turned of a reddish-brown by alkalies, like the infusion of rhubarb, and acids restore the colour.

EFFECTS ON THE ECONOMY.

According to Buchner, no injurious consequences are to be apprehended from the administration of berberin as a therapeutical agent. Of this he had an opportunity of satisfying himself both on his own person and on others. When labouring under *indigestion*, he took it with the best effects; not only was the dyspepsia removed, but also a yellow hue of the skin which had previously existed. He recommends it, therefore, as an excellent stomachic, especially when there is *disturbance of the functions of the liver*. In doses of two, five or ten grains, it only aids the appetite; but in larger doses—fifteen to twenty grains—it acts upon the bowels without inducing tormina, and therefore not as a drastic.

Within the last few years, Koch has published some observations on the use of berberin. He treated several cases with it as prepared by Buchner himself, when he found all his results confirmed, and that it merited a high rank amongst bitter agents. He gives two cases of marked disturbance of the digestive function, in which berberin afforded essential service; and recommends it highly in *convalescence from typhus, cholera*, &c.[1]

XLIII. BIGNO'NIA CATAL'PA.

Synonymes. Catalpa, Catalpa Cordifolia seu Arborescens seu Arborea, Catalpa or Catawba Tree.
French. Catalpa.
German. Katalpa, Bignonienbaum.

Bignonia Catalpa belongs to the Natural Family, Bignoniaceæ; Sexual System, Didynamia Angiospermia. It is a tree well known in this country, but is not applied to any medicinal use. According to Kämpfer and Thunberg, the Japanese physicians consider the pods (*siliquæ*) to be a powerful remedy in different *asthmatic affections*. This gave occasion to several Neapolitan physicians—and especially Professor Antonucci—to institute experiments in reference to its virtues, and their report was decidedly favourable. Brera also extols it in *asthma*. As to the precise mode in which it acts, we have no exact information. Dierbach and Richter[2] place it amongst the Acria; whilst, according to the analysis of Grosso,[3] it seems more likely that its active principle is of a fatty nature, resembling the butter of the cacao.

[1] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 181.
[2] Riecke, Op. cit. S. 72.
[3] Gazette Médicale de Paris, 1834, p. 8.

It is probable, that it possesses no other virtues than those of a simple demulcent, and that the properties ascribed to it have been mainly, if not wholly, derived from the substances associated with it. Brera, for example, administered it with the following additions:[1]

℞. Catalp. siliquar. ℥ss.
Aquæ q. s. ad. colatur. f ℥viij.

Adde

Oxymel. scillæ f ℥ss.

Or,

℞. Catalp. siliquar. ℥ss.
Senegæ rad. ℥ij.
Aquæ q. s. ad colatur. f ℥viij.

Adde

Oxymel. scillæ f ℥j.

To be taken by little and little. *Brera.*

XLIV. BOLE'TUS LA'RICIS.

Synonymes. Boletus purgans seu albus, Agaricus albus, Fungus Laricis, Polyporus officinalis, Fungus of the Larch, White Agaric.
French. Agaric blanc.
German. Lerschenschwamm.

This fungus grows on the stem and larger branches of the larch. Formerly, it was administered as a cathartic, but in this respect it has become obsolete. Still, it has been retained in many Pharmacopœias; for example, in those of Amsterdam, Bavaria, Brunswick, Paris, Ferrara, Geneva, Hamburgh, Hanover, Oldenburg, Poland, Prussia, Saxony, Sweden, Wirtemburg, and Wurzburg. Latterly, it has been administered frequently in the *colliquative sweats of phthisis.* Barbut, of Nismes, made many trials with it,[2] which were favourable; and the experience of Andral was similar.[3] More recently, however, he has expressed the opinion, that no great advantage has been derived from it.[4] By several of the German physicians equally advantageous results have been obtained—as by Toel and Trautzsch—so that, according to Riecke,[5] it deserves, perhaps, to be better known and investigated. Kopp has added his testimony in its favour.[6]

Formerly, as a cathartic, half a dram to a dram of the powdered boletus was given. In profuse diaphoresis it is administered in doses of from two to six grains. The dose, repeated for a few evenings, according to Barbut, arrests the sweating, which, Riecke

[1] Ricettario Clinico, Pad. 1825.
[2] Burdach. in Journal der Praktisch. Heilkund. von Hufeland, Mars. 1830.
[3] Journal de Pharmacie, vol. xx.
[4] Cours de Pathologie Interne, &c., recuelli et rédigé par A. Latour, p. 157. Edit. Bruxelles, 1837.
[5] Op. cit. S. 73.
[6] Denkwürdigk. in der ärztlich. Praxis. Frankf. 1836, S. 344, cited by Riecke.

thinks, is effected through its revellent excitation of the abdominal nerves; for which reasons he suggests, that the propriety of the union of opiates with it, to prevent its purgative effect, may be questionable. Kopp gives it in the dose of three grains, morning, noon, and night; and Pisson[1] in from four to six, eight, and ten grains. If it acts upon the bowels, which is rarely the case, the dose must be diminished, or a small quantity of opium or laudanum be added.

Pilulæ boleti laricis cum opio.

Pills of white agaric and opium.

℞. Bolet. laricis gr. xv.
Extract. opii gr. iiss. M. et
divide in pil. vj.

One or two at bed-time in the *colliquative sweats of phthisis.*
Rayer.[2]

XLV. BRAYERA ANTHELMINTICA.

Synonymes. Hagenia Abyssinica, Banksia Abyssinica, Kosso, Kousso, Cousso, Cusso, Habbi.

This plant is a native of Abyssinia, and belongs to Nat. Ord. Rosaceæ Sanguisorbeæ (*Decandolle,*) Sex. Syst. Icosandria Digynia. It was first taken from Abyssinia to Europe by Dr. Brayer, from whom it received its name. The flowers are the parts used in medicine, and yield, on examination, an extractive matter, containing tannic acid, which is most readily taken up by hot water; and, consequently, the decoction is the best form of preparation.

In Abyssinia, the flowers of brayera are said to have been employed with great success in *tapeworm.* It would seem, that the tænia solium especially is endemic in many parts of that country, —so much so, indeed, that few of the natives are exempt from it. They are in the habit of taking the anthelmintic every two months, children commencing at the age of five or six years, and continuing it through life. Being a drastic cathartic, it cannot be thus taken indiscriminately with impunity, and prolapsus ani is often induced by it. The dose varies from six to eight drams, and is taken in cold water, early in the morning. It usually acts on the bowels in about a couple of hours, the worm—or a part of it, being generally expelled in the third or fourth evacuation.[3]

In Europe, no experiments had been made with them until Dr. Plieninger, having become acquainted with a missionary from

[1] Annales de Thérap. Oct. 1847.
[2] Bouchardat, Annuaire de Thérapeutique, p. 8, Paris, 1842.
[3] Transactions of the Med. and Physical Society of Bombay, cited in Dublin Journ. of Med. Science, March, 1845; and in Ranking's Half-Yearly Abstract, Amer. edit., Part I., p. 88. New York, 1845.

Abyssinia, and heard his description of their wonderful effects, obtained some of them from him,[1] which he submitted to Dr. Kurr, who detected, on examination, the constituents above mentioned. With the rest of the flowers, Dr. Plieninger made trial in two cases. He took a handful of the *blossoms*, about ℥j. or ℥iss. and boiled them in ℥xvi. of *water* down to one half, adding to the strained liquor as much *honey* as counteracted, in some measure, the objectionable taste. This decoction was taken by a delicate woman, about thirty years of age, who had previously used the *extractum filicis maris* in pilular form, according to Peschier's plan, without success. In the course of the day, she passed numerous fragments of tænia, mixed with mucous discharges, without experiencing any striking inconvenience from the remedy. From this time, she remained free from the parasite.

A robust man, thirty-eight years of age, who had taken large quantities of tartrate of antimony and potassa, in consequence of violent inflammation of the lungs,—whilst he lay sick of this disease, discharged a great many portions of tænia, without having previously experienced any inconvenience from the presence of the entozoon. In July, 1834, he took the same decoction. Since then, he has had no appearance of tænia in his evacuations.

Although but few cases had then occurred in which brayera had been administered in European practice, Dr. Plieninger considered it a valuable addition to the materia medica, inasmuch as it can be administered to delicate persons and children, without violence being done to the whole organism, as is the case with many of the true anthelmintics; but the article had not been imported in sufficient quantities into Europe to admit of the necessary trials for fully testing its efficacy. Since then, a quantity of the flowers was brought to Europe by M. Rochet d'Héricourt, and trials were made with it in Paris, in the service of MM. Sandras and Chomel, which were entirely successful. M. Sandras followed the directions given him by M. Rochet d'Héricourt, and having kept the patient fasting the evening before the intended administration of the remedy, he gave, on the following morning, the whole of an infusion made from 20 *grammes*—about five drachms—of the flowers coarsely pulverized, to 250 *grammes*—about eight ounces of warm water. At the expiration of about an hour, the cathartic action of the medicine commenced; the first evacuations generally contained portions of the parasite; and, in the third or fourth, it was found expelled entire.[2] It has also been used successfully in three cases, by Drs. Budd and Todd.[3]

So far as the author knows, this anthelmintic has not been intro-

[1] Riecke, Op. cit. S. 73.

[2] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 256. Paris, 1847; and Ibid. pour 1849, p. 254.

[3] Medical Times, April 20, 1850.

duced into this country, where tænia is rare. Should the plant be considered worthy of cultivation, it is said that a supply can be readily obtained at Massowah, on the Red Sea. Being of a hardy nature, it might bear to be transplanted into Europe or this country. Hitherto, the great drawback to the use of Kousso has been the difficulty of procuring it, and its enormous cost. "At the time when it could be purchased in Paris," says Dr. Pereira,[1] "its price was £1 15s. per ounce, or 17s. 6d. per dose. M. Rochet d'Héricourt, the sole holder of the medicine, at the present time, refuses to sell any quantity less than his entire stock, at the rate of one guinea per ounce. His nephew tells me that his uncle possesses 1400 lbs. of it, which, at one guinea per ounce, will cost 22,400 guineas! The impossibility of effecting a sale on such terms will, I doubt not, ultimately compel the holder to reduce his demands to something approaching to reason."

XLVI. BRO'MINUM.

Synonymes. Bromium, Bromum, Brominium, Bromineum, Bromina, Muride, Murina, Bromine.
French. Brôme.
German. Brom, Bromin, Murid, Murin, Stinkstoff.

This elementary substance was discovered in 1826, by Balard, of Montpellier. In its chemical properties it is allied to chlorine and iodine;—to the former more than to the latter.[2] Balard detected it whilst occupied in some investigations on the water of salt-ponds, and gave it the name bromine—from βρωμος, "a stench or smell,"—on account of its disagreeable odour. It is met with chiefly in sea water, and in certain animal and vegetable substances that live therein. It has likewise been found in many mineral waters, of this and other countries, and especially in salt springs—as in those of Salina, by Professor Silliman, and of Kenawha, by Professor Emmet. It is in the secondary list of the Pharmacopœia of the United States, (1842.)

METHOD OF PREPARING.

Balard's mode of preparing bromine consists in passing a current of *chlorine* through *bittern*, after which *ether* is added, and the two liquids are strongly agitated. The chlorine decomposes the bromide of magnesium—the form in which bromine exists in the bittern—and converts the bromide into a chloride of magnesium, setting the bromine free. The ether dissolves the evolved bromine, the mixture assuming a hyacinth-red colour. The ethereal solution is agitated with *caustic potassa*, by which bromide

[1] Pharmaceutical Journal, July, 1850; or, The American Journal of Pharmacy, Oct. 1850.
[2] Glover, Edin. Med. and Surg. Journ., July, 1842.

of potassium and bromate of potassa are generated; the ether becoming colourless and pure, and fit to be used for dissolving fresh portions of bromine. When a sufficient quantity of the bromide has been obtained, it is mixed in a retort with *peroxide of manganese*, and acted on by *dilute sulphuric acid*, by which the bromine is given off. The sulphuric acid sets free hydrobromic acid, which, at the moment of its disengagement, is deprived of its hydrogen by the oxygen of the peroxide of manganese, and is thereby converted into bromine. The bromine passes over in reddish vapours, and is made to condense under water contained in an appropriate receiver.

M. Bussy[1] prefers the following form. The mother waters of *kelp*, (*Soude de Varecq*,) after iodine has been precipitated from them by means of chlorine, contain bromine in the state of a metallic bromide, when care is taken to add no more chlorine than is required to precipitate all the iodine. To 1250 parts of these *mother waters*, 32 parts of *peroxide of manganese* in powder, and 24 of *common sulphuric acid* at 66° are added. The mixture is then put into a tubulated glass retort, to which a tubulated receiver is adapted, and to the latter a tube, which dips into a flask. The retort and receiver, as well as the tube, must be ground so as to fit accurately without lutes or corks, which would be destroyed by the chloride. Every thing being arranged, the retort is heated until the liquid is made to boil, when the bromine condenses in the receiver under the form of red, oily striæ, with a small quantity of water. The operation must be arrested when the red vapours cease to be produced. By slightly heating the receiver, without dismounting the apparatus, the bromine may be made to pass over into the flask, in which it will condense on cooling. The mother waters used in this preparation should not be rejected, until it is evident, on the addition of a fresh quantity of sulphuric acid and oxide of manganese, that they contain no more bromine.

Bromine, at the ordinary temperature, is a fluid of a blackish-red colour, when regarded in quantities,—but of a hyacinth-red when placed in a thin layer between the eye and the light. Its smell is strong, peculiar, acrid and disagreeable, resembling that of chlorine. Its taste is acrid. It colours the skin yellow—the colour gradually disappearing of itself. Its specific gravity is 2.966. It is readily set free; and, when volatilized, assumes the form of dark-red vapours. It boils at 117°; is sparingly soluble in water, and the solution is of a yellow colour. It is more soluble in alcohol, and still more so in ether. In its chemical relations with other bodies, bromine, as before observed, resembles chlorine and iodine; but chlorine appears to have more power, and iodine less than bromine,—as bromine is separated from all its combina-

[1] Journal de Pharmacie, Janvier, 1837.

tions by chlorine, whilst it decomposes the compounds of iodine, and assumes the place of the latter. It forms acids both with oxygen and hydrogen. Its test is the production of an orange colour with starch.

EFFECTS ON THE ECONOMY IN HEALTH.

Experiments have been instituted to discover the influence of bromine on the animal economy, and especially by Barthez.[1] In this respect also it resembles iodine, and, like it, belongs to the class of irritant poisons. Twelve grains, dissolved in water, and injected into the jugular vein of a dog, destroyed it almost instantaneously. Cough ensued; the respiration and circulation were accelerated; the pupils dilated; the male organ was erect; and these signs were followed by involuntary discharge of the excrement, and, at times, stiffness of the upper and lower extremities. On dissection, Barthez found the cavities of the heart full of coagulated blood, and the lungs gorged with the same fluid; in the venæ cavæ there were dark coagula; and in the stomach and intestines, small, bloody, blackish cylinders, similar to sticks of lunar caustic. The same quantity, introduced into the stomach, caused death in three or four days, when the œsophagus was tied; when, however, the animal was able to vomit, fifty to sixty drops were requisite. The poison acts less intensely when it is given in conjunction with aliment; it produces coughing, excitement, nausea and vomiting. Constant sucking of the tongue was noticed, with frequently extraordinary restlessness and anxiety, and debility gradually augmenting until death. On opening the body, the stomach has been found contracted; the mucous membrane wrinkled, at times softened, and frequently the seat of roundish ulcerations, of an ashy-green colour. Near the pylorus, Barthez found black spots, which could be readily scraped off with the back of the scalpel, and left gangrenous ulcers exposed. Barthez recommends magnesia as an antidote to bromine, but he rests his recommendation on a single observation, only. Butzke obtained similar results from his experiments. In one case, only, in which a dog died a few hours after a dose of three drams, he found the intestines unchanged, and death could only be ascribed to the paralyzing influence of the poison on the nervous system.[2]

Two series of effects, according to Dr. Glover, are produced by its introduction, in large doses, into the stomach: one, arising from the volatilized bromine getting into the fauces and air-passages; and, the other, from its corrosive and irritant action on the stomach and intestines. Another series, he conceives, may be due to its entrance into the circulation. It appears to be more irritant when diluted than when pure.

[1] De l'Action du Brôme, &c., (Thèse) Paris, 1828. See, also, Fournet, in Bulletin Général de Thérapeutique, Février, 1838.

[2] Christison on Poisons, 3d edit. p. 186.

The vapours of bromine do not seem to exert any organic influence on the workmen who prepare it.[1]

EFFECTS ON THE ECONOMY IN DISEASE.

Pourché first used both pure bromine and bromide of potassium for therapeutical purposes. He found it very efficacious in *scrofula*, especially in dispersing *strumous swellings*, both when given internally and applied externally.[2] In a case of very large *goître*, it was highly serviceable. According to Pourché's observation, it excited heat in the face, headach, dryness of the throat, &c., which, however, soon disappeared. Pourché gave it internally, diluted with forty parts of distilled water, beginning with five or six drops of this mixture, and gradually raising the dose. It has also been added in a dilute state to lotions and cataplasms. The remedy is not, however, much used.

Magendie frequently administered bromine, but more commonly some of its preparations. He prescribed it in cases in which iodine did not appear to exert the proper efficacy, or where the patient had become accustomed to its use. The chief diseases in which he gave it were *scrofula*, *amenorrhœa*, and *hypertrophy of the ventricles of the heart*. It has also been administered by M. Fournet,[3] in *chronic arthritis*, both internally and externally; but his facts, as he himself remarks, were too few to enable him to deduce any general conclusions as to the therapeutical value of the remedy in those affections. He always gave it in a pure state, in the form of mixture, with a solution of gum: and, externally, it was applied in the form of "alcoholic mixture" to the affected joints. The dose was at first two drops in four ounces of the vehicle; and it was gradually increased by two drops at a time, until as much as sixty drops were given in the twenty-four hours.

The ALCOHOLIC MIXTURE, used by M. Fournet as an external application, consisted, at the commencement, of ten drops of *bromine* to an ounce of *alcohol:* this was augmented daily by five drops until it reached one hundred and twenty drops.

Dr. Glover[4] considers a solution of bromine in water an elegant and useful application in *scrofulous*, *syphilitic*, and *specific ulcers*, as well as in *eczematous eruptions*. He gives a case of obstinate *tuberculous eruption*, where an ointment of bromine and bromide of potassium,—eight minims of bromine, and half a dram of the bromide to an ounce of lard effected a cure; and also, a case of *sarcomatous tumour of the knee* removed by a similar but stronger ointment. He thinks that, physiologically, bromine and the bromides are nearer the group of chlorine and the chlorides, than that of iodine and the iodides. He maintains, that the che-

[1] A. Chevallier, Annales d'Hygiène Publ. &c., Avril, 1842.
[2] Bulletin Général de Thérapeutique, No. 14. 30 Juillet, 1837.
[3] Ibid. Février, 1838.
[4] Edinb. Med. and Surg. Journal, Oct. 1842.

mical and physiological relations are alike, and that the same is true of the medicinal properties.'

The preparations of bromine are described in other parts of this volume.

XLVII. BRU'CIA.

Synonymes. Brucina, Brucinum, Brucium, Caniramium, Caniraminum, Pseudangusturinum, Vomicina, Brucine.
French. Brucine.
German. Brucin, Kanimarin.

This alkaloid was discovered by Pelletier and Caventou, in 1819, in the bark of the false angustura—*Brucea antidysenterica.* It is found also in small quantities in nux vomica, and in St. Ignatius's bean.

METHOD OF PREPARING.

An alcoholic extract of *false angustura bark* is prepared, which is dissolved in a large quantity of cold water, and filtered, in order to separate the fatty matter. The colouring matter is precipitated by *acetate of lead;* the excess of this is thrown down by sulphohydric acid gas, and the brucia by an *alkaline base,* for which purpose *magnesia* may be employed. The precipitate from the magnesia is then washed, dried, and treated with *alcohol,* which lays hold of the brucia: this is obtained by evaporation. As brucia is somewhat soluble, the precipitate ought not to be washed too much. Brucia, thus obtained, is coloured, but it may be procured colourless by forming an oxalate of brucia, and treating it with a mixture of equal parts of alcohol and ether. The oxalate is thus deprived of its colouring matter; after which it is decomposed by magnesia: brucia is thus obtained wholly pure and devoid of colour.

Pure brucia is of a white colour, and in regular crystals of the form of oblique prisms, having a base representing a parallelogram; it has a pearly lustre, very bitter taste, and is soluble in 500 parts of boiling water, and in 850 parts of cold. In alcohol it dissolves readily, from which solution it is obtained in the crystalline form. When exposed to the influence of heat, it melts at a temperature very little above that of boiling water. At a higher temperature, it is decomposed, and affords the same products as vegetable substances that do not contain nitrogen. With acids, brucia forms neutral salts, which differ from the salts of strychnia. The sulphate of brucia crystallizes in very fine needles, and resembles the sulphate of morphia, but it has a much more bitter taste. Nitrate of brucia does not crystallize, which constitutes an essential difference between brucia and strychnia. With an

' Edin. Med. and Surg. Journal, Oct. 1842, and Lond. and Edinb. Monthly Journal of Med. Science, Nov. 1842, p. 1011.

excess of nitric acid, the salt has a beautiful pearly (*nacre*) aspect.

EFFECTS ON THE ECONOMY.

Brucia acts energetically on the animal economy in the same manner as false angustura, but much more strongly. It is similar, in its operation, to strychnia, but is considered to be weaker in the proportion of one to ten, according to Pelletier; one to twelve, according to Magendie;[1] and one to twenty-four, according to Andral.[2] It requires four grains to kill a rabbit, whilst half a grain of strychnia is sufficient. A tolerably strong dog, to which three grains of brucia had been given, was affected with symptoms resembling tetanus, but did not die.

Pelletier is of opinion that brucia, or rather the alcoholic extract of false angustura, might be substituted in practice for the extract of nux vomica; its operation is nearly the same, whilst there is no danger of its acting too violently. Andral has frequently prescribed it, and his deductions are, that it is far more under our control than strychnia. Like strychnia, it has been given in cases of *paralysis* with varying success. It would appear to have acted most beneficially in that resulting from lead poisoning. M. Bricheteau, from his observations on man, and M. Bouchardat,[3] from his on animals, infer that brucia is more active than is usually admitted. In *paralysis succeeding apoplexy*, the former employs it with much advantage, and accords with M. Andral in its being more manageable than strychnia. He is of opinion, that no benefit is to be expected from it in paralysis until six months have elapsed from the attack of apoplexy. Earlier than this it may induce serious effects, owing to its toxical influence on the cerebro-spinal system. He commences with about the sixth of a grain, (*un centigramme*,) and increases the dose each day by the same quantity, so long as no effect is induced. Should convulsions supervene, it must be discontinued, until the effects are decidedly diminished, when it must be again augmented by a sixth of a grain in the day. M. Bricheteau has found some patients bear as much as three grains in the day. Magendie administered it with success in two cases of *atrophy*, one of the leg, and the other of the arm.

MODE OF ADMINISTRATION.

Brucia, according to Magendie, may be given either in pills or tincture, gradually augmenting the dose. Andral raised it from half a grain to five grains. Magendie recommends, that the alkaloid should always be that obtained from false angustura,—the brucia of nux vomica being mixed with a portion of strychnia, which

[1] Formulaire, &c., des Nouveaux Médicamens, &c.
[2] Journal de Physiologie de Magendie, iii. 267, Juillet, 1823.
[3] Annuaire de Thérapeutique, &c., pour 1847, p. 42. Paris, 1847.

adds to its activity, and renders it difficult to determine the dose. The following formulæ are recommended by him:—

Pilulæ bruciæ.

Pills of brucia.

℞. Bruciæ pur. gr. xij.
Confect. rosæ ʒss. M. exactiss. et fiant pilulæ xxiv.

One pill to be begun with twice a day. *Magendie.*

Tinctura bruciæ.

Tincture of brucia.

(French, *Alcool de Brucine.*)

℞. Alcohol (36° Aréon., s. g. 847,) f ʒj.
Bruciæ gr. xviij. M.

Of this tincture, from six to twenty-four drops may be given, in the form of mixture, in any vehicle. *Magendie.*

Mistura bruciæ.

Mixture of brucia.

(*Potio Stimulans.*)

℞. Bruciæ gr. vj.
Aquæ destillat. f ʒiv.
Sacchar. ʒij. M.

Dose.—A table-spoonful night and morning. *Magendie.*

XLVIII. CAIN'CÆ RADIX.

Synonymes. Rad. Chiococcæ, R. Cainanæ, R. Caninanæ, R. Cahincæ, R. Kahincæ, R. Serpentariæ Braziliensis; Cainca Root.
Portuguese. Raiz Crusadinha, R. Preta.
German. Caincawurzel.

The plant which furnishes the root introduced into Europe of late years, and which has since become known as a remedial agent, is *Chiococca anguifuga*, of the Family Rubiaceæ; Sexual System, Pentandria Monogynia.[1] The shrub grows wild in the forest of Brazil, especially in the province of Minas Geraes, and the root is used there against the bites of serpents. This is of the thickness of the finger, round, and knotty; the surface smooth or irregularly wrinkled; the wood tough, and of a whitish colour; the smell disagreeable, especially that of the fresh root; and the taste at first like that of coffee, but afterwards nauseous and pungent. The bark of the root alone possesses efficacy, the woody portion having no action. The bark separates readily from the wood; it is thicker on the root itself than on the branches; and, on the outside, is of an amber, or brownish yellow green colour; yellower and brighter on the youngest parts; the epidermis is not easily separated. According to the chemical investigations of

[1] Art. Chiococca, in Encyclopäd. Wörterb. vii. 531. Berl. 1831; and Von Martius, Spec. Mat. Med. Brasil, i. 18.

Pelletier and Caventou,[1] the following are found to be the constituents of the bark:—1. A bitter principle, crystallizable in small, white, silky, shining needles; inodorous, and very soluble in hot alcohol, which communicates to the whole plant a degree of astringent bitterness, and at the same time has an acid reaction on litmus paper. In order to separate this acid, which has been termed by those chemists—*acidum cahincicum seu cainanicum seu cainanium seu cainanum*, German, Caincasäure, Caincabitter—in a pure state, the alcoholic extract of the root must be dissolved in water, filtered, and precipitated by lime, until the fluid loses all its bitterness; the precipitate is then decomposed by oxalic acid, and boiling alcohol or acetic or muriatic acid may be dropped into an aqueous decoction of the bark of the root, and, in the course of a few days, the acidum cahincicum will separate in the form of small crystals. With cahincic acid, prepared in this way, however, some colouring matter is still united. 2. A fatty, green, nauseous-smelling substance, which communicates to the plant its odour. 3. Yellow colouring matter; and 4. A viscid colouring matter.[2]

EFFECTS ON THE ECONOMY.

The effect of cainca root seems to be especially exerted on the *digestive* and *urinary organs*. It occasions watery evacuations, and diuresis. From the experiments, however, of Albers,[3] made on a great number of dropsical patients in the Charité, at Berlin, he was induced to deny its diuretic powers, and to place it amongst the drastic purgatives, by the side of helleborus niger. Wolff was of the same opinion. According to Von Langsdorff,[4] it is a highly efficacious emmenagogue, possessing, also—to use his own language—considerable resolvent virtues, and hence employed in *dropsies that are connected with obstructions in the abdomen*. Riecke[5] asserts that he had occasion to employ it in two cases of *ascites* complicated with induration of the liver. He had no expectation of effecting a radical cure, but it afforded no palliation; diuresis was not excited, whilst nausea, colic, and diarrhœa supervened, so that he discontinued it: he gave it in decoction. Others have observed the same inconvenience from its use, or have found it wholly ineffectual; for example, B. Heyfelder, Reinhardt, Bartels,[6] and others. Riecke suggests the possibility, in these cases, of adulteration of the drug. On the other hand, cainca has been highly extolled by François, Ribes, Wagner, Solieer, Löwenstein,[7] &c., but particularly by Von Langsdorff.

The main diseases in which cainca is recommended, are, 1. *Drop-*

[1] Journal Général de Médecine, Mai, 1830, and Phila. Journ of Pharmacy, iii. 165. Philad. 1831. [2] Journal de Pharmacie, xvi. 465.
[3] Medicin. Zeitung. No. iv. Sept. 1832.
[4] Hecker's Litter. Annal. B. iv. S. 395, and Rust's Repertorium, B. xiv. S. 458.
[5] Die neuern Arzneimittel, u. s. w. S. 84. Stuttgart, 1837.
[6] Gräfe und Walther's Journal der Chirurgie, u. s. w. xxiv. S. 470. Berlin, 1836.
[7] De Radice Caincæ ejusque in morbis hydropicis virtute. Berol. 1828.

sies, in which many favourable trials have been made by Von Langsdorff, Spitta,[1] Guddoy, Engler, François, Wagner, Solieer, Béral, Robredo,[2] &c. 2. *Intestinal worms*, against which it appears to act like other drastics. 3. *Obstructed menstruation:* on this subject, however, farther trials are needed. When it operates as an emmenagogue, it is probably altogether like cathartics that act more especially on the lower part of the bowels, that is, by contiguous sympathy. 4. M. François has recommended it highly in *catarrhus vesicæ*, but the experience of others has not confirmed this.[3] It may be mentioned, that, in its native country, it is used for *rheumatic pains;* in a peculiar kind of *pica* experienced by the negroes of South America; and, as already remarked, against the *bites of serpents.*

MODE OF ADMINISTRATION.

Cainca is given in various forms—POWDER, INFUSION, and DECOCTION; and, besides these, a TINCTURE and an EXTRACT have been made of it. A SYRUP and a WINE have also been recommended. To form the latter, one ounce of the *powdered root* is infused in a pint of *wine:* the tincture is made with one part of the *root* and eight parts of *alcohol* at 20°. The ALCOHOLIC EXTRACT is considered to be the most uniform in strength, and has, therefore, been preferred by many. The SYRUP is formed by dissolving ʒiiss. of the *extract* in a little *alcohol*, mixing this with a pint of hot *simple syrup*, and allowing it to boil for some time, in order that the alcohol may evaporate. The dose of the powder is from ℈j. to ʒss. in the twenty-four hours. It appears, however, to be the most objectionable form, and to give rise to unfavourable symptoms more frequently than the others. Opinions vary as to whether the infusion or the decoction should be preferred. According to Caventou and Pelletier, boiling extracts very well the efficacious parts of the root, and there are cases in which the decoction has rendered essential service after the infusion had been administered without success. Of the decoction, from f ʒj. to f ʒiij. are given in the day. Of the extract, the dose, in the twenty-four hours, is from twenty to thirty grains; of the tincture, f ʒj. to f ʒij.[4]

The decoction used by Spitta and others was made as follows:

Decoctum radicis caincæ.

Decoction of cainca root.

℞. Caincæ rad. ʒij.
Coque cum aquæ Oiss. ad dimidiam partem, et cola.

Dose.—A table-spoonful three times a day.

Von Langsdorff[5] *& François.*

[1] Hecker's Litterar. Annal. iv. 396.
[2] Journal de la Academia de Medicina de Megico, Oct. 1836; cited in Brit. and For. Med. Review, p. 562, Apl. 1838.
[3] Bulletin Général de Thérapeutique. No. 13, Juillet, 1837.
[4] Journal de Chimie Médicale, Mai, 239-242. Paris, 1827.
[5] Hufeland und Osann's Journ. B. lxii. St. 2.

By others, the following form has been employed:

℞. Cainc. rad. ℥j.
Aquæ Oij.
Coque ad dimidiam partem et cola.

Dose.—Two table-spoonfuls three or four times a day.

Engler.

Dr. John H. Griscom,[1] of New York, considers there is a remarkable analogy between cainca and apocynum cannabinum.

The *Acidum cahincicum*, described above, is said to possess tonic, cathartic and diuretic powers, and has been used successfully in some cases by François, in the dose of six grains gradually increased to fifteen.

XLIX. CALEN'DULA OFFICINA'LIS.

Synonymes. Calendula Sativa, Caltha Sativa, Verrucaria, Chrysanthemum, Sponsa Solis, Single Marigold, Garden Marigold.
French. Souci, S. Ordinaire.
German. Ringelblume, Gemeine Ringelblume, Todtenblume.

This plant belongs to Family Synanthereæ; Sexual System, Syngenesia Necessaria. It is much cultivated in the gardens of southern Europe more especially, and grows wild there. The whole plant has a feeble aromatic smell, which is not, however, unpleasant. The taste is bitter and somewhat pungent. It was examined chemically by Geiger and Stoltze,[2] who found in it a peculiar glutinous matter, readily soluble in alcohol, insoluble in ether, and in ethereal or volatile oils, and but little in water: to this they gave the name *calendulin*.

EFFECTS ON THE ECONOMY.

The term *officinalis* indicates, that the calendula was formerly received into the lists of the Materia Medica as an "officinal;" but it had become entirely obsolete, when Westring,[3] a Swedish physician, in 1817, recalled attention to it. He recommended it particularly in cases of *cancer of the breast* and *uterus*, having noticed its good effects by accident. Visiting an aged female, who had suffered for a long time under an extremely painful induration of one mamma, he found she was able to allay the burning pain by the application of the fresh plant. This induced him to try it in several cases of *cancer*, and from the results he was led to infer, that it is perhaps the best agent that can be employed in that frightful malady. He never, however, employed it alone, but associated with it other active remedies, so that but little attention

[1] Amer. Journal of the Medical Sciences, for May, 1838, p. 55.
[2] Berlin. Jahrb. d. Pharmac. B. xxi. S. 282.
[3] Erfahrung über die Heilung der Krebsgeschwüre, u. s. w. Translated from the Swedish into German, by K. Sprengel. Hal. 1817.

was paid to his recommendation;—a great portion of the efficacy of the agents employed, being—it was thought probable—ascribable to the associated articles.

Some time after Westring's publication, the remedy was used by others, and his observations were confirmed. Rudolph[1] employed it with advantage internally, in a case of *induration of the mamma* in a young female; but the acetate of iron was at the same time applied externally in solution. Fehr[2] found it highly useful not only in incipient, but in advanced *scirrhus:* Stein praises it in *cancer of the integuments*, (Hautkrebs.) He forms the expressed juice of the young plant and flowers into an ointment with fresh butter, and applies it once or twice a day by means of lint, having previously washed the ulcers with a decoction of the plant. Internally, the calendula is prescribed in the form of *decoction*, made with milk or water, or of a *mellago* prepared from the fresh juice, dissolved in an aromatic water; or made into pills. When the salve is applied, a sense of burning arises, which speedily becomes absolute pain. This soon, however, abates, and almost wholly disappears; and if it be too violent, more butter may be added; the ichorous discharge becomes improved; the offensive odour corrected, and in from fourteen to twenty-one days, the ulcer is converted into one of a benign and readily cicatrizable character.

Rust, also, frequently administered the *extractum calendulæ* in *cancerous ulcers*, and as a discutient in *chronic indurations*, in combination, however, with other efficacious agents. Schneider affirms, that he prescribed the extract with the best effects in *induration of the stomach*, and in *tumefaction* and *decided induration of the glands and uterus*. He employed a decoction of the flowers and plant in *cancer of the uterus*, and found it an excellent soothing and discutient agent. Muhrbeck[3] used the extract with eminent success in *chronic vomiting;* Carter[4] in extremely *obstinate vomiting;* and De Camp in a case of *cardialgia*, where the excitability of the stomach was so great, that every remedial agent was rejected before it had opportunity to act. Fehr also extols it in *amenorrhœa*, in which disease it was celebrated with the older physicians; but, as Riecke[5] has remarked, the amount of experience with calendula is yet small—too small for us to pronounce whether it merit a fixed place in the lists of the materia medica.

[1] Hufeland und Osann's Jour. der prakt. Heilk. B. lviii. St. 1, S. 119.

[2] Verhandlungen der verein. ärztlich. Gesellschaft. der Schweiz. Jahrg. 1831, and Dierbach, in Heidelberger Annalen, B. x. H. 4, S. 501. Heidelberg, 1834.

[3] Hufeland's Journal der prakt. Heilk. B. lxii. St. 5, S. 128. Rust's Magazin. der gesammt. Heilk. B. xi. S. 350.

[4] London Med. Rep. April, 1826, p. 347. See, also, Link und Osann, in art. Calendula, in Encyc. Wörterb. u. s. w. B. vi. S. 520. Berl. 1831. [5] Op. cit. S. 101.

MODE OF ADMINISTRATION.

The *extractum calendulæ* is contained in the Hanoverian and Saxon Pharmacopœias; in the latter it is directed to be prepared in the following manner:—

℞. Calendul. officinal. part. j.
Aquæ part. viij.

Macerate for twenty-four hours; then boil for a quarter of an hour, and strain forcibly; boil the remainder with four parts of water; mix the two liquors, and, after twenty-four hours' rest, evaporate to the proper consistence.[1]

The dose of the extract is different according to different observers. Muhrbeck gave four grains five times a day. Fehr allows ʒij to ʒvj. Phöbus directs the dose of the extract, prepared according to the Prussian Pharmacopœia, to be from eight to sixteen grains, gradually increasing it to ʒss and more, from two to four times a day. It may be given either in the form of pill or mixture. Externally, the extract is used in solution, to moisten the dressings of ulcers, and to form ointments. The dose of the decoction of the fresh plant is f ʒj. to f ʒij.

The Sardinian Pharmacopœia has a *Conserva florum calendulæ*, made by beating together one part of the flowers and two parts of powdered sugar. It has, also, an *Acetum florum calendulæ*, made of one part of the *petals* digested in four parts of *vinegar;* and the Wirtemberg Pharmacopœia has an *Unguentum florum calendulæ*, made of four ounces of the petals boiled in a pound of fresh butter, until the mixture is entirely evaporated. This is used as an emollient and resolvent.

Pilulæ calendulæ.
Pills of calendula.

℞. Ferri subcarb.
Calend. pulv.
Extract. calend. āā ʒj.
Mucilag. acac. q. s. ut fiant pilulæ xc.

Dose.—Five to eight, three times a day, as a soothing agent in *cancerous ulcers.* *Rust.*

℞. Hydrarg. chlorid. mit. ℈ss.
Antim. sulphur. aur. ℈j.
Extr. calendul.
—— conii, āā ℈ij. M. f pil. pond. gr. ij. sing.

Dose.—Five pills, three times a day, as a discutient in *chronic indurations.* *Rust.*

Lotio extracti calendulæ.
Lotion of the extract of calendula.

℞. Extract. calend.
——— anthemid. āā ʒij.

[1] Pharmacopée Universelle, &c., par Jourdan, ii. 536.

Solve in

Aq. lauroceras. f ℥ij.

Adde

Tinct. opii f ℥j.

As a dressing wash (Verbandwasser) in *cancerous ulcerations.* *Rust.*

It is obvious that the precise agency of the calendula cannot be tested in any of these formulæ, the substances associated with it being themselves active agents. In this country, it is never perhaps used.

L. CALX CHLORINA'TA.

Synonymes. Calcis Chloridum seu Hypochloris, Oxychloruretum Calcii, Protochloruretum Calcii, Chloruretum Oxydi Calcii, Bichloruretum Calcii, Oxymurias Calcis, Calx Oxymuriatica, Calcaria Chlorata seu Chlorica seu Chlorinica, Chlorum Calcariæ, Chloretum Calcariæ, Chlorinated Lime, Chloride, Chloruret, Hypochlorite, Chlorite or Oxymuriate of Lime, Tennant's Bleaching Powder.

French. Protoxichlorure de Calcium, Oxichlorure de Chaux, Chlorure d'Oxide de Calcium, Bichlorure de Chaux, Oximuriate de Chaux, Muriate Suroxigéné ou Oxigéné de Chaux, Chlorate ou Souschlorate de Chaux, Poudre de Blanchement, Poudre de Tennant.

German. Kalkchlorid, Chlorkalk, Chlorigsaurer Kalk, Chlorcalciumoxyd, Oxydirt Salzsaurer Kalk, Bleichpulver.

Chlorinated lime is a compound of chlorine and oxide of calcium.

METHOD OF PREPARING.

It may be prepared either in the dry or moist way. In the former case, *chlorine* is made to act on *hydrate of lime* in a pulverulent form; in the latter, *chlorine*, in a gaseous state, is passed into *lime water.* For technical purposes, the latter is most used; for pharmaceutical, the former. In the London Pharmacopœia, it is directed to be prepared as follows:—Take of *hydrate of lime* a pound; *chlorine*, as much as may suffice; send in the chlorine to the lime in a proper vessel, till it is saturated. Chlorine is very easily evolved from binoxide of manganese, mixed with chlorohydric acid, by a gentle heat.[1] It is generally, however, prepared in large chemical establishments for the use of bleachers, and is therefore in the list of the Materia Medica in the Pharmacopœia of the United States, (1842.)

Chlorinated lime has the appearance of a white, loose powder, of a sour, bitterish and somewhat biting taste, exhaling a marked smell of chlorine, and dissolving with tolerable facility in water, at the same time giving off much chlorine gas.[2] Its nature and

[1] Brande's Dictionary of Materia Medica, p. 135. Lond. 1839.

[2] Link, Art. Chlor, in Encyc. Wörterb. der Medicin. Wissenschaft, vii. 579. Berlin, 1831.

composition are a subject of dispute, and hence the term "chlorinated lime," which has been adopted by the London, Edinburgh, and United States Pharmacopœias, in place of chloride of lime.

M. Hunoux Desfontenelles[1] affirms, that having prepared pills of chlorinated lime, extract of opium and honey, they experienced a spontaneous combustion a short time after they were prepared; and he states, that the reaction took place at times whilst the mixture was being made. He found, that powdered marshmallow root and liquorice, when united with chlorinated lime and honey, produced the same result. It would hence appear that chlorinated lime and organic substances ought not to be associated in the same prescription.

EFFECTS ON THE ECONOMY.

The action of chlorinated lime is generally esteemed to be analogous to that of liquid chlorine; Hufeland, however, assimilates it to that of chloride of calcium. The data have been considered as scarcely, perhaps, sufficient to determine its precise operation. It appears, however, to act mainly by means of its chlorine, which, being loosely combined, is readily disengaged,—all acids, even the carbonic, occasioning its separation. It is not much employed internally; but, according to Cima, it occasions slight pains in the abdomen, burning in the stomach, and at times diarrhœa.

As to its *internal administration*, Cima gave it in cases of *scrofulous swellings*. By Cloquet, it was used both internally and externally in *gangrenous ulcers;* and by Gräfe, Deschamps, Graves,[2] and the author in *fœtor oris*. In a case of *pectoral disease, with great fœtor of the breath and expectoration*, it was administered by Drs. Graves and Stokes with remarkable benefit—a pill of three grains with one of opium being given three times a day, and the quantity being increased to twelve grains a day: the bed was also sprinkled with a solution of it. It has been used with advantage by the author in a similar case; and in *gangrene of the lungs*. By Reid,[3] it was prescribed in *dysentery*, and in a *bilious typhus* occurring in summer; by Copland[4] in the last stage of *typhus fever*, when the evacuations were highly offensive, given in draughts of aromatic water with mucilage. Dr. Pereira[5] also states that he can bear testimony to the good effects of it in *bad cases of fever;* but the same results were not observed in the *fever of Edinburgh*.[6] It was likewise given by Groh, Cohen, and Schlesier[7] in *phthisis*, and by Gräfe in *gonorrhœa*. In none of

[1] Jour. de Chimie Médicale, and Soubeiran, Jour. de Pharmacie, Février, 1842, p. 121.
[2] Dublin Hospital Reports, vol. v.
[3] Transactions of the Association of Fellows and Licentiates of the College of Physicians in Ireland, vol. v. 1838.
[4] Houlton's Appendix to translation of Magendie's Formulary, p. 163.
[5] Elements of Materia Medica, &c., 2d edit. p. 593, Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.
[6] Christison, Dispensatory, p. 242. Edinb. 1842.
[7] Casper's Wochenschrift für die gesammte Heilkunde, No. 37, 1838.

these cases is it presumable, that chlorinated lime possesses virtues not contained in liquid chlorine.

For *external use* it has been adopted in various cases, and especially in *ulcers*. According to Trusen, an aqueous solution is proper for *torpid ulcers* of almost all kinds—the *phagedenic*, the *scrofulous*, &c. In *syphilitic ulcers*, it appears to be of use when the chancre is sloughing, and eats deeply into the flesh.[1] Trusen employed a solution formed by rubbing from ʒiij. to ʒiv. with a pint of *water*, pouring off the supernatant fluid after it had stood a quarter of an hour, and applying it by means of pledgets of lint to the ulcer, renewing the application whenever the lint became dry. In this way, he found the profuse ichorous secretion from old ulcers diminish, the offensive odour abate, and fresh and healthy granulations spring up. By the same kind of treatment, *phagedenic*, *herpetic* and *scrofulous ulcers* generally cicatrized speedily and permanently.[2] Trusen employed, at the same time, crude antimony with cathartics; and in all cases he directed strict repose, and regulated diet.

Trusen's observations have been confirmed by many modern physicians, amongst whom may be mentioned Labarraque, Lisfranc, Ekl, Lemaire, Heiberg, and Kopp. In *ozæna*, good effects were observed from it by Horner,[3] Awl,[4] Heron,[5] Detmold,[6] and Strathing: and a solution of it, in the form of injection, was found serviceable in *fistula*, by Trusen and Ricord. In *cancerous ulcers*, recourse has been had to it by Heiberg, Labarraque, Duparcque, Martinet, &c., and, in all cases, it corrected the offensive odour, and, at times, the ulcer itself assumed a more favourable appearance. Dr. Frohlich[7] used it with advantage in a *cancerous affection of the face*, in the strength of one part to sixteen parts of water. In such cases it has been recommended, in order to have the concentrated action of the chloride, that it should be formed into a paste by admixture with water, and be applied in this manner.

It has been prescribed, also, in cases of *ulceration of the mouth*, by Kopp, Angelot, Heiberg, &c., applied either in the form of solution or of a soft paste. In cases of *wounds*, the application of a solution of it has been recommended by many, as by Trusen, Ekl, Lisfranc,[8] to promote cicatrization after the inflammation has subsided. In a case of *punctured wound received in dissecting*, and when the inflammation was proceeding up the arm with alarm-

[1] Mene, in Gazette Médicale, Feb. 11, 1832.
[2] See, also, Houlton's Appendix to Magendie's Formulary, p. 162.
[3] Amer. Jour. of the Medical Sciences, No. xi.
[4] Ibid. No. xxii. for Feb. 1833, p. 543. [5] Ibid. Nov. 1836, p. 271.
[6] Holscher's Annalen, 1840, Bd. v. Heft. 1; cited in Brit. and For. Med. Rev., Oct. 1841, p. 549.
[7] Medicin. Jahrbücher des k. k. österreich. Staaten. B. xvii. S. 168. Wien, 1834.
[8] Bulletin Général de Thérapeutique, Juillet, 1838.

ing rapidity, and the pain and tension were extreme, the patient experienced immediate relief from a solution employed as a lotion, combined with the free use of leeches.[1]

Gubian[2] has proposed to apply it to prevent *pitting from small-pox*. The maturated pustules are to be opened, and washed with a weak solution; desiccation takes place very promptly, and, it is said, no marks or pits are left.

On account of its antiseptic properties, it has been applied in *cancrum oris*, by Labarraque, Richter, Berndt, and numerous others, and in *sloughing affections of the female organs of generation*, of an analogous nature, by Labarraque and Ekl; in *hospital gangrene*, by Percy, Labarraque, Siedmogrodzki, Delpech, and Renard; and in *gangrene of the scrotum*, as well as in *ordinary gangrene*, by Heiberg and Trusen; in all of which it was of decided efficacy.[3] In such cases it may be applied either in the form of the paste above mentioned, or in strong solution—℥ij to Oj of water.

In *burns* of the second and third degree, when they are not spread over too great a surface of the body, a solution of chlorinated lime, according to Trusen, markedly diminishes the pain, moderates the too great suppuration, and excites, especially in the second degree, sound granulations; in the third, speedy separation of the dead portions, and in both cases a smooth and firm cicatrix. Either a solution united with mucilaginous substances, or a liniment prepared of it, may be applied.

Lisfranc's observations[4] entirely accord with those of Trusen. He applies compresses spread with cerate over the burnt parts; the compresses having holes in them so that the burnt surfaces are exposed; they are then covered with lint soaked in a solution of chlorinated lime, which is kept *in situ*, and moistened as it becomes dry. A solution of it, as well as of chlorinated soda, may be applied, indeed, with advantage in the first stage of a burn or scald; and Mr. Holt[5] affirms that he knows nothing so efficacious in a "*black eye.*" Dr. Chopin,[6] too, affirms, that in *wounds produced by contusion, laceration, or by the explosion of gunpowder*, where there is much pain, speedy and certain relief is produced by keeping the dressings constantly wet with a solution of it: he found it, as well as chlorinated soda, very serviceable in cases of *sore nipples*.

In *chilblains*, it has been used in the form of solution and of liniment with advantage, not only in ulcerated chilblains, but where the skin was unbroken, by Trusen, Lisfranc, Gräfe, and

[1] Alcock, Essay on the Use of the Chlorurets, &c. London, 1827.
[2] Journal de Chimie Médicale, vi. 315.
[3] Riecke, Die neuern Arzneimittel, u. s. w. Stuttgart, 1837.
[4] Gazette Médicale, Mars 21, 1835. See, also, Bulletin Général de Thérapeutique, Juillet, 1838; and Clinique Chirurgicale de l'Hôpital de la Pitié, Paris, 1841.
[5] Lancet, April 6th, 1834.
[6] Gazette Médicale, Oct. 31, 1835.

others. In many cases, however, it has been found advantageous to diminish the inflammation first by the application of leeches. In cases of *deeper frost-bites* it has likewise proved beneficial.

In *salivation* caused by mercury, it has been valuable,[1] especially when administered at the beginning of the increase of secretion. When the ptyalism has proceeded to a greater extent, Trusen uses, at the same time, sulphureous baths. A collutory of chlorinated lime not only diminishes the excessive secretion from the salivary glands, but speedily mitigates the sense of burning in the mouth, induces the healing of the erosions of the mucous membrane, and corrects the mercurial fœtor. In such cases, the author has frequently employed it with advantage, although the affection is not much under the control of medicine.

In *offensive odours from the mouth*, arising from carious teeth, Regnard employed a solution of it, but it excited the salivary glands in a disagreeable manner. On the other hand, E. Gräfe recommends it strongly in this very case, and even in caries, both inwardly and externally, as a collutory and tooth powder. In the latter form, it is said to remove speedily the *tartar* and *yellow depositions* on the teeth. By Chevallier and Kluge, it is strongly recommended for cleansing the mouth. The latter gives a formula for a collutory, which will be found amongst the prescriptions at the end of this article. It effectually cleanses, whilst it does no injury to the enamel of the teeth.

In *scarlatina*, a solution of chlorinated lime may be employed most advantageously as a gargle, and in the form of ablution to the surface.[2]

In *scrofulous swellings of the glands*, according to Cima, it may be applied with advantage in the form of ointment; and by Gräfe it is recommended in *swellings of the joints*. It has likewise been used successfully by Werneck in *goître*.

In several *chronic eruptions*, it has been much extolled—as in *herpes*, by Kopp; in *itch*, by Heiberg, Derheims,[3] Cluzel, Fantonetti,[4] Hospital,[5] Wittzack,[6] and Napoli.[7] Dr. Christison[8] affirms, that he never uses any other remedy in *itch*;—a solution, containing between a fortieth and a sixtieth part of chlorinated

[1] Elliotson, in Houlton's Appendix to translation of Magendie's Formulary, Amer. edit. p. 162. Philad. 1834.

[2] Copland, in the Appendix to Houlton's edition of Magendie's Formulary, p. 163, S. Jackson, of Northumberland, (now of Philadelphia,) in Amer. Journal of Medical Sciences, xii. 261 and 550, and Ibid. for May, 1838, p. 56. (Dr. J. uses chlorinated soda.)

[3] Journal de Chimie Médicale, ii. 575.

[4] Bulletin de Thérapeutique, 1833; and American Journal of the Medical Sciences, August, 1833, p. 533.

[5] Amer. Journal of the Medical Sciences, Nov. 1834, p. 240 (extracted.)

[6] Casper's Wochenschrift, Feb. 4, 1837, S. 79.

[7] Journ. de Chimie Méd., cited in Amer. Jour. of Pharmacy, July, 1841, p. 172.

[8] Dispensatory, Amer. edit. by R. E. Griffith, p. 302. Philad. 1848.

lime, applied five or six times a day, or continuously with wet cloths, allays, he says, the itching in the course of twenty-four hours, and generally accomplishes a cure in eight days. He has, also, found the same lotion useful in most other eruptions attended with itching, which symptom it allays even where it does not remove the disease. In *pruritus pudendi muliebris*, it has been advised by Darling; and in *tinea*, by Trusen, Roche, Cottereau, Kopp, and Ebermeier. In the last disease, it is applied in the form of liniment; in the others, in solution; but in the itch often also in the form of ointment. Michaelsen recommends the following method of treating itch: Take of chlorinated lime from two to four ounces, according to the degree in which the disease exists, and the length of time it has been in the system; put this in a common flask or bottle full of rain or river water, so that as much as possible may be dissolved. In using it, the patient must shake the bottle well, in order that some of the undissolved lime may be taken up. With this he washes the parts affected three or four times a day. Every third or fourth day, when the skin becomes somewhat rough or irritated, he is made to take a tepid bath, or to wash himself with warm soap and water; and this until the cure is accomplished. The internal management is the same as in other plans of treatment. In the case of young children, the mixture must of course be weaker—about one ounce to a pint of water. By this plan, the patient, it is said, is entirely cured, without any unpleasant concomitants, in from seven to ten days.

Chlorinated lime has likewise been applied in *purulent ophthalmia*. Varlez[1] cured *contagious blennorrhœa of the eye*, by dropping upon it a solution of it. Colson, Delatte, and Reynaud[2] also saw good effects from it, both in *acute purulent ophthalmia*, and in *chronic ophthalmia with granulations, obscurity of the cornea*, and especially in *copious secretion from the Meibomian glands*. Guthrie[3] applied a solution successfully in three cases of *ophthalmia neonatorum;* and Pereira[4] advises a weak solution in the same cases. Farvagnié used it beneficially in *scrofulous* and *catarrhal ophthalmia*.[5]

Dr. Radclyffe Hall[6] has treated *purulent ophthalmia*, both in the adult and in children, with success, by a saturated solution. His plan of using it is as follows. The eyelids are slowly and gently separated, until the cornea can be seen, when that is practicable; and all secretion is wiped away with a fine, soft sponge. A large, bushy camel's hair pencil, charged with the strong solu-

[1] Cited in American Journal of Med. Sciences, i. 459.
[2] Journal für Chirurgie, u. s. w. B. xiv. H. 4.
[3] Medical and Physical Journal, Nov. 1827.
[4] Elements of Mat. Med. 2d edit., i. 593, Lond. 1842; or, 2d Amer. edit. by J. Carson, Philad. 1846.
[5] Verhandlung. der vereinigt. ärztlich. Gesellschaft. der Schweiz. Jahr. 1829. Zürich, 1830.
[6] Provincial Med. and Surg. Journal, Dec. 1844.

tion, is then insinuated beneath the upper eyelid, and swept round the front of the eye; the pencil is again charged with the solution, and applied to the lower eyelid everted. Unless plenty of the fluid be thus applied, it will be less effectual, but equally painful. There is considerable pain, of a smarting, burning character, for half an hour or longer, and the already swollen eyelids become still more tumid. In a few hours, a serous discharge oozes out from between the eyelids, and the swelling partially subsides. This is followed by a secretion of matter; but, after two or three applications of the solution, it is in perceptibly diminished quantity, and the discharge gradually loses its characteristic yellow colour, and is seen in flakes on opening the eyelids. After three or more applications, the eyelids no longer swell, and the pain is much less. As the inflammation lessens, the eyes must be kept clean with warm water, and matter must never be suffered to collect beneath the upper eyelid; a little spermaceti ointment is smeared on the edges of the eyelid, and the strong solution is applied once in every twenty-four hours, until the secretion ceases to be in the least degree puriform. The longest period required for the cure was a month; the shortest, four days.

It has likewise been employed advantageously in *other blennorrhœas* besides the one mentioned, and especially in the *gonorrhœal*.[1] Gräfe, of Berlin,[2] affirms, that he succeeded with it when copaiba and cubebs had failed. He used it both in the form of pill, made as described hereafter, and of injection—the injection being made by dissolving gr. xxiv. in f ℥vj. of *water*, and adding ʒss. of *wine of opium*. His observations are confirmed by Dr. Radclyffe Hall,[3] who observes, that in the treatment of diseases attended with a contagious discharge, it is desirable not only to lessen the inflammatory action which causes the secretion, but, at the same time, to alter the contagious character of the matter secreted; and he advises chlorinated lime as capable of fulfilling these indications. In the first stage of *gonorrhœa*, before the discharge has become completely puriform, or the scalding great, a single injection of about two fluidrams of a saturated solution in water, will always, he says, put a stop to the disease. In the second stage, where there is a considerable discharge of pus, and more pain, several injections are required. In *gleet*, also, provided the discharge be not kept up by some structural change in the urethra, the strong injection is useful, but not to so striking a degree. The effects of injecting this strong solution are,—sharp pain, and often erection for the moment; slight puffiness and eversion of the orifice of the urethra, and tenderness

[1] Alcock, Essay on the Use of Chlorurets, &c. Lond. 1827.

[2] American Journal of Medical Sciences, and Amer. Journal of Pharmacy, 2d series, vol. ii. 86. Philad. 1838. See, also, M. Roussf, Bulletin Général de Therap. Janv. 1842.

[3] Op. cit.

on pressure, with a feeling of unusual firmness for two or three inches down the corpus spongiosum, where these did not already exist. In a short time the pain subsides, and in a quarter or half an hour, a serous discharge issues from the mouth of the urethra. Occasionally, œdema of the prepuce, with its attendant sense of numbness in the part, ensues. There is scalding, but, usually, not to any very great degree, for the first two or three times of passing the urine, which may be, in a great measure, obviated by injecting a little oil of almonds a short time previously. In about eighteen or twenty-four hours, the lips of the urethra are found to be separated by a clot of firm, yellow pus. This is removed by the stream of urine, and may, or may not, form a second time. If the disease be only in its first stage, it will now, according to Dr. Hall, be cured; but if more established, the injection will have to be repeated as often as the peculiar tingling sensation and gonorrhœal secretion reappear. In this case, the small, firm clot is not formed; but, in its stead, there is a discharge of more fluid pus. The number of injections, and, consequently, the length of time required for cure, depend chiefly upon the anterior duration of the disease. In the acute stage of a first attack, where both pain and discharge are considerable, Dr. Hall has never seen any harm from employing this strong injection,—using, at the same time, mild aperients, tartrate of antimony and potassa and opium internally, enjoining perfect rest and abstinence, and frequently washing out the urethra with some weak, astringent solution, as that of acetate of zinc, formed by the double decomposition of sulphate of zinc and acetate of lead. On the contrary, the course of the disease has appeared to be materially shortened. When the inflammation is subacute, but the discharge still purulent, as in persons habituated to the disease, or after a certain period of a first attack, copaiba or cubebs have been given in the usual way, but the injection has been manifestly of service. In *gleet*, a single injection has sometimes cured, after the failure of almost every other kind of injection. More frequently, several injections have been required. In a few instances, the chlorinated lime has wholly failed; but, in these cases, no other injection has succeeded afterwards.

But one of the most important of the applications of chlorinated lime is as an antiseptic and disinfecting agent.[1] It is admirably adapted for preventing and checking putrefaction, and for correcting the offensive odour of parts already putrefied:[2] and hence its application is most useful in anatomical investigations.[3] Some time before dissection, the body may be enveloped in a cloth wetted with a solution of it, (*Calc. chlorin.* ℥ss., *Aquæ* Oj.,) which must be kept wet by sprinkling it from time to time: in

[1] Labarraque. on the Use of the Chlorides of Soda and Lime, translated by Jacob Porter. New Haven, 1829. [2] Alcock, Op. cit. [3] Magendie, Formulaire, &c.

this manner the offensive odour is speedily corrected. It is equally well adapted for purifying the air of the wards of hospitals, jails or ships; a little of the solution being sprinkled, from time to time, on the floors; or shallow vessels, containing it, being placed in different parts of the room. It is used, moreover, for neutralizing contagious miasmata dispersed in the air, or contained in clothing, furniture, &c., care being taken, in all these cases, that due ventilation be practised. It has been properly doubted, however,[1] whether its use be productive of any advantage in preventing the spread of infectious, contagious, or epidemic diseases. It has been affirmed, indeed, to be positively injurious, by deteriorating the atmosphere, and in this there may be truth, unless the precautions, mentioned above, be taken. In various cases, in which such diseases have prevailed, it has destroyed all offensive odour,—acted, in other words, as an antibromic or deodorizer,—but the extension of the malady has not been prevented.[2]

MODE OF ADMINISTRATION.

Chlorinated lime has been given internally both in the form of *pill*, *solution* and *troches*, the dose being from gr. ij. to gr. vj. four to six times a day. Externally, it is generally applied in solution of different strengths, (from ʒj. to ʒiv. to eight ounces of water)—being decanted to remove the particles of lime from it, unless where it is considered advisable to employ the turbid solution.

In cases of very offensive evacuations from the bowels, ten or fifteen grains may be added to a common enema. It is, likewise, applied in the form of ointment, and of liniment, and also of paste made by admixture with water.

The following forms have been given for its administration:[3]

Trochisci calcis chlorinatæ.

Lozenges of chlorinated lime.

℞. Calcis chlorin. ʒij.
Sacchar. ℥viij.
Amyl. ℥j.
Tragac. ʒj.
Carmin. gr. iij.
M. Fiant trochisci. pond. gr. iij. sing.

One of these to be taken three or four times a day, and allowed to dissolve in the mouth, in cases of *fœtor oris*. *Deschamps.*

Mistura calcis chlorinatæ.

Mixture of chlorinated lime.

℞. Calcis chlorin. ʒj.
Mist. amygd. f ℥vij.
Syrup. acaciæ f ℥j. M.

A table-spoonful every three hours in *gonorrhœa*.—*E. Gräfe.*[4]

[1] Observations on the Chlorides and Chlorine as "disinfecting agents," and as Preventives of Cholera, by H. Bronson. Boston, 1832. See, also, American Journal of the Medical Sciences, for Feb. 1833, p. 481; Albers, in London Med. Gaz. viii. 410, (as to its inefficacy in cholera;) and Pereira, Elements of Mat. Med., &c., 2d edit., i. 591. Lond. 1842; or 2d Amer. edit., by Dr. Carson, Philada. 1846. [2] Pereira, Ibid. p. 592.
[3] Riecke, Op. cit. S. 94. [4] Journal für Chirurgie, u. s. w. B. xiv. St. 2.

Pilulæ calcis chlorinatæ.

Pills of chlorinated lime.

℞. Calcis chlorin. ʒj.
Ext. opii gr. ix.
Mucilag. acac. q. s.
Divide in pilulas liv.

Dose.—One, every two or three hours, in *gonorrhœa*, gradually increasing the dose until eight, ten or twelve are taken every hour. *Gräfe.*

Collutorium calcis chlorinatæ.

Collutory of chlorinated lime.

℞. Calcis chlorin. grs. xv. ad ʒss.
Mucil. acac. f ℥j.
Syrup. aurant. f ℥ss. M.

A little of this solution to be applied by means of a mop of charpie to *ulcers in the mouth.* *Angelot.*

℞. Calcis chlorin. ʒiij.
Aquæ destillat.
Alcohol. āā. f ℥ij.
Ol. rosæ gtt. iv.
Solve et filtra.

Chevallier.

A tea-spoonful of this solution is mixed with a glass of water, and used in *fœtor oris.* According to Riecke,[1] an analogous nostrum has been sold at a high price under the name—*Pneumokatharterion.*

℞. Calcis chlorin. ʒj.
Solve, leniter terendo, in
Aquæ destillat. Ovj.
tunc adde
Alcohol. (.830) f ℥viij.

Mist. reponatur in loco frigido per horas xxiv.; tunc filtretur et reserv. in lagenâ bene obturatâ. ("Let the mixture be put aside in a cold place for twenty-four hours; then let it be filtered and kept in a well stopped vessel.")

It has been recommended that the mouth should be rinsed with this after the teeth have been brushed.—*Freyburg von Kluge.*

℞. Calcis chlorin. ℥ss.
Solve exactiss. trituratione in
Aq. f ℥ij.
et post limpid. clarificat. admisce
Alcoholis f ℥ij.
Ol. rosæ gtt. iv. M.

The mouth is rinsed, in cases of *salivation*, with a mixture made by adding a tea-spoonful of the solution to a glass of water. *Trusen.*

The Pharmacopœia of Sweden has an *antiscorbutic collutory*, called *Linctus ad stomacacen seu oxymuriatis calcici*, which is formed as follows:

[1] Op. cit. S. 94.

℞. Solut. calcis chlorin. ʒss.
Aquæ,
Mellis, āā. ʒvj. M.

Dentifricium calcis chlorinatæ.

Dentifrice of chlorinated lime.

℞. Calcis chlorin. in pulv. gr. iv.
Corallinæ rubræ ʒij. M.

A new tooth-brush should be slightly wetted, then dipped in this powder, and rubbed over the teeth. Employed to give their natural colour to teeth. *Magendie.*

Solutio calcis chlorinatæ.

Solution of chlorinated lime.

℞. Calcis chlorin. ʒiij.
Solve in
Aquæ destill. Oj.
Adde
Tinct. opii crocat. vel
Vini opii f ʒj. ad f ʒij. M.

Applied to *frost-bites*. *Trusen.*

℞. Calcis chlorin. ℥ss.
Tere invicem et sensim affunde
Aq. (seu Aq. rosæ) Oj.
Et post clarificat. limpid. admisce
Mucil. acac. (seu sem. cydon.) ℥ij.

Applied, by means of linen rags, in cases of *burns*.—*Trusen.*

℞. Calcis chlorin. ʒij. ad ʒiij.
Aquæ Oj. Solve.

To be applied, by means of rags kept constantly wet, in cases of *hospital gangrene;* the mixture being shaken.
Rust & Kluge.

℞. Calcis chlorin. ℥iij.
Aquæ destillat. Oj.
Solve et cola.

Used as a lotion in cases of *itch* on the thighs, legs and arms, twice or thrice daily. In general, six or eight days are sufficient to effect a cure. *Magendie.*

The *disinfecting liquor of Labarraque, Liqueur désinfectante de Labarraque,* is made by adding ten parts of *water* to one part of *chlorinated lime* divided in a mortar; suffering the solution to settle, and then filtering.

Collyrium calcis chlorinatæ.

Collyrium of chlorinated lime.

℞. Calcis chlorin. gr. iv. ad vj.
Vin. opii ♏ x.
Mucilag. acac. f ʒiss.
Aq. rosæ f ℥ij. M. et filtra.

To be dropped on the eye, in cases of *catarrhal* and *scrofulous ophthalmia.* *Farvagnié.*

Injectio calcis chlorinatæ composita.
Compound injection of chlorinated lime.

℞. Calcis chlorinat. ʒij.
Decoct. kramer. f ℥xiij. M.

Half an ounce of this to be injected into the nose three or four times a day, in cases of *ozæna.* *Detmold*, of Hanover.

Cataplasma calcis chlorinatæ.
Cataplasm of chlorinated lime.

℞. Calcis chlorin.
Sodii chlorid. āā. ʒss.
Aquæ destill. Oss.
Farinæ sem. lin. q. s. ut fiat cataplasma.

Used in cases of *scrofulous swelling of the joints.* *Gräfe.*

Unguentum calcis chlorinatæ.
Ointment of chlorinated lime.

℞. Calcis chlorin. ʒj.
Adipis ℥j. M. et fiat unguentum.

To be rubbed in, in cases of *scrofulous swellings.* *Cima.*

℞. Calcis chlorin. ʒss.
Adipis ℥j. M. et f. unguent.

Used in *goître.* *Werneck.*

℞. Adipis ℥j.
Sodæ borat.
Calcis chlorin. āā. ʒj. M. exactissimè.

In cases of *chilblains.* *Trusen.*

℞. Sulphuris ℥iss.
Calcis chlorin. bene tritur. ℥ij.
Adipis ℥x. M.

In *itch*, morning and evening. *Hospital.*

Linimentum calcis chlorinatæ.
Liniment of chlorinated lime.

℞. Calcis chlorin. ʒss.
Tere in mortario vitreo et sensim affunde
Aq. rosæ (seu fontanæ) f ℥j.
Et post. limpid. clarificat. admisce
Ol. amygd. f ℥j.

To be applied, by means of a pencil, in cases of *tinea capitis.* *Trusen.*

LI. CAN'NABIS IN'DICA.

Synonymes. Indian hemp, Gunjah, Haschisch.
French. Chanvre Indien.
German. Hanf.

Cannabis, which grows in India, and has been described by some botanists under the name *Cannabis Indica*, does not appear

to possess any specific differences from the common hemp, *Cannabis sativa;* and accordingly by many botanists they have been regarded as identical.[1]

The term "Indian hemp" has long been assigned, in the United States, to Apocynum cannabinum: this has given occasion in Europe, and occasionally in this country, to confusion in regard to the two articles, which are very distinct in their natural and medical characters.[2]

The narcotic effects of cannabis have been long known to the people of Southern Africa, South America, Turkey, Egypt, Asia Minor, India, and the adjacent countries of the Malays, Burmese, and Siamese, by whom it is used in various forms to induce intoxication. It is, likewise, extensively employed in popular practice in various diseases. In Western Europe its use is unknown, and it is questionable, whether the hemp of that region or of this country be possessed of the same properties. Dr. O'Shaughnessy, of Calcutta, states, that the extraordinary symptoms produced by the oriental plant depend upon a resinous secretion with which it abounds, and which seems to be wholly absent in the European plant. The absence of the resinous secretion, and consequent want of narcotic power, he ascribes to difference of climate. M. de Courtive[3] has submitted to analysis cannabis procured from Algiers, or from Indian seeds reared in France. He finds the active principle to reside in resin, which he extracted by a complicated process of maceration and the action of alcohol. From 9 to 10 parts of this resin—*cannabine*—were procured from 100 parts of the plant: the Algerian article furnishing it in greater abundance; and he affirms, that a grain and two-thirds, or even half the quantity, produced in some temperaments an equal effect with half a dram of the thick extract. The Cannabis sativa of Italy furnished an active but much weaker resin. The resin obtained by M. de Courtive is of a deep greenish-brown colour, of an aromatic but nauseous odour, and of a hot, acrid, and enduring taste. It is soluble in cold ether, alcohol, and volatile oils; insoluble in water and dilute alcohol.

The Messrs. Smith, of Edinburgh, satisfied themselves that the resin concentrates in itself the whole properties of the plant. The following is their mode of preparing it. Digest bruised *gunjah* in successive portions of warm water until the expressed water comes away colourless, and again for two days at a moderate heat in a solution of *carbonate of soda*, in the proportion of one part of the salt to two of gunjah. Colouring matter, chlorophyll and

[1] Royle, Mat. Med. and Therap., Amer. edit. by J. Carson, p. 551. Philad. 1847, and Pereira, Elements of Materia Medica, 2d edit. p. 1066. Lond. 1842.

[2] Farre, in Lond. Med Gaz., May 5, 1843, p. 209.

[3] Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 52. Paris, 1849; and Ranking's Half yearly Abstract, viii. 214, Amer. edit. Philad. 1849.

inert concrete oil, being thus removed, express and wash the residuum, dry it, and exhaust it by percolation with rectified spirit. Agitate with the tincture *milk of lime* containing an ounce of lime for every pound of gunjah; and, after filtration, throw down excess of lime with a little *sulphuric acid.* Agitate with the filtered liquor a little *animal charcoal,* which is afterwards to be removed by filtration. Distil off most of the spirit: add to the residual tincture twice its weight of water in a porcelain basin, and let the remaining spirit evaporate gradually. Lastly, wash the resin with fresh water till it comes away neither acid nor bitter; and dry it in thin layers. Dry gunjah yields six or seven per cent. of it; and its strength as a narcotic corresponds with this proportion.[1]

In certain seasons and in warm countries, a resinous juice exudes, and concretes on the leaves, slender stems and flowers of cannabis. This constitutes the *churrus* of Nipal and Hindoostan, and in it resides the powers of all the preparations of hemp. This resin—*cannabine, haschischine*[2]—is very soluble in alcohol and ether; partially soluble in alkaline, but insoluble in acid, solutions. When pure it is of a blackish-gray colour; it is hard at 90° of Fahrenheit, but softens at higher temperatures, and fuses readily. It is soluble in the fixed and in several volatile oils. Its odour is fragrant and narcotic; taste slightly warm, bitterish and acrid. The dried hemp plant, which has flowered, and from which the resin has not been removed, is called *Gunjah* or *Haschich.* It is made into bundles of 24 plants each. These bundles are 2 feet in length, and 3 inches in diameter.[3] It yields to alcohol twenty *per cent.* of resinous extract, composed of the resin—*churrus*—and green colouring matter. The Gunjah is used for smoking. The larger leaves and capsules, without the stalks, constitute *Sidhee, Subjee,* or *Bang,* which is used to form with water an intoxicating drink. When the plant is distilled with a large quantity of water, traces of volatile oil pass over, and the distilled liquor has the powerful narcotic odour of the plant.[4]

EFFECTS ON THE ECONOMY.

Cannabis Indica, raised in India, appears to have the greatest activity. Mr. Donovan made numerous experiments with hemp cultivated by himself, and was satisfied that domestic hemp is destitute of the principle "which renders the Indian plant so desirable an extract to the voluptuous people of the East."

The effects of this remedy would appear to have been well known to the Arabian and Persian physicians of both modern and

[1] Christison, Dispensatory, Amer. edit. p. 973. Philad. 1848.
[2] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 10.
[3] Ballard and Garrod, Elements of Mat. Med. and Therap., p. 413. Lond. 1845.
[4] For the history of the Haschisch, see Moreau, Louradour and Bouchardat, in Bouchardat, Annuaire pour 1847, p. 11. Paris, 1847.

ancient periods; but the first person, who seems to have well tested its properties was Dr. O'Shaughnessy.[1] In his various experiments, he did not observe the least indication of pain, or any degree of convulsive movement. They all, he affirms, "led to one remarkable result,—that while carnivorous animals and fish, dogs, cats, swine, vultures, crows, and adjutants invariably and speedily exhibited the intoxicating influence of the drug, the graminivorous,—such as the horse, deer, monkey, goat, sheep, and cow,—experienced but trivial effects from any dose that was administered." Encouraged by these results, he felt no hesitation as to the perfect safety of giving the resin of hemp an extensive trial in cases in which its apparent powers promised the greatest degree of utility. The general effects observed on man were alleviation of pain in most cases, remarkable augmentation of the appetite, aphrodisia, and great mental cheerfulness. The more violent effects were a peculiar form of delirium, and a cataleptic state.

Under the influence of fourteen grains of the resinous extract taken at bed-time, Mr. Donovan[2] awoke early in the morning, with a rush of strange sensations through his head, accompanied by a crackling and singing noise, and a vibratory motion through the whole body. These gradually subsided, and whilst dozing off, he thought an explosion took place in his head, followed by the same rushing noise and vibration as before, and afterwards by a strange metallic sound. Various other noises succeeded. His sense of touch and feeling had gradually become more and more obtuse, until at length he lost all feeling, unless he pinched himself severely. "The effects," says Mr. Donovan, "were now at their height, and the consequences were surprising. I absolutely lost the consciousness of having a body, and my corporeal existence, appeared to be comprised within the head, and a small portion of my chest near the throat: in these spots I felt as much alive as ever, but all other parts were without feeling, and, to my perception, annihilated. My intellect was not in the least disturbed; memory was as good as ever. I reasoned well enough; was conscious of external objects as in perfect health; but I had some notion that if I gave way to sleep, I should never wake in this world; yet, strange to say, I felt perfectly resigned to this sudden termination of existence." Similar phenomena have appeared in others from a much smaller dose.[3]

On trying an alcoholic extract, sent to Dr. Christison[4] by Mr. Andrew Robertson of Calcutta,[5] for toothache, he found, that about

[1] On the Preparations of Indian Hemp, or Gunjah. (*Cannabis Indica*,) &c., Calcutta, 1839; and Brit. and For. Med. Rev., July, 1840, p. 224.

[2] Dublin Journal of Med. Science, Jan. 1845. [3] Op. cit.

[4] See the author's General Therapeutics and Mat. Med. 4th edit. i. 380. Philad. 1850.

[4] Op. cit. p. 973.

[5] For an account of this extract, see Pharmaceutical Journal, cited in American Journal of Pharmacy, for August, 1847, p. 195.

four grains, taken at three A. M., caused, in an hour, cessation of pain, a pleasant numbness in the limbs, giddiness, a rapid succession of unassociated ideas, and impossibility to follow a train of thought, frequent intervals of sleep, and slight increase in the force of the pulse. Next morning there was an ordinary appetite, much torpidity, great defect and shortness of memory, extreme apparent protraction of time, but no peculiarity of articulation or other effect, and these symptoms lasted until two P. M., when they entirely ceased in a few minutes after taking lemonade. The results, however, of different observers, in regard to this agent, are by no means in accordance. Whilst some believe it capable of replacing opium, where the latter disagrees, others have found it fail where opium had failed. Dr. Lawrie, of Glasgow,[1] has reported its effects in twenty-six cases, from which he drew the following conclusions. *First.* It seems to belong to that class of narcotics, which rapidly induce excitement and intoxication, followed by sleep—neither sound nor refreshing. *Secondly.* In a full dose it acts powerfully on the heart, causing palpitation, and a rapid, weak, intermittent pulse; and on the nervous system, producing delirium, coma, convulsions and dilated pupils. *Thirdly.* Its effects are generally transitory. In one case, however, the intoxication and dilatation of the pupils lasted nearly forty-eight hours. *Fourthly.* It is a very uncertain agent, in some cases producing the most violent and seemingly dangerous symptoms; in others, being nearly inert. *Fifthly.* It very frequently causes vomiting, which, whether it occur spontaneously, or from emetics, very speedily relieves its unpleasant, and perhaps dangerous effects. *Sixthly.* Applied around the eye, it does not dilate the pupil. *Seventhly.* It exerted little influence on the few patients to whom it was given in the form of enema. *Eighthly.* He does not think it a valuable addition to our narcotic medicines. In very few cases did it act as an agreeable soporific and anodyne. In none did it succeed when opium had failed; and in one case only was it preferred to opium. He does not think it is to be trusted to. *Ninthly.* So far from acting generally as an anodyne, its effect was so disagreeable, that the majority of those who took it once, only did so a second time on compulsion, and this was the more remarkable, as the patients on whom he experimented belonged to a class to whom stimulants of all kinds were familiar, and who would greedily swallow opium and spirits to an unlimited amount. *Tenthly.* It seemed useful in two cases of *subacute rheumatism;* and, lastly, it caused an immediate craving for food, and, in a few, permanently increased the appetite.

Professor Miller,[2] of Edinburgh, believes cannabis to be comparatively valueless as an anodyne, as well as hypnotic, in ordinary

[1] Lond. and Edinb. Monthly Journal of Medical Science, Nov. 1844, p. 497.
[2] Ibid. Jan. 1845.

circumstances. Its virtue seems to him to consist in a power of controlling inordinate muscular spasm. This it exhibited in a case of *traumatic tetanus* reported by him. Many cases have been published, in which its anti-convulsive power was confirmed. In opposition, however, to Professor Miller, Dr. Clendinning[1] has no hesitation in affirming, that its exhibition has usually, and with remarkably few substantial exceptions, been followed by manifest effects as a soporific or hypnotic, in conciliating sleep; as an anodyne, in lulling irritation; as an antispasmodic, in checking cough and cramp; and as a nervine stimulant, in removing languor and anxiety, and raising the pulse and spirits; and these effects have been observed by him in both acute and chronic affections, in young and old, male and female.

Dr. Corrigan[2] believes, that the action of cannabis is primarily on the motor nerves; its influence he inclines to think being transmitted along these to the sensorium, and nerves of sensation. Speaking of its peculiar advantages as a sedative, he affirms, that even in over-doses it does not produce the dry tongue, or the derangement of the digestive organs, which occasionally follows the use of opium. Its effects on different persons, however, he remarks, are very different. In the case of a lady who had long suffered from *neuralgia* of the face, neck and head, twenty drops of the tincture caused temporary loss of power in almost all the muscles, followed by sleep; while a similar dose has been taken by other patients three times daily, for weeks, with impunity and advantage.

Dr. Pereira[3] experimented on some specimens of Gunjah and Nipalese churrus, which were sent to him by Dr. O'Shaughnessy. He tried them both on animals and man, and gave specimens of them to medical friends; but their effects were found to be comparatively slight. "Whether,"—says Dr. Pereira,—"this be owing to the preparations having undergone some deterioration in their passage, or to the comparative phlegmatic temperament of the English, I know not. My experiments on animals were made in the lecture-room of the London Hospital before the students of the Materia Medica class; and the trials on the human subject were made in the wards of the hospital."

Messrs. Ballard and Garrod[4] state, that when the dose was large, they have observed the urine acquire an odour something like that evolved when the tincture is mixed with water, and in part like that of the Tonquin bean.[5]

[1] Provincial Med. and Surg. Jour., May 27, 1843, and Med. Chirurg. Trans., xxvi. 208.
[2] London Med. Times, cited in Med. Examiner for Sept. 1845.
[3] Elements of Mat. Med. 2d edit. ii. 1098. Lond. 1842. [4] Op. cit.
[5] For the experiments of M. Lieautaud and Brierre de Boismont, and of M. E. de Chaniac, see Bouchardat, Annuaire de Thérapeutique, pour 1845, p. 29, Paris, 1845, and Ibid. pour 1846, p. 13. See, also, Lieautaud, cited in Ranking's Abstract, p. 342. Amer. edit. New York, 1846.

Indian hemp was prescribed by Dr. O'Shaughnessy in various diseases. In *rheumatism*, acute and chronic, the results were not very satisfactory. In one case, the most marked catalepsy supervened along with the usual intoxicating effects. In a case of *hydrophobia*, the soothing influence of the remedy was very great; but the disease terminated fatally. In *cholera*, he considered its agency to be "promising, and to deserve the attention of the practitioner;" and since then it has been extolled in that disease by MM. Aubert-Roche, Chaniac, Willemin,[1] Gastinel, Legroux[2] and others.

The testimony is strongest in regard to its influence in *traumatic tetanus*[3] of which Dr. O'Shaughnessy refers to fourteen cases; of these, *nine* appear to have recovered. It is well remarked, however, by Messrs. Ballard and Garrod,[4] that it is no easy matter to determine the claims which a medicine holds forth to control tetanus; and that we should be cautious of advancing statements in reference to the subjugation of such a formidable disease unless on the most unexceptionable evidence. "Tetanus has been occasionally recovered from under a variety of treatment, and hence the disappearance of it in a few cases during the treatment by this drug must not rashly be used as a decided evidence of its curative capabilities. Of two cases lately treated with it in the University College hospital, one died, and the other recovered: the former was traumatic; the latter idiopathic. However, it is difficult to say how far it influenced the favourable termination; inasmuch as full and repeated blood-letting and colchicum were also employed." This difficulty exists in most of the reported cases. In but few has cannabis been given alone. It is proper, too, to add, that in the hands of Mr. Stafford,[5] Mr. Potter,[6] and Dr. Babington, it failed, or, at the most, afforded only temporary relief, although the utmost care was taken to obtain the article in a state of purity.[8] From the results of his cases, Dr. O'Shaughnessy concludes, that the resin of hemp, given boldly and in large doses, is capable of arresting effectually the progress of that formidable disease, "and in a large proportion of cases, of effecting a perfect cure;"—and further; "that in hemp the profession has gained an anti-convulsive remedy of the greatest value."

The commendations of Dr. O'Shaughnessy gave occasion to the employment of cannabis by many practitioners. Mr. Ley prescribed it with advantage in various *spasmodic diseases,—chorea, sciatica*, &c., which gave him the most perfect confidence in its

[1] Bouchardat. Annuaire de Thérapeutique pour 1849, p. 51.
[2] Ibid. pour 1850, p. 10.
[3] See, also, cases by Ley, Lond. Lancet, April 1, 1843, and Isaac Heister, Bost. Med. and Surg. Journal, June 17, 1846, p. 394.
[4] Op. cit. p. 414.
[5] Lond. Med. Gaz., April 29, 1845.
[6] Lond. Lancet, Jan. 11, 1845, p. 36.
[7] Ibid. Dec. 14, 1844, p. 352.
[8] Charlton, Retrospective Address, in Transactions of the Provincial Med. and Surg. Association, xiv. 20. Lond., 1846.

power to produce relaxation of the muscles, heavy sleep, and during its action, abatement of pain;[1] and Wolff[2] and Ruhbaum,[3] found it valuable in neuralgic affections. Mr. Lynch[4] likewise prescribed it with success in a case of *neuralgia* above and around the right orbit; and in an epidemic *neuralgia of the head*, but especially of the jaw, which prevailed around Rathenow in the last quarter of the year 1847, Ruhbaum[5] found great benefit from 16 to 20 drops of the tincture of cannabis, which contained about a grain of the alcoholic extract. It has also been given in *mania* with advantage, by M. Moreau.[6] Dr. Conolly, it appears, in a clinical lecture upon mental disorders, remarks, that he believes there is very little of the genuine Indian hemp now in Europe. He thinks, that if his observation of its effects in the Hanwell Asylum be not altogether erroneous, it must become an important article of commerce. After some careful trials of the tincture, he feels justified in speaking well of it. It is chiefly useful, he thinks, in chronic cases. A dram and a half, and sometimes two drams, have frequently been given in chronic cases of *recurrent mania*, and although generally with good effects, sometimes without any whatever.[7] By Dr. Corrigan, cannabis has been administered with great success in *chorea*, in the Richmond Hospital, Dublin.

With such evidence in its favour, it is certainly important, that Indian hemp should be subjected to a full and fair trial; and even admitting that it may fall short of the character given of it by Dr. O'Shaughnessy and others, it can scarcely fail to be an important addition to our Materia Medica.

Dr. Churchill[8] speaks favourably of the powers of cannabis in checking *uterine hemorrhagic discharges*, from his own experience, as well as from that of others. The largest class of cases in which he found it of the most unqualified benefit was of *menorrhagia*, where the discharge, although excessive, is fluid, and but little mixed with clots, and when the uterus is not enlarged. In many such cases, five drops of the tincture, three times a day, arrested the flow in from twenty-four to forty-eight hours. In several cases of threatened abortion, when employed sufficiently early, it succeeded remarkably well. He prescribed it, too, in three cases of *cancer uteri*, at a tolerably early period, on account of continued draining of blood; and he thought temporary relief was afforded. It appeared to him to exert an astringent power in hemorrhages from mucous surfaces, and to have a sedative or ano-

[1] Provincial Med. and Surg. Journ., Aug. 20, 1842.
[2] Schmidt, Op. cit. s. 155.
[3] Schmidt's Jahrbücher u. s. w., No. 9, Jahrgang, 1848, S. 277.
[4] Provincial Med. and Surg. Journ., April 1, 1843.
[5] Schmidt's Jahrbücher der gesammten Medicin. Jahrgang, 1848, No. 11; S. 155.
[6] Du Hachisch et de l'Aliénation Mentale, Etudes Psychologiques; Paris, 1845. Noticed by Dr. Pliny Earle, in Amer. Journ. of the Med. Sciences, April, 1846, p. 423.
[7] Amer. Journal, loc. cit. [8] Medical Times, May 12, 1849.

dyne effect. The preparation he invariably used was Mr. Donovan's tincture of the resin, with which he begins in the dose of five drops, three times a day, increasing it, in a few cases, to ten, but seldom more. The effects are very soon seen, generally in twenty-four or forty-eight hours; often much sooner. In some cases, indeed, the effect was instantaneous.

In consequence of Dr. Churchill's belief, that cannabis possesses powers similar to ergot in arresting hemorrhage from the uterus, Dr. Simpson[1] was induced to try, whether it is possessed of any oxytocic property; accordingly, he gave it in several cases of *tedious labour*, and he states that parturient action seemed to be very markedly and directly increased after its exhibition; but, far more extensive and careful experiments would be required before a decided opinion could be attained in regard to its possessing such powers, and their amount.

MODE OF ADMINISTRATION.

The preparations used by Dr. O'Shaughnessy are the following:—

Extractum cannabis Indicæ alcoholicum.

Resinous or alcoholic extract of Indian hemp.

This is prepared by boiling the rich adhesive tops of the dried *Gunjah* in alcohol (·835) until all the resin is dissolved. The tincture, thus obtained, is evaporated to dryness in a vessel placed over a pot of boiling water. The mode of preparing the resin by the Messrs. Smith, of Edinburgh, is given before. The ordinary dose of the extract is from two to five grains; that of the pure resin of Messrs. Smith appeared to them to be active in the dose of two-thirds of a grain, although made with old gunjah.[2]

In *hydrophobia*, the resin in soft pill, to the amount of ten to twenty grains, is directed to be chewed by the patient, and to be repeated according to the effect.

Tinctura cannabis Indicæ.

Tincture of Indian hemp.

℞. Extract. cannab. Indic. alcohol. gr. xxiv.
Alcohol. dilut. f ℥j.

Of this a dram is given in *tetanus* every half hour, until the paroxysms cease, or catalepsy is induced. In *cholera*, ten drops given every half hour were often found to check the vomiting and purging, and bring back warmth to the surface. Dr. O'Shaughnessy's experience leads him to prefer small doses of the remedy in order to excite rather than narcotize the patient.

[1] Monthly Journal of the Medical Sciences, July, 1850.

[2] See, on all this subject, Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 51—60. Paris, 1849.

Haustus cannabis Indicæ.

Draught of Indian hemp.

℞. Tinct. cannab. Indic. ♏ xv.
Alcohol. ♏ xlv. M. ut f. haustus.

Donovan.

Mr. Donovan[1] recommends that the patient should either swallow the whole of this directly from the bottle, to avoid loss—or pour it into a little water, and instantly swallow it off. If it be not taken instantly, the resin will be precipitated—will adhere to the vessel, and thus escape being swallowed, which always happens when the prescriber directs water to be mixed in the draught by the apothecary; and Mr. Donovan says he has seen several disappointments in consequence.

LII. CARBO ANIMA'LIS.

Synonymes. Carbo Carnis, Caro Vitulina Tosta, Animal Charcoal.
French. Charbon Animal.
German. Thierische Kohle, Fleischkohle, Thierkohle.

Animal charcoal is an ancient remedy, which has been revived amongst us. The older physicians used several kinds, and recommended them in various diseases, but without having any fixed principle: the circumstances, indeed, that suggested their exhibition, in many cases, are entirely unintelligible to us of the present day. In the old Wirtemburg Pharmacopœia, we find the *Erinaceus combustus*, or "burnt hedgehog," as an antihydropic; the *Sericum tostum*, or "burnt silk," and the *Hirundines combustæ*, or "burnt swallows," as antiepileptics; the *Lepus combustus*, or "burnt hare," as an antilithic; the *Reguli usti*, or "burnt wrens," advised in nephritis and calculous affections; and the *Talpæ combustæ*, or "burnt moles," at one time much extolled in erratic gout, lepra, scrofula, ulcers and fistulæ! All have properly fallen, however, into oblivion with the profession, although there may yet be some who cling with pertinacity to these relics of ancient ignorance and superstition. The "*cancer remedy*" of Cosme, into the composition of which burnt shoe-soles entered, appears to have kept up the employment of animal charcoal, as well as the "burnt sponge," *Spongia usta*, in which, however, the charcoal is of but little efficacy compared with the iodine it contains. These were, perhaps, the only forms in which animal charcoal was used at the time when Weise, a German physician, revived its employment; and many physicians soon came forward to attest favourably in regard to it.

[1] Op. cit.

METHOD OF PREPARING.

Weise gives the following method of preparing it: Cut *ribs of veal*, with the flesh attached, into small pieces, and put them into a drum for roasting coffee—turning the drum constantly whilst it is placed over the fire. When inflammable air begins to pass off, which is distinguished by the flame playing around the drum, the combustion must still be kept up a quarter of an hour longer. If it be continued as long as any inflammable air is disengaged, the preparation is inefficacious. The substance, most commonly met with under the name of "animal charcoal," is obtained by burning bones. The residue, when reduced to powder, is the well known substance *bone black* or *ivory black*. This generally contains more or less phosphate of lime, according to the kind of bone from which it has been procured. It is directed in the London Pharmacopœia, and in the last edition of the Pharmacopœia of the United States (1842,) to be purified by digestion in dilute muriatic acid, as follows: Take of *animal charcoal*, a pound; *muriatic acid* and *water*, each twelve fluidounces. Mix the muriatic acid with the water, and gradually pour it upon the charcoal; then digest for two days in a gentle heat, occasionally agitating. Set aside, and pour off the supernatant liquor; then wash the charcoal with repeated portions of water till no traces of acid are perceptible; lastly dry it.[1] Charcoal, prepared in this way, should be a combination of carbon, carbonate and phosphate of lime, hydrogen, and nitrogen. From an analysis, which Meurer made of animal charcoal, prepared according to Weise's formula, it contains, also, chloride of sodium and a little carbonate of soda, as well as a portion of iron.

EFFECTS ON THE ECONOMY.

In the case of a young man of *scrofulous diathesis*, Weise saw a *tumour*, of the size of a hazelnut, and very painful, situate under the nipple, disappear under the use of animal charcoal. According to him, its efficacy is strongly exerted on the uterus and mammæ. Rothamel and Hohnbaum extol it in *dyspepsia* and *gastricism*, as well as in cases of *diarrhœa*. In obstinate *chronic glandular indurations*, especially of the mammary glands, Weise affirms it to be a certain remedy: he, at the same time, however, considers a regulated diet to be indispensable. *Scirrhus of the lips*, he says, also disappears under its use, and even *scirrhous goître*, when the charcoal is associated with burnt sponge. On *cartilaginous polypi*, it is said to have exerted a beneficial agency, and to have diminished the tendency of *mucous polypi* to return after operation. Even *open cancer*, it is asserted, has been healed by it.[2] On these recommendations of Weise, animal charcoal has been

[1] For the mode of preparation on the large scale, see Pereira, The Elements of Materia Medica and Therapeutics, 3d edit. i. 312. Lond. 1849.

[2] Riecke, Die neuern Arzneimittel, u. s. w. S. 104.

used by several German physicians, especially by Wagner, Kopp, Pitschaft, Radius, Rothamel, Hesselbach, Gumpert, Hohnbaum, Fricke, Michaelsen, and Siebenhaar; and, as a general result of their observations, it would seem not to be devoid of therapeutical agency; although many of the experimenters failed in noticing any sanative effect from it. Fricke, for example, did not observe the least benefit in the very cases mentioned by Weise. He gave it, also, in the way of experiment, in several other cases, but without detecting the slightest influence on the organism. Other physicians saw advantages from its use in open cancer, but these were only transient. On the other hand, the experience of Wagner, Kopp, Michaelsen, and Rothamel would seem to show, that it was effectual in removing *incipient scirrhus of the mammæ*. Kopp employed it successfully in *scirrhous goitre*, and Pitschaft in a case of what he terms *struma varicosa*. Radius dispersed under its use a considerable *swelling of the submaxillary glands*. In *scrofulous affections*, especially in *scrofulous indurations of the glands*, it is said to have proved useful in the hands of Kopp, Rothamel, Speranza, Kuhn, and others; but Baudelocque did not find it possess any therapeutical property.[1] Pitschaft, in a delicate, strumous woman, who was suffering constantly under *ozæna*, found it of eminent service after other remedies had failed. Radius thought it aided the absorption of a *disintegrated cataract*, and Siebenhaar saw good effects from it in *induration of the pancreas*. Riecke[2] suggests, that farther trials may show, that it might be used in the place of iodine, which it appears to resemble in its action on the economy, whilst it affects the organism less injuriously. It is doubtful, however, whether the properties of the two substances can be regarded as at all analogous, and whether animal charcoal be possessed of any other properties than those usually ascribed to prepared charcoal—*carbo ligni*.

MODE OF ADMINISTRATION.

Carbo animalis is given in doses of from half a grain to three grains twice a day—commonly in the form of powder with sugar, or with powdered liquorice root. Weise advises it to be sprinkled on the hard edges of *cancerous ulcers*, and Speranza extols an ointment made of charcoal, and oil, or simple cerate, as a discutient in *scrofulous swellings*.

Pulvis carbonis animalis.

Powder of animal charcoal.

R. Carbon. animal. gr. ij.
Glycyrr. pulv. gr. v.
F. pulvis.

[1] Dubois (d'Amiens,) Traité de Pathologie Générale, 2ème édit. p. 206. Bruxelles, 1835.

[2] Op. cit.

A powder to be given morning and evening in *induration of the mammæ*. *Michaelsen.*

℞. Carbon. animal. gr. vi.
Spong. ust. gr. xij.
Glycyrrhiz. pulv. ʒss.
M. f. pulv. in partes vi. æquales dividendus.

A powder to be taken night and morning in *scirrhous goître*. *Riecke.*

℞. Carbonis animal. gr. iv.
Glycyrrh. pulv. ℈iv. M. et divide in part. viij.

One of these to be taken dry, morning and evening, a little water being drunk afterwards, in cases of *scirrhous indurations of the mammæ*. After the eight powders have been taken, the dose may be increased gradually by half a grain, until it ultimately attains four grains. At the same time, unirritating and spare diet should be inculcated.

Bolus carbonis animalis.

Bolus of animal charcoal.

℞. Carbon. animal. gr. iij.
Ammon. muriat. pulv. ℈j.
Ext. conii gr. ij.
—— glycyrrhiz. q. s. ut fiat bolus.

One of these to be given three times a day;—in cases of *swelling* and *scirrhus of the prostate*, and of the *mucous membrane of the urethra*. *Magendie.*

LIII. CARBO'NIS SESQUI-IO'DIDUM.

Synonymes. Carbonis Sesqui-ioduretum, Iodidum Carbonis, Ioduretum Carbonii, Carbonei ioduretum, Iodoformum, Iodoforma, Carbonium seu Carboneum iodatum, Sesqui-iodide or Sesqui-ioduret of Carbon, Iodoform.

French. Iodure de Carbone, Iodoforme.

German. Iodkohlenstoff, Iodkohlenwasserstoff, Iodätherid, Formylsuperiodid.

This preparation is made by mixing *concentrated alcoholic solutions of iodine* and *potassa* until the former loses its colour. A solution is obtained, from which the addition of water throws down a yellow precipitate—the sesqui-iodide of carbon, which is soluble in alcohol and ether, but insoluble in water. The ethereal solution yields large yellow crystals by slow evaporation. It has a sweet taste, and a strong, saffron-like odour. Mitscherlich[1] considers the taste very disagreeable. M. Bouchardat gives the following form for its preparation.[2] Take, of *iodine*, 100 parts; *bicarbonate of potassa*, 100 parts; *water*, 750 parts; *alcohol*,

[1] Traité de Chimie, traduit par Valerius.

[2] Annuaire de Thérap. pour 1844, p. 116. Paris, 1844; and Nouveau Formulaire Magistral, p. 333. Paris, 1845.

250 parts: mix the whole in a flask, which must be placed in a water bath, the heat of which must be gradually raised, to favour reaction. When the liquor has lost its colour (*sera decolorée,*) add, of *iodine*, 25 parts; heat again; renew the addition of *iodine* when the liquor has lost its colour; and, a short time after the point has been passed at which it no longer changes by heat, add a few drops of a solution of *potassa*, to deprive the liquor of colour. Filter, and wash the precipitate produced, which will consist of crystalline plates of iodoform, of a beautiful citrine colour. The evaporated liquor will yield a large quantity of crystals of pure iodide of potassium.

According to M. Bouchardat, iodoform furnished by this process, will be as economical as any other product of iodine; and, he does not doubt, it will occupy a useful rank amongst the preparations of iodine employed internally.

Fifty grains, given by Dr. Cogswell,[1] to a strongly made terrier dog, proved fatal; and, on dissection, the large vessels were found congested; the inner membrane was closely corrugated, and the apices of the rugæ were of a rose-red colour. M. Bouchardat gives it in the form of pill, united with extractum absinthii in *scrofulous affections*, and of lozenges.

EFFECTS ON THE ECONOMY IN DISEASE.

The dose of iodoform is one grain three times a day. Dr. Litchfield[2] used it with advantage in five cases of *enlarged glands;* in two of *lepra*, and three of *porrigo*, in the form of ointment composed of ʒss. of the powder to ʒvj. of simple cerate.

Pulvis carbonis sesqui-iodidi.

Powder of sesqui-iodide of carbon.

(*Iodoform powder.*)

℞. Carbon. sesqui-iodid.
Elæosacchar. Vanill. āā ʒij.
Sacchar. pulv. ℥ij. M.

Dose.—Fifteen grains, three times a day, in *scrofula.*

Bouchardat.[3]

LIV. CETRARI'NA.

Synonymes. Cetrarinum, Cetrarium, Cetrarin, Cetrarine.
French. Cetrarin.
German. Cetrarin, Moosbitter, Flechtenbitter der Isländischen Flechte.

This substance was extracted from Cetraria Islandica, by M. Herberger, a pharmacien at Kaiserslautern.[4]

[1] Essay on Iodine, p. 122. Edinb. 1837.
[2] Lond. Med. Gaz., Aug. 1836.
[3] Annuaire, &c., pour 1842, p 129.
[4] Buchner's Repertorium, B. viii. H. 1, 1837.

METHOD OF PREPARING.

The coarse powder of *cetraria* is boiled for half an hour in four times its weight of *alcohol* at .883; it is then left at rest until vapours cease to be given off, to avoid the loss of the alcohol; when it is strained and pressed. Three drams of *muriatic acid*, previously diluted with *water*, are now added to each pound of the moss; this is mixed with from four times and a quarter to four times and a half its bulk of *water*, and the mixture is left at rest for a night in a closed flask. The next day, the deep yellow fluid, which swims above the copious deposite obtained, is poured off; this deposite is the impure cetrarin, the colour of which is more or less greenish. It is now collected on a filter (*chausse*,) left to drain as little as possible, and subjected to pressure. To purify it, it must be divided into small fragments, and washed, whilst still moist, with alcohol or ether, which deprives it of colour; it is then treated with two hundred times its weight of *boiling alcohol*, in which the inorganic matter, that has hitherto accompanied it, is scarcely soluble. The greater part of the cetrarin is gradually precipitated on the cooling of the alcoholic solution. The portion which still remains in solution may be separated by the evaporation of the alcohol.

One pound of cetraria, according to Messrs. Ballard and Garrod,[1] yields about two drams and a half of cetrarin.

Pure cetrarin is, at times, in the state of a white powder, resembling magnesia; at others, in small globules united in the form of arborizations, which do not present—even under the microscope—any crystalline texture. When gently compressed, it has a slight silky splendour. It is neuter, light, unalterable in the air, inodorous, and has a very intense, bitter taste, especially in the alcoholic solution. Its best solvent is absolute alcohol, one hundred parts dissolving 1.70 of it at the boiling temperature, but only 0.28 at 14° centig. (58° Fahr.) Alcohol, at .830 dissolves 0.44 when boiling; 0.28 at 25° cent. (77° Fahr.,) and only 0.04 at 14° cent. (58° Fahr.) It is still less soluble in boiling and in cold water, the essential oils, creasote, &c. It is somewhat more soluble in ether, but insoluble in the fixed oils.[2]

EFFECTS ON THE ECONOMY IN DISEASE.

Müller, of Kaiserslautern,[3] details two cases in which he has administered cetrarin. One of these was a *quartan*, the other, a *tertian intermittent*. The effects appeared to be exerted more slowly than those of quinia, but it seemed to him not to affect the stomach as much.[?] Its price must be considerably less, as M.

[1] Elements of Mat. Med. and Therap., p. 365. Lond. 1845.
[2] Journal de Pharmacie, xxiii. 505. Paris, 1837; and Bulletin Général de Thérapeutique, No. 18, Sept. 30, 1837.
[3] H. Bruck, in Bulletin Général de Thérapeutique, No. 17, 15 Sept., 1837.

Herberger succeeded in obtaining, from a pound of cetraria, 135 grains of very pure cetrarin. It has also been prescribed successfully in intermittents, by Regatelli and Von Lippich.[1]

It has not been given, so far as the author knows, in this country.

MODE OF ADMINISTRATION.

Müller gave it in the form of powder, according to the following prescription:—

℞. Cetrarin.
Acaciæ ãã. gr. ij.
Sacchar. ℈ss. M. et fiat pulvis.

Dose.—One of these every two hours, during the *apyrexia*.

Bruck,[2] suggests, that if dissolved in alcohol, its action may be incomparably more potent, and that it may more speedily arrest the paroxysms of an *intermittent*, than when given in powder.

LV. CHIMAPH'ILA (FO'LIA.)

Synonymes. Chimaphilæ vel Chimophilæ Umbellatæ Folia, Chimaphilæ Corymbosæ Folia, Pyrola, Pyrolæ Umbellatæ Folia, Winter Green, Umbellated Winter Green, Pipsissewa.

French. Herbe à pisser, Pyrole en Ombelle.

German. Die Blätter des holdenblühtigen Wintergrüns, Wintergrün-Blätter.

This plant is not new to us; but numerous trials have been made with it of late in Europe. It is admitted into the Pharmacopœia of the United States, is a beautiful evergreen, and is indigenous in the northern parts of Europe, Asia, and America. It belongs to the Natural Family Ericineæ of Decandolle; Pyrolaceæ Lindley; Sexual System, Decandria Monogynia. A good description of it is given by Barton.[3]

The leaves have a bitter-sweetish taste, with some degree of astringency. The taste of the stems and roots is, in addition, considerably pungent. Boiling water and alcohol extract the virtues of the plant. The constituents, so far as ascertained, are bitter extractive, tannic acid, resin, gum, lignin, and saline matters. The active principle has not been determined. It probably resides in the bitter extractive—the resin and tannic acid, however, contributing to its effects.[4]

EFFECTS ON THE ECONOMY IN DISEASE.

The leaves of Chimaphila were long used by the Indians of this continent, and from them the American physician was induced

[1] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 71. Erlangen, 1848.
[2] Op. cit.
[3] Medical Botany, i. 17; see, also, Art. Chimaphila, in Wood and Bache's Dispensatory.
[4] Pereira's Elements of Materia Medica, &c., ii. 1333. Lond. 1842; or 2d Amer. edit., by Carson. Philad. 1846.

to employ them. The first regular treatise respecting the plant is said to have been a thesis of Dr. Mitchell, published in the year 1803.[1] In Canada, it is said to have been long used in *diseases of the urinary passages*, especially *calculus;* in *dropsy*, and in *chronic gout* and *rheumatism;* its effects appearing to resemble —but not to exceed—those marvellously ascribed to uva ursi.[2] Somerville[3] and Barton extol it as an excellent diuretic in different forms of *dysuria*, and in *dropsies*, especially such as succeed to acute diseases; in *nephralgia* as a palliative, especially when the paroxysms are occasioned by gravel which has accumulated in the kidney; and even in *vesical calculus*. During its use, the appetite has improved, and the digestive powers have augmented; the patients often experiencing—immediately after it was taken—an agreeable sensation in the stomach, and in the region of the kidneys. Radius[4] found it especially serviceable in *dropsy, gout,* and *rheumatism;* and in *inordinate activity of the secretory function of the mucous membranes—chronic catarrh, phthisis pituitosa*, &c. According to him, it is contraindicated where there is much fever, disposition to diarrhœa, gastricism, and great debility of the stomach. Heyfelder affirms, that it appears to be advantageous in the *debility of the digestive organs attendant upon dropsy*, but its diuretic effect is not considerable or enduring, so that it requires to be associated with more powerful agents.

Experiments, which have been made in the Bürger-hospital, at Pesth, and which have been collected by St. Rochus, and published by Windisch, the director of the hospital, are extremely favourable to the chimaphila. Within two years, nearly two hundred *dropsical cases* are said to have been radically cured by it. Windisch recommends it most strongly to the attention of his colleagues; he asserts it to be one of the best diuretics we possess; that it does not impair digestion; moderately accelerates the circulation; gently encourages the action of the bowels, and powerfully augments the urinary secretion; that the patients willingly take it, and that it induces no nausea. It was administered with advantage in dropsies unaccompanied by fever, and not dependent upon organic mischief, upon "corruption of the humours or paralysis of the lymphatic textures." In febrile conditions and inflammatory diatheses, it is said to have been always injurious, as well as when it was administered prior to the resolution of obstructions remaining after long protracted intermittents; but when these are removed, and no excitement exists,—more, according to Windisch, is to be expected from it than from any other agent, and he

[1] Barton's Collection, ii. 2.
[2] See the author's General Therap. and Mat. Med., 4th edit. i. 276. Philad. 1850.
[3] Medico-Chirurgical Transactions, v. 340.
[4] Auserlesene Heilformeln zum Gebrauche für praktische Aerzte und Wundärzte, u. s. w. S. 175. Leipz. 1836.

strongly advises, that careful trials should be made with it in the proper cases. He advises, also, that its use should be persevered in, in order that good effects may be derived from it.

The author has frequently administered chimaphila in public and private practice, and has found it serviceable, where a tonico-diuretic was indicated. It is probably owing to its tonic properties, that it has been found occasionally serviceable in *scrofula*.

MODE OF ADMINISTRATION.

Chimaphila is given either in *infusion*, or, what is preferable, in *decoction;* the dose in the day being from half an ounce to an ounce of the drug. Where it does not act sufficiently on the bowels, Radius advises, that a few senna leaves should be added. In affections of the chest, he found the addition of the spirit of nitric ether advantageous. Generally, however, he gave it alone. Windisch found a combination of it with tartrate of antimony and potassa, sulphuret of potassium, muriate of ammonia, squill, and, in very great weakness, cinchona and preparations of iron, serviceable. Radius often administered, also, the aqueous or spirituous extract.

Decoctum chimaphilæ.

Decoction of pipsissewa.

℞. Chimaphil. ℥j.
Aquæ Oij. (Oiss, Ph. U. S. and Lond.)
Coque ad colatur. Oj.

To be used daily in *dropsy*. *Somerville.*

Dr. Joy[1] adds to this two drams of *Liquor Potassæ Carbonatis*, and directs four table-spoonfuls of the mixture to be taken three times a day. He recommends it "in *dropsy* and *chronic affections of the urinary organs*," as if all these affections were identical or even analogous pathological conditions!

℞. Chimaphil. ℥ss. ad ℥j.
Coque cum aquæ f ℥xij. ad reman. f ℥vj.
Coctione finitâ adde
Spiritûs frumenti (*gin*, *malt spirit* or *whisky*) f ℥ij.
Digere frigidè per horas vj. et cola.

Dose.—Two spoonfuls, to be taken four times a day, in *dropsy* and *gout*. *Radius.*

℞. Chimaphil. ʒvj.
Coque cum aq. f ℥xij. ad reman. f ℥vj.
Sub finem coctionis adde
Fol. sennæ ʒij. et cola.

Dose.—A spoonful to be taken every two hours. *Radius.*

A fermented decoction was used by Dr. Parrish, in the Pennsylvania Hospital, in cases of *strumous disease*, particularly *white swelling* and similar *affections of the joints*. According

[1] Tweedie's Library of Medicine, 2d American edit. vol. iii. p. 692. Philad. 1842.

to Dr. Carson,[1] it makes an agreeable beverage. A decoction or infusion is first formed with half a pound of *chimaphila leaves*, to a gallon of *water:* a pound of *sugar* or half a pint of *molasses*, half an ounce of powdered *ginger*, and some *yeast* are then added. This mixture is placed in a tight vessel, and kept in a warm place, until fermentation is accomplished. Instead of the ginger, or, in addition to it, essence of spruce may be used.

The dose is half a tumblerful three or four times daily.

J. Parrish.

LVI. CHLO'RINUM.

Synonymes. Chlorinium, Chlorineum, Chlorum, Chlorine, Murigene, Acidum Muriaticum Oxygenatum seu Marinum Dephlogisticatum, Spiritus Salis Marini Dephlogisticatus, Dephlogisticated Muriatic Acid, Oxygenated Muriatic Acid.

French. Chlore.

German. Chlor, Chlorgas.

Uncombined chlorine is employed medicinally not only in the gaseous but in the liquid state. Each of these will be treated in succession. The forms for evolving it in the gaseous state, as well as the gaseous chlorine itself, have had various names assigned them expressive of their chemical or medical properties. They have been termed, respectively, *Acidum muriaticum oxygenatum ad contagia; Fumigatio muriatico-oxygenata; Fumigatio Guyton-Morveauniana; Pulvis ad fumigationes muriaticus; Species pro vaporibus superoxydi muriatici; Suffitus oxymuriaticus; S. chlorini; Alexiterium Chloricum, Fumigation de Chlor, F. de Guyton, F. Guytonienne, F. Hygiénique*, &c.

METHOD OF PREPARING.

Chlorine is obtained from chlorohydric or muriatic acid. For this purpose, one part of well pulverized *peroxide of manganese* with five or six parts of *concentrated muriatic acid*, is put into a retort, to which heat is applied, and the gas received over water. Or, it may be obtained from a mixture of one part of *peroxide of manganese*, four parts of *kitchen salt*, two parts of *concentrated sulphuric acid*, and four parts of *water*.

Chlorine is a greenish-yellow gas; of a peculiar, strong, disagreeable, stifling odour. The flame of a lighted taper introduced into it becomes at first pale, afterwards red, and is ultimately extinguished. It remains unchanged in the highest temperatures. It has a great affinity for hydrogen, so that it abstracts this gas from every substance that contains it, and forms with it chlorohydric acid. Hence it decomposes all the gases that contain hydrogen, and all organic colouring matters, as well as—it is conceived by many—miasmata and contagious matters.

[1] Pereira's Elements of Mat. Med. and Therap., 2d Amer. edit. p. 391. Phila. 1846.

EFFECTS ON THE ECONOMY.

Chlorine, when diluted, and received into the lungs, occasions coughing, and symptoms of suffocation, to which a protracted catarrh often succeeds: not unfrequently, too, we observe in those who are compelled to be exposed to it, bronchitis and pneumonia. Animals soon die when they are immersed in it.[1] In Mr. Broughton's experiments, mice exposed to it fell dead in less than thirty seconds. On opening them, the heart was found palpitating; the peristaltic motion of the intestinal canal continued, and could be kept up by irritating it with a probe. The vessels of the brain were collapsed. The lungs were tinged with the yellow colour of the gas, and the peculiar odour of chlorine was perceptible throughout their structure. Coagulation of the blood took place as under ordinary circumstances. A rabbit, two or three weeks old, was immersed in it, and died in less than half a minute. On opening the thorax, the heart was found acting freely, and on puncturing the aorta, the blood jetted out forcibly to a considerable distance. The peristaltic motion of the bowels was also going on. The vessels of the brain were in a collapsed state. The lungs were very much distended, tinged yellow, and, when removed from the chest to a distance, emitted the odour of chlorine. The right ventricle of the heart was distended with dark blood. The eyes were much glazed in each experiment. "It has been generally thought," adds Mr. Broughton, "that chlorine is incapable of passing the epiglottis" [the glottis] "but from the above observations it is evident that this gas enters the bronchial tubes in the act of inspiration. A portion of it probably circulates through the brain, suspending the cerebral functions without directly destroying the action of the involuntary organs,—contractility remaining long after the destruction of animal life, as is evinced by the activity of the heart and of the intestinal canal."[2]

These very facts, however, seem to show, that but little of the gas enters the lungs; probably no more than what passes immediately preceding the closure of the glottis by the forcible contraction of the arytenoidei muscles. When inhaled in a dilute state, it is absorbed; and, according to Mr. Wallace, the urine acquires bleaching properties. It would appear, also, that, in manufactories, the chief consequences from exposure to an atmosphere of it are acidity, and other stomach complaints, which the men generally remove by taking chalk:[3] this fact is confirmatory of the view, that acidity of the stomach is usually, if not always, dependent upon excess in the secretion of the gastric acids, the most important of which is the chlorohydric. When chlorine is inhaled,

[1] See Christison on Poisons, Amer. edit. p. 152. Philad. 1845.

[2] Journal of the Royal Institution, from Jan. to June, 1830.

[3] Pereira, Elements of Mat. Med. &c., 2d edit. i. 228, Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.

it is reasonable to suppose that more of this acid may be secreted in the stomach.

The irritating effects of chlorine become less and less, where persons are exposed to the fumes, and workmen are able to carry on their operations with impunity in an atmosphere impregnated with it, where one unaccustomed to such exposure could not remain with impunity for more than a few minutes.[1]

MODE OF ADMINISTRATION.

1. *By inhalation.*—In the way of inhalation, chlorine gas is never administered in a state of purity, but always diluted with atmospheric air; often, too, it is united with watery vapour. Gannal affirms, that the workmen in a bleaching establishment, who suffered under *diseases of the chest*, were visibly improved, and ascribed the amelioration to the inhalation of air containing it. He, therefore, instituted various experiments on *consumptive individuals*, from which good results, he conceived, followed. Sir James Murray[2] also mentions, that a friend of his had observed similar effects among his workmen who were exposed to the inhalation of watery vapour strongly impregnated with chlorine. The experiments, however, which were instituted at La Charité, in Paris, on this mode of treating *phthisis*, were by no means encouraging; and the same may be said of those at the Hôtel Dieu of that city, instituted by Rullier.[3] In many cases, indeed, the disease appeared to be aggravated. Bayle, likewise, thought the inhalation of it generally unfavourable, although he asserts that he cured a case of *tubercular phthisis* with it. Since then, it has been recommended by Cottereau. Professor Albers,[4] of Bonn, who administered it repeatedly, and carefully watched its effects, conceives, that it acts as a stimulant when applied to the membrane, but that, when it gets into the blood, its effects are antiphlogistic; and he is of opinion, that when there is no hæmoptysis or violent local irritation present, chlorine inhalations may be used in *diseases of the lungs* and *air-passages*. Its stimulant effect gradually diminishes, and, after a time, the mucous surfaces of the lung become less sensible to its exciting influence. In *tubercles of the lung*, *chronic catarrh*, *chronic inflammation*, and *ulceration of the bronchial mucous membrane*, and in *dilatation of the bronchi*, he found it of no service; and, in most cases, it could not be borne, in consequence of the irritation it induced; but its operation was very salutary in *pure ulceration of the lungs*, or *vomica*. It had always, however, to be administered

[1] Christison, A Treatise on Poisons, 1st Amer. edit. p. 616. Philad. 1845.

[2] A Dissertation on the Influence of Heat, &c., Lond. 1829; cited in the Dub. Jour. of Medical Science, for March, 1839, p. 96.

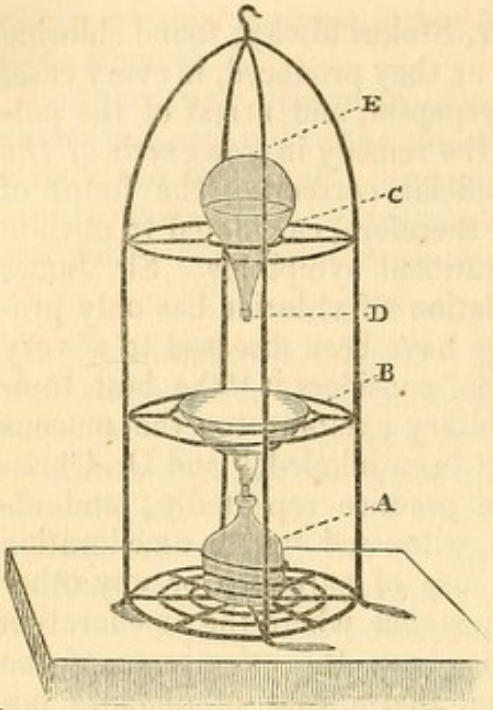
[3] See, also, Pereira, Op. cit. p. 229; and E. J. Coxe, Practical Treatise on Medical Inhalation, p. 83. Philad. 1841.

[4] Hannoversch. Annalen, 1836, cited in Brit. and For. Med. Rev. July, 1837, p. 215.

cautiously and experimentally. Dr. Stokes always found chlorine inhalations prejudicial in *phthisis*, as they produced, in every case, increase of bronchial irritation, dyspepsia, and arrest of the pulmonary secretion. In his trials of the remedy in *gangrene of the lungs*,[1] he found it decidedly beneficial, correcting the fœtor of the breath and expectoration, and, therefore, calculated to obviate not only the local but the constitutional symptoms. Sir James Clark[2] is of opinion, that the inhalation of chlorine has only produced relief in persons whose lungs have been diseased to a very limited extent. Dr. A. T. Thomson[3] considers it "the best topical expectorant, and the most salutary excitant to the mucous membrane of the lungs that has yet been inhaled;" and Dr. Christison[4] affirms, that he has tried the practice repeatedly; and although, like Dr. Elliotson, he has witnessed "such amelioration as he never saw before under the use of narcotics or any other means," he has not met with any instance where the amelioration was permanent. Such, likewise, has been the experience of the author. Dr Pancoast informed him, that a case of *aphonia* occurring in a young lady, in which there was but little voluntary power over the diaphragm, was cured by the inhalation of chlorine, after the galvanic plates and the electro-magnetic apparatus had been used in vain.

Chlorine may be inhaled from a common dish or inhaling apparatus, by dropping any of the acids on a mixture of chlorinated lime, so that the gas may be disengaged slowly; but the best method of inhaling it, as well as iodine, is that recommended by Dr. Corrigan.[5] He properly remarks, that, in order for inhalation to have a fair trial, it is requisite, *first*, That the apparatus should be simple in its construction, and easily kept in order. *Secondly*, That it should be capable of keeping up a supply of vapour for any length of time, and that the evolution of the vapour should be steady and easily regulated. *Thirdly*, That it should also furnish a sufficient supply of aqueous vapour to prevent any irritation of the larynx, or lining membrane of the air-tubes; and, *fourthly*, and most important of all, that its employment should entail neither trouble nor fatigue on the invalid.

[1] Dublin Hospital Reports, vol. v.
[2] Treatise on Tubercular Phthisis, p. 84, Lond. 1834; also, Amer. edit. Philad. 1835.
[3] Elements of Mat. Med. and Therap. 2d edit. Lond. 1835.
[4] Dispensatory, p. 312. Edinb. 1842.
[5] Dublin Journal of Medical Science, March, 1839, p. 94.



To fulfil these objects, Dr. Corrigan advises the apparatus represented in the marginal figure. It consists of a light open iron-wire frame, about eighteen inches high, at the bottom of which is a spirit-lamp, A: at the proper height above it is an evaporating porcelain dish, about six inches in diameter, B: above this is a glass globe, C, with its neck downwards. In the neck of the globe is a cork, D, bored, and through the opening is drawn, moderately tight, a short plug of cotton wick, such as is used in a spirit lamp: in the glass globe at E, opposite the neck, is drilled a pin-hole, to allow air to pass in, according as the fluid within drops out through the neck. To use it, the porcelain dish is filled with hot water, the spirit lamp is lighted, and as soon as the water in the dish has begun to boil, the glass globe containing chlorinated lime, (if this be the substance used,) is placed as in the illustration. The rate, at which the fluid in the globe shall percolate the cotton wick and drop into the hot water beneath, is easily regulated. If it should not drop with sufficient rapidity, one or two of the threads of cotton may be removed. Should it drop too rapidly, this is corrected by pressing in the cork more tightly, or introducing one or two additional threads of wick.

Eight ounces of a saturated solution of *chlorinated lime* may be poured into the glass globe; and into the water of the porcelain dish, two ounces of the *diluted sulphuric acid* of the pharmacopœia. As the solution drops, the acid seizes on the lime, and the chlorine is evolved in connexion with aqueous vapour.[1]

Chlorine is but little used in this form, and can only be adapted for cases in which the pathological condition of the bronchial mucous membrane, or neighbouring parts, requires the exhibition of an excitant.[2] In this way, it may be occasionally serviceable in *chronic bronchitis;* but its administration requires great caution.[3] In cases of poisoning by hydrocyanic acid, as well as by sulphuretted hydrogen, it is a most efficacious agent. Chlorinated lime may be used for this purpose.

[1] London Medical Gazette, April 6, 1839, p. 49.

[2] Toulmouche, in Revue Médicale, Avril, 1834. See, on the various modes of inhalation, Sir C. Scudamore, in Lond. Med. Gaz., Feb. 7, 1840, and E. J. Coxe, Practical Treatise on Inhalation. Philad., 1841.

[3] Archives Générales, Avril, 1834; and a communication on the excellent effects of chlorine vapour in *catarrh*, in Gazette Médicale de Paris. June, 1838.

2. *By Fumigation.*—Fumigations of chlorine have been particularly recommended by Dr. Wallace, of Dublin.[1] They appear to resemble, in their action, the nitrous and nitro-muriatic acid baths, and have been especially employed in *liver diseases*, unaccompanied by inflammation, but in which there is a disturbance of the biliary secretion. According to Wallace, they are more certain than ablutions and baths of nitro-muriatic acid, and have the advantage, that their application subjects the patient to less inconvenience.[2] The good effects of chlorine, in such cases, have likewise been tested by Zeise,[3] in his bathing establishment at Altona. When chlorine is brought in contact with the skin, in this way, it soon occasions a pricking sensation; increase of transpiration; great afflux of fluids to the surface of the body, and sometimes a pustular eruption; increased secretion of saliva, urine, and bile; slight inflammation of the mouth and fauces, and impeded respiration and circulation. Dr. Mettauer is disposed to refer the action of the compound, in every case, to the presence of chlorine, and to believe, with Dr. Scott, of India, who first introduced the nitro-muriatic acid to notice, about thirty-three years ago, (1817,) that a solution of chlorine in water will answer, in all cases, as well as the acid. In the last edition of the Pharmacopœia of the United States, the following formula has been introduced for the preparation of the Acidum Nitro-muriaticum. Take of *Nitric acid*, f ℥iv., *Muriatic acid*, f ℥viij. Mix them in a glass vessel, and, when effervescence has ceased, keep the product in a well stopped glass bottle, in a cool and dark place.

Dr. Wallace found chlorine fumigations serviceable not only in *hepatic diseases with disordered secretion of the liver*, but in several other morbid conditions, as *hypochondriasis, cachexia*, and in all affections in which a prolonged excitation of the skin, and a restoration of its suppressed or impaired functions are esteemed serviceable,—hence, in *old cases of syphilis, scrofula, chronic catarrh*, and *rheumatism*. Generally, cathartics were combined with the fumigations, and the evacuations were constantly observed to present a highly bilious character. In *chronic cutaneous affections*, as in *lepra, psoriasis*, and *scabies*, these fumigations have been found useful; but, generally, fumigations of sulphurous acid are employed in preference, in consequence of the greater facility with which they can be prepared.[4]

Injections of chlorine gas have been employed for the radical cure of *hydrocele* by M. Deblois, of Tournay, and M. Decondé.[5]

[1] Researches respecting the Medical Powers of Chlorine, &c. Lond. 1822.

[2] See, on the Nitro-Muriatic Mixture, as a remedial agent, J. P. Mettauer, American Journ. Med. Sciences, Feb. 1840, p. 291.

[3] Nye Hygea udgived af C. Otto, 1825, and Hufeland und Osann's Journ. der prakt. Heilkund. B. lxiii. St. 1.

[4] Green on Diseases of the Skin, American Library edit. Philad. 1838.

[5] Bulletin Médical Belge, Janvier, 1836.

The gas is contained in a bladder, to which is attached a pipe and stop-cock adapted to the canula of the trocar, into which it is fixed after the fluid is evacuated; the stop-cock is then turned, and the bladder pressed so as to force the gas into the tunica vaginalis. When this is distended, the pipe and bladder are removed, and the thumb is placed over the mouth of the trocar, so as to prevent the issue of the gas for the space of two minutes; it is then allowed to pass, and two or three repetitions of the injection are made, which are sufficient for the cure. It would appear, that risk must be incurred from the injection of such an acrid substance, but M. Decondé says not.

Fumigations of chlorine, with the view of *destroying the matter of contagion*, and of *preventing the spread of contagious diseases*, have long been used.[1] As long ago as the year 1773, they were proposed for these purposes; and were subsequently extensively used by Guyton de Morveau; hence they have been called the "*Guytonian*," or "*Guyton Morveau fumigations.*" In fumigating the extensive general penitentiary at Milbank, Westminster, Dr. Faraday adopted the following method. One part of *common salt* was intimately mixed with one part of *black oxide of manganese;* the mixture was placed in a shallow earthen pan, and two parts of *oil of vitriol*, previously diluted with two parts by measure of *water*, were poured upon it,—the whole being stirred with a stick. Chlorine was liberated for four days. The quantities of the ingredients employed were 700 pounds of common salt, the same quantity of oxide of manganese, and 1400 pounds of sulphuric acid.[2]

Whatever may be the virtues of chlorine fumigations as an antibromic or smell destroyer, experience would seem to have shown that they are useless in preventing the spread of zymotic diseases. Possessed, as all the preparations of chlorine are, of potent antibromic virtues, it was natural to suppose, that they might equally destroy morbific miasmata, and therefore be valuable preventives of cholera, and other zymotic maladies. In the fever of the Niger, they were fully tried and totally failed, and there is no reason to believe that they are more effective in other forms. Some years ago, chlorine was employed at the Small Pox Hospital, London, with the view of arresting erysipelas in the wards.[3] The offensive smell was removed as usual, but the propagation of the disease appered to be unaffected. During the progress of cholera on the continent of Europe, in 1831 and 1832, extensive trials were made with it, but without any beneficial result.[4] At

[1] Link, Art. Chlor. in Encyclopäd. Wörterb. der medicin. Wissenschaft. B. vii. S. 575. Berlin, 1831.

[2] Pereira, Op. cit. p. 228.

[3] Pereira, Op. cit., 3d edit., i 371, Lond. 1849.

[4] Dierbach, Die Neuesten Entdeckungen in der Materia Medica, i. 411, Heidelberg und Leipzig, 1837.

a time when the Cholera Hospital at Moscow, was filled with clouds of chlorine,[1] the greatest number of attendants was attacked; and similar facts were noticed by distinguished observers in Berlin and elsewhere.[2]

When chlorine is evolved in the manner above described, it is liable, like all the acid gases, to the objection, that it is extremely irritating when respired. It cannot, therefore, be used in the sleeping apartments of the sick, although it may be employed beneficially after they have been withdrawn, and the object is to disinfect the chamber. It ruins all polished surfaces, but this can be effectually obviated by painting them over with a compost of starch. The chlorides are not liable to the same amount of objection, as they exhale the chlorine slowly.

LVII. CHLO'RINI AQUA.

Synonymes. Aqua Chlorinii seu Chlorinei seu Chlorata seu Chlorinica seu Chlori seu Oxymuriatica seu Oxygenata muriatica seu Oxygeno-muriatica, Liquor Chlori seu Chlorini seu Acidi Muriatici Oxygenati seu Alexiterius Oxygenatus, Chlorum liquidum, Solutio Chlorinii seu Alexiteria Oxygenata, Solution of Chlorine, Liquid Oxymuriatic Acid.

French. Chlore Liquide, Eau de Chlore.

German. Chlorwasser, Wasseriges Chlor, Chlorflüssigkeit, Dephlogistisirte oder Oxydirte Salzsäure, Uebersäure Salzsäure, Oxydirt Salzsäures Wasser.

This preparation is contained in many of the foreign pharmacopœias. It is in those of Austria and Anvers; and in the Batavian, Bavarian, Belgian, Danish, Dublin, Edinburgh, Parisian, Finnish, Hanoverian, Polish, Prussian and Swedish.[3] It has been more extensively administered on the continent of Europe than in this country or in Great Britain.

METHOD OF PREPARING.

The Prussian Pharmacopœia directs *chlorine gas*, made after the manner before described, to be passed into the bottles of a Woulfe's apparatus filled with *distilled water*, until two-thirds of the water are displaced: the bottles are corked under water, and the water is agitated until it takes up the gas. The liquid is then drawn off into small bottles, which are well filled, and kept in a dark place. In this way, liquid chlorine may be kept for a long time undecomposed. In its preparation, some little chlorohydric acid is formed, so that it has at times to be purified by treating it with a solution of nitrate of silver.

[1] Albers, Lond. Med. Gazette, viii. 40.

[2] Gérardin and Gaimard, Du Cholera-Morbus, 3ème édit., p. 110, Paris, 1833, and the author, in Report of the Sub-Committee on Cleansing the city (Philad.,) p. 15, Phila. 1849.

[3] Pharmacopée Universelle, i. 405. Paris, 1828.

The process of the Dublin Pharmacopœia is similar to this. That of the Edinburgh Pharmacopœia differs; and is as follows: Take of *Chloride of sodium*, sixty grains; *Sulphuric acid* (commercial,) two fluidrams; *Red oxide of lead*, three hundred and fifty grains; *Water*, eight fluidounces. Triturate the chloride of sodium and oxide together; put them into the water contained in a bottle with a glass stopper; add the acid, and agitate occasionally till the red oxide becomes almost white. Allow the insoluble matter to subside before using the liquid.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments made by Orfila[1] on dogs, it appears, that considerable doses of a moderately concentrated solution of chlorine prove fatal by exciting, sooner or later, inflammation of the stomach, accompanied with great languor; and when death takes place very rapidly, signs of organic alteration are met with in the stomach. In its action on the economy, chlorine is closely allied to the acids, and especially to the chlorohydric. Introduced into the stomach in moderate doses, solution of chlorine excites an agreeable feeling of warmth, which soon spreads over the whole of the body: in strong doses, according to L. W. Sachs, a kind of intoxicating stupor is induced by it, soon succeeded by prostration. It has been conceived to act equably as a moderate excitant of the nervous system, and thereby to moderate inordinate action in any part; and is, to a certain extent, antiphlogistic, without possessing any of the debilitating qualities of the antiphlogistics proper. In the opinion of some of the German pathologists, it powerfully stimulates the organic actions, especially the lymphatic and glandular systems, moderating inordinate secretion. Its antiseptic properties are likewise considerable. It would appear, however, that the number of observations has not been sufficiently great—although they have been by no means few—to allow of any comprehensive appreciation of its exact *modus operandi* on the human organism.[2]

EFFECTS ON THE ECONOMY IN DISEASE.

Although solution of chlorine is properly no new remedy, it is only of late years that it has been frequently administered. At the present day, in some countries, it is in common use. It is not long since Meurer maintained, that it is impossible to administer chlorine internally, and that in every case in which it was believed to have been given, the article really taken was chlorohydric or muriatic acid; for, owing to the affinity of chlorine for hydrogen, whenever any union takes place between it and organic matters, the chlorine, he affirmed, disappears, and chlorohydric acid alone exists, as he had proved by repeated experiments. In this

[1] Toxicologie Générale, i. 141.
[2] Riecke, Die neuern Arzneimittel, u. s. w. S. 30, Stuttgart, 1837.

assertion, however, he was opposed by many observers. Herzog and Bärmann came forward with experiments, to show that Meurer had gone too far in his deductions; and, from all the experiments, it would appear, that in prescribing *aqua chlorini* many mistakes had been, and—we may add—still are, committed. From Bärwald's experiments, it would appear, that if water which has rested on aromatic or other vegetable substances be chosen for the dilution of the solution of chlorine instead of distilled water, a difference is produced in the rapidity of the decomposition. In a mixture of aqua chlorini, distilled water, and simple syrup, the decomposition takes place tardily; but if, in place of syrup, a mucilaginous juice be substituted—for example, the syrupus althææ—acids are speedily formed; as well as when a decoction of althæa is substituted for distilled water; whereas a mixture of decoction of salep, (gr. v. to water ℥j.) syrup, and aqua chlorini, in well stopped bottles, remained undecomposed above twenty-four hours. In these experiments, however, the persistence of the smell and taste of the chlorine exhibited, that the whole of it had not been converted into chlorohydric acid. In the same manner as in the case of the decoction of marsh-mallows, the addition of infusum sennæ and infusum valerianæ, as well as of the solutions of extracts, and especially of liquorice, destroyed the smell of the aqua chlorini instantaneously, even when the taste of chlorine could still be detected. When the solution was combined with remedial agents that contained much colouring matter, the decomposition took place with great rapidity. From the results of these experiments, Bärwald advises aqua chlorini to be given in admixture with distilled water and simple syrup, as in this way only can we be sure that the patient has taken the chlorine undecomposed. Herzog lays it down as a rule, that the solution of chlorine should only be mixed with colourless transparent substances—water, simple syrup, gum Arabic or decoction of salep.

In respect to its administration in disease, it may be well to speak first of its internal use, which, in several morbid conditions, seems to have rendered good, and in some cases eminent, service. The following are the diseases in which it has been chiefly recommended:—

Irritative fever,—as in the violent irritative fever that occurs during the period of dentition; in which it has been administered with great success by Kopp, Mehlhausen, Göden, Trusen, and Riecke.[1] Dangerous determinations to the head have been, in this way, obviated, along with the unpleasant complications which are apt to be occasioned thereby. Toël[2] exhibited it in *convulsions during dentition*, which were accompanied by too great activity of vessels; and he affirms, that he has prescribed no remedy, which, in all respects, answered so well.

[1] Op. cit. S. 30. [2] Archiv. d. med. Erfahrung. März und April, 1825.

Nervous fever, especially when tending to the putrid character. In the *plague*, according to Wagner, it is of no avail; but in *putrid fever*, according to Kopp, it is highly useful. Spangenberg observed good effects from it in an *epidemic typhus* with hepatic derangement. It is likewise extolled in *typhus* by Wolf, Braun, Hufeland, and others; and by Sacco in the fever called *petechial*,—itself a typhus. Of late, it has been much used in Germany in *typhus abdominalis*, which corresponds to our *typhoid fever*, to oppose the origin and development of the intestinal ulcerations; but when the disease is farther advanced it has been found useless. It is especially recommended in this disease by Clemens, but he commonly premised the use of an emetic. Trusen considers the emetic unnecessary. He first applies leeches to the epigastrium, and then prescribes immediately aqua chlorini in considerable doses;—in lighter cases, a dram every two hours; and if the disorder of the head be already great, the tongue chapped and the peculiar expression of countenance present, he gives two drams every two hours. Bartels is less satisfied with the action of chlorine in *abdominal typhus*. It raises, he says, the sinking powers very speedily, but often excites the sanguiferous system, and not unfrequently increases the abdominal symptoms so palpably, that the physician is compelled to have recourse to other agents. Riecke[1] thinks, however, that it may be of essential service in this disease, which so frequently mocks the best directed efforts of the practitioner; and he suggests, that farther experiments are highly desirable, especially as those instituted by Trusen and others are not free from objection, by reason of their having associated substances with chlorine that quickly decompose it.

Carbunculus malignus (Milzbrandkarbunkel.)—In the variety of *malignant anthrax* caused by handling the skins of cattle, the internal and external use of chlorine has been found of essential service by Ettmüller, Herbst, Stumpf, and Hoffmann. The benefit derived from its use externally, in this and similar affections, induced Dr. Cramer[2] to try its effects on bad *furuncu-lous swellings*, the progress of which was surprisingly expedited, and the extension of the ulceration much limited, compared with what occurs under the use of poultices.

Scarlatina.—Pfeufer, Wendt, Kopp, and Trusen extol it highly in this disease for which, on theoretical grounds, it would seem to be appropriate, by reason of the great turmoil in the sanguiferous system,—indicated by rapidity of pulse and inordinate evolution of heat, which bear but little direct ratio to the degree of vital energy. Braithwaite, who, it is asserted, was one of the earliest, if not the earliest, that advised chlorine in scarlatina, sup-

[1] Op. cit. S. 33.

[2] Casper's Wochenschrift, No. 8, cited in Brit. and Foreign Medico-Chirurg. Rev. July, 1850, p. 278.

posed that it acted as specifically as the bark in intermittent, or mercury in syphilis! and Trusen asserts that it may be advantageously used in cases where other remedies have been found ineffectual. It is especially recommended by Braun and Spiritus in malignant scarlatina. Dr. Watson[1] says, that from several distinct and highly respectable sources, chlorine has been strongly pressed upon his notice as a most valuable remedy in the severest forms of scarlatina. His informants have stated, that whereas they formerly dreaded to be summoned to cases of that disease, they now, having had experience of the virtues of chlorine, felt no misgivings in undertaking its treatment. Dr. Watson himself has not had opportunities enough for trying it to speak confidently of its sanative power, but presumes that its disinfecting properties may account in part for the good it does. It probably deprives the foul secretions of their noxious quality. The author has often used it, but, in highly malignant forms of the disease, like every other agent, it fails. He gives it internally; sponges the surface with it; and employs it, or a solution of chlorinated lime or chlorinated soda, as a gargle. Dr. Cramer saw great relief follow its application to the neck, in a case of this disease in a child, in which suffocation was impending. He kept compresses well soaked in it to the part.

In other *febrile affections—small-pox*, *measles*, *rubeolæ*, &c.—it has been prescribed with advantage; and Dr. Schneider[2] strongly recommends it as a gargle in *small-pox* and *angina*. He applies it diluted with water, and finds it exert a remarkable ectrotic effect over *variola* when affecting the tongue and throat; and over *angina* in general. In *putrid dysentery*, (faulige Ruhr,) it is extolled by Nysten and Kopp; and in *intermittent*, by Kopp and Kretschmar. Trusen recommends it in the irregular, and especially in the anticipating forms, where danger exists of their becoming continued. Under its use, he found the paroxysms become regular, with perfect apyrexia, so that the ordinary febrifuges could be given advantageously. In *gastric fever*, Trusen trusted to it solely for the removal of the disease; he found that it corrected the morbid secretions from the mucous membrane of the digestive tube. Other physicians have also derived equally favourable results from its administration in that malady.

In *gastromalacia*, it has been prescribed by Rhades, Blasius, and Winter, but as Riecke,[3]—from whom this detail of the experience of the German practitioners has been chiefly taken,—properly observes, farther observation is necessary before we can decide as to its efficacy in such cases.

In *erysipelas*, especially of children, it has been recommended by Kopp.

[1] Lectures on the Principles and Practice of Physic, 2d Amer. edit., p. 1024. Philad. 1845.

[2] Cramer, Op. cit.

[3] Op. cit. S. 34.

In *inflammation of the liver*, favourable results were obtained from it in the Children's Hospital at St. Petersburg; and it exhibited, in these cases, the analogy to calomel in its action, which has been pointed out by many observers.

In *hydrophobia*, it has been used both internally and externally as a preventive, especially by the Italian physicians Brera, Previtali,[1] Ghisaldoni, Agliati, Arrigoni, Narcisi, and Anelli, whose experience is in its favour. Wendelstädt and Ruppius have likewise published favourably regarding it. It is obvious, however, that much fallacy may arise as to the precise agency of reputed preventives. Every one, for example, who may be bitten by a mad dog is not attacked with hydrophobia; and, unless great caution be used, any article may be regarded as a preventive. This is the main reason why we have so many preventives of this and other diseases.

Solution of chlorine has been advised by Ruppius and Mertzdorf in *dropsy*, especially *such as supervenes on the acute exanthemata*.

In the *diathesis phthisica*, it has been recommended by Göden, and has been affirmed to moderate the *hectic in phthisis*, and to make the remissions more marked. In these cases, it requires to be given in large doses, and to be exhibited for a considerable time.

In many cases of *chronic cutaneous affections* with diminished plastic energy, it has been used with success by Kopp.

In *noma* or *cancrum oris*, and in *fœtor of the mouth*, it has been recommended internally as well as topically; and, according to the experiments of Persoz, Nonat, and others, it renders eminent service in cases of poisoning by hydrocyanic acid.

Externally, it is used either pure, diluted with water, or in combination with oil. Godier affirms, that he cured *strumous swellings of the glands* by a cerate of chlorine. Eisenmann, Cullerier, and Blache recommend it—at times pure, at others diluted—in the way of injection, in *gonorrhœa* and *leucorrhœa*. It is employed, also, in *flabby*, *putrid*, and *offensive ulcers*, in *carbunculus malignus*, and in *chronic cutaneous affections*—as *tinea capitis*, *itch* (Deimann,) *herpes* (Alibert,) *asthenic aphthæ*, &c.

In *large abscesses* and in *buboes*, great advantage was derived by Mr. Cramer[2] from its external use. The matter was at times absorbed, and when this was not the case, the progress of the case was still very favourably influenced.

Lastly: ablution with a solution of chlorine, or of the chlorides, has been advised as a *preventive of venereal infection*. In *cancerous ulcers*, it corrects the unpleasant odour, and excites a new action in the part, causing the secretion of better pus: farther than this, we cannot expect much from it. Baths of it are recommended by Wagner as an excellent means for preventing the *plague*.

[1] Pratiche Osservazioni sull' Idrofobia, &c. Milan, 1820. [2] Op. cit.

Schönlein advises, that in *scarlatina* the whole surface of the body should be washed with a mixture of aqua chlorini and water, which he prefers to ablution with cold water.

Finally: aqua chlorini is occasionally sprinkled in the sick chamber, to *purify the atmosphere* during the prevalence of contagious or other diseases.

MODE OF ADMINISTRATION.

As already remarked, whenever aqua chlorini is prescribed, its facility of decomposition must be borne in mind. It is, for this reason, best to prescribe it, for internal administration, with water only,[1] or at most with the addition of simple syrup. For external use, water alone should be associated with it. As to the precise mode in which chlorine is affected by fatty substances, we have as yet no accurate knowledge; it may be calculated, however, that part undergoes decomposition. Such combinations have, notwithstanding, been found useful.

The solution should never be prescribed in quantity larger than is necessary for twenty-four hours, as by frequently opening the vessel in which it is contained, decomposition readily ensues. The vessel should be put in a dark place, and be surrounded by black paper.

The average dose for an adult, in the twenty-four hours, may be fixed at an ounce, although much larger quantities may be given without inconvenience. It is scarcely necessary to say that the precise dose must vary with the degree of concentration.

Unguentum chlorini.

Ointment of chlorine.

Unguentum oxygenatum ex tempore parandum.

℞. Aquæ chlorin. p. j.
Adipis p. viij. M.

Used in *itch.* *Pharmacopœia of Austria.*

Linimentum aquæ chlorini.

Liniment of chlorine.

℞. Aquæ chlorin. f ʒj.
Olei olivæ f ℥j. M.

Externally, in *obstinate itch*, *tinea capitis*, and *herpes*. *Deimann & G. A. Richter.*

℞. Ceræ albæ ʒij.
Leni calor. liquef. adde
Ol. amygdal. q. s.
ut fiat linimentum cui refrig. adde
Aq. chlorin. ʒiss. M.

Used externally in *ulcers*. *Ludwig.*

[1] Lepage, Journ. de Chimie Méd. cited in Encyclop. des Sciences Méd. Janv. 1842. p. 22.

Gargarisma aquæ chlorini.

Gargle of chlorine.

℞. Tragac. pulv. gr. xij.
Aquæ f ℥iv.
Aquæ chlorin.
Syrup. āā. f ℥ss. M.

To be used as a gargle in *ulceration* and *chronic inflammation of the mouth and fauces.* *Ratier.*[1]

LVIII. CHLOROFORMUM.

Synonymes. Chloroforma, Carboneum chloratum, Superchloridum formylicum, Chloroform, improperly called, by some, Chloric ether,[2] and Terchloride of Carbon.
French. Chloroforme.
German. Chloroform, Formylsuperchlorid.

This preparation, which was admitted into the Supplement of the last edition of this work, has acquired fresh interest, in consequence of its introduction and extensive employment as an anæsthetic in the same cases as sulphuric ether; which it has indeed, in the practice of many, wholly supplanted.

METHOD OF PREPARING.

Chloroform was discovered separately and about the same period by Mr. Guthrie,[3] M. Soubeiran,[4] and Liebig.[5] It is obtained in the following manner, according to the process of Mr. Guthrie. Into a clean copper still put three pounds of *chlorinated lime*, and two gallons of well flavoured *alcohol*, s. g. ·844, and distil. Watch the process, and when the product ceases to come over highly sweet and aromatic, remove and cork it up closely in glass vessels. The remainder of the spirit should be distilled off for a new operation. These proportions are not essential: if more chlorinated lime be used, the ethereal product will be increased; nor is it necessary that the proof of the spirit should be very high. Mr. Guthrie says he "has commonly used the above proportions and proof, and has every reason to be satisfied with them." From the above quantity he has commonly obtained about a gallon of *ethereal spirit.*

It may be obtained also in the following manner.[6] One part of *hydrate of lime* is suspended in 24 parts of cold *water*, and *chlorine* is passed through the mixture until nearly the whole lime is dissolved. A little more *hydrate* is then added to restore the

[1] Formulaire Pratique des Hôpitaux Civils de Paris, 3ème édition. Paris, 1827.
[2] Dierbach, Die neuesten Entdeckungen in der Materia Medica, iii. 930, Heidelberg, und Leipzig, 1847.
[3] Silliman's Journal, xxi. 64, Jan. 1832.
[4] Annales de Chimie et de Physique, xlviii. 131. Paris, 1831.
[5] Ibid. xlix. 146. Paris, 1832.
[6] Fownes, Elementary Chemistry, p. 339. Philad. 1845.

alkaline reaction: the clear liquid is mixed with one part of *alcohol* or *wood spirit*, and after an interval of 24 hours is cautiously distilled in a very spacious vessel. A watery liquid containing a little spirit, and a heavy oil collect in the receiver; the latter, which is the chloroform, is agitated with water, digested with *chloride of calcium*, and rectified in a water bath.

The most fragrant form is obtained by the action of chlorinated lime on alcohol. Dr. Christison[1] gives the following mode of preparing the article, which he and others have used so successfully as an anæsthetic. One pound avoirdupois of *bleaching powder*, with three pounds of *water* and three ounces of *rectified spirit*, yields, by distillation in a roomy vessel, about nine fluidrams of crude chloroform of the density 1·220. After this, the residuum begins suddenly to froth up. The crude chloroform, which is covered in the receiver by a stratum of weak spirit, is purified by shaking with it half its volume of *sulphuric acid*, gradually added; and water and alcohol being thus removed, the strong chloroform is freed of a little sulphuric acid by redistilling it from milk of lime or baryta. The product, which is pure chloroform, if the process be well conducted, amounts to about half a fluidounce. Dr. Christison has not found the quantity to be increased, as some have represented, by increasing the quantity of alcohol.

Chloroform is a transparent, colourless fluid, of the specific gravity 1·480; of a peculiar, fragrant, ethereal odour, resembling that of apples; and of an ethereal, slightly acrid, intensely sweet, taste. It speedily evaporates; and boils at 140° Fahr. It is readily soluble in alcohol and ether, but only in 2000 parts of water. It dissolves volatile oils, camphor, caoutchouc, wax, and resins. Its most frequent adulteration is with alcohol, which is easily detected by the reduction of its density.

Dr. W. Gregory,[2] however, ascribes the injurious effects of the chloroform in ordinary use to the presence of certain volatile oily impurities, which must be removed before it can be safely employed. These oils contain chlorine, have a disagreeable smell, and, when inspired or smelt, cause distressing headache and sickness. The test recommended by Dr. Gregory for these impurities is to agitate the chloroform with sulphuric acid, which should be quite colourless, pure, and of the full density of 1·840 at least. This, when agitated with impure chloroform, becomes yellow or brown, from its action on the oils, which it chars and destroys. Any change of colour is readily seen by the contact with the colourless chloroform that floats above. Pure chloroform gives no colour to the acid. Dr. Beatty[3] accords with Dr. Gregory in

[1] Dispensatory, Amer. edit. by R. E. Griffith, p. 974. Philad. 1848.
[2] Monthly Journal of Med. Science, May, 1850, p. 414; or Amer. Journ. of Pharmacy, Oct. 1850, p. 328.
[3] The Dublin Quarterly Journal of Med. Science, August, 1850.

the belief, that we have thus in our power a very simple means of testing and purifying chloroform before employing it.

EFFECTS ON THE ECONOMY.

The medical properties of chloroform are like those of sulphuric ether, than which, when sufficiently diluted, it possesses a more agreeable taste, so that it is readily taken even by children. Dr. H. Hartshorne[1] experimented with it on himself and others when in health. He found that seventy-five drops gave him a sensation of general diminution of consciousness and sensorial capacity. Sight, hearing, and touch were made less impressive; but no feeling of exhilaration or perversion occurred. He was drowsy. The pulse was not at all accelerated; it was, indeed, two beats slower in the minute; and the same effects were observed in two other medical gentlemen, from two or three times the quantity. One took over two hundred drops. He became very heavy, and, in a short time, passed into a sound sleep. In all of them, the influence had departed after an hour or two. No one felt as if he had taken alcohol, and in none was the pulse increased; and the conclusion with all of them was, that it is a direct sedative to the encephalic nervous system,—a sedative narcotic.

Chloroform is said to have been used with advantage in *asthma*, *spasmodic cough*, *atonic isthmitis*, "and other diseases in which a grateful and composing medicine is indicated."[2] In cases of *cancer* it has been given internally in the dose of two or three drops by Mr. Tuson,[3] and has produced sleep and perfect ease. As a local application to the cancerous part its action was of a sedative character. He also gave it with advantage in *uterine irritation* or *neuralgic affections of the uterus*. In such cases, he prescribed it internally, but in others, attended with obstinate discharge, it ought to be injected as well. In *obstinate vomiting*, three drops have "at once taken effect;" and in such cases Mr. Tuson has found benefit from applying it to the pit of the stomach. *In cancer of the pylorus*, "it has proved most efficacious in preventing the return of the food, and in relieving the pain and suffering of the patient." In *sloughing ulcers*, he has used it extensively, and he is not acquainted with a remedy more beneficial. "In *phagedæna*, there cannot be a more useful local application; but care should be taken to apply it only to the sloughing parts." "In *fungoid disease*, the application of the chloride of carbon has been very remarkable." Mixed with water, it is said to form a very useful gargle in *foul ulcerated sore-throat*, removing the fœtor, and giving the ulcers a healthy appearance. It is also, according to Mr. Tuson, of the greatest use

[1] Amer. Journ. of the Med. Sciences, p. 353, Oct. 1848.
[2] Dispensatory of the United States, 6th edit., p. 1242. Philada. 1845.
[3] Lond. Lancet, July 15, 1843, p. 553, and The Structure and Functions of the Female Breast, p. 410. Lond. 1846.

in *affections of the gums and teeth*, "removing the unpleasant stinging pains produced by the exposure of some nervous filament; and its use not only gives ease, but removes any unpleasant fœtor from the breath." Such is a picture—doubtless overdrawn by Mr. Tuson—of the efficacy of chloroform as a remedial agent.

As a narcotic, chloroform has been given internally in *asthma*,[1] *spasmodic cough*, *cancer*, *uterine irritation*, *hysteria*,[2] *neuralgia*,[3] *chronic vomiting from nervous causes*, *such as that which occurs in pregnancy*, and in short wherever sulphuric ether has been found of service.

As a sedative and soothing external application it has been used in *open cancer*, *sloughing ulcers*, *orchitis*,[4] *neuralgia*,[5] *neuralgic tooth-ache*,[6] *lumbago*,[7] *painful pelvic tumours*;[8] and as a collutory in *fœtor oris;* and internally it has been prescribed in *neuralgia*,[9] *flatulent colic;* in *cough*, as an addition to pectoral mixtures; and by M. Delcoux, in *intermittent fever*, who ascribes to it febrifuge and antiperiodic virtues. Soon after its discovery, it was prescribed by the Doctors Ives,[10] of New Haven, in *asthma*, *spasmodic cough*, *scarlatina*, and *atonic quinsy*, and with favourable results.

But its most interesting and important application is as an anæsthetic agent administered in the way of inhalation. As long ago as the year 1832 it was employed in this manner by Professor Ives,[11] of New Haven, in a pulmonary affection attended with great debility and dyspnœa, which was effectually relieved by it; but no farther attention appears to have been paid to it until Professor Simpson,[12] of the University of Edinburgh, instituted trials with it, and other anæsthetic agents, and found it infinitely more efficacious than any. In his first publication, after having tried it on upwards of fifty individuals, he detailed some striking cases of midwifery and surgical practice, in which it had been inhaled with the most satisfactory results. The main advantages which he conceived it to possess over sulphuric ether, were;—that a much less quantity is needed; that its action is much more rapid and

[1] M. Guillot, cited in Christison, Op. supra cit.; and Dispensatory of the United States, 8th edit., p. 1243. Philad. 1849.

[2] Formby, Christison's Dispensatory, p. 975. Philad. 1848.

[3] Mr. Tuson, Op. cit: also Wahu, Annuaire de Médecine, et de Chirurgie pratiques, pour 1850, p. 15.

[4] Buisson, L'Union Médicale, No. 4, cited in Brit. and Foreign Medico-Chirurg. Rev. July, 1850.

[5] Ranking, Half-yearly Abstract, ix. 219, Amer. edit. Philad. 1849. Tuson, Op. cit.; Hays and Bond, Transactions of the College of Physicians of Philadelphia, vol. 2, No. 6; and Laroque, Bulletin de Thérapeutique, Mars, 1849, p. 209.

[6] Pigeolet, cited by Wahu, Annuaire de Médecine, et de Chirurgie pratiques, pour 1849, p. 247.

[7] L'Union Médicale, 21 Oct. 1848. [8] Ibid. 31 Octobre, 1848.

[9] H. Hartshorne, Amer. Journ. of the Med. Sciences, Oct. 1848, p. 353.

[10] Silliman's Journal, xxi. 406. [11] Ibid.

[12] Account of a new anæsthetic agent as a substitute for sulphuric ether in Surgery, Edinb. 1847.

complete, and generally more persistent; its inhalation more agreeable and pleasant; and that being required in much less quantity, it is more portable and transmissible than sulphuric ether;—that recovery is usually more speedy, leaving fewer unpleasant feelings; and that it does not excite irritation of the bronchial tubes, is pleasant to the taste, and does not leave a disagreeable taint of the breath. As soon as the discovery was promulgated by Dr. Simpson, the inhalation of chloroform was largely employed in all cases in which the inhalation of ether had previously been directed. Experiments were made by numerous observers,—by Dr. Simpson[1] himself, Dr. Snow,[2] M. Sédillot,[3] Mr. Wakley, jun.,[4] Mr. Gruby,[5] MM. Duméril and Demarquay, M. Amussat,[6] M. Gerdy,[7] M. Jobert,[8] Mr. F. Sibson,[9] M. Coze,[10] and others, to determine its physiological action; from all of which it appears, that whilst chloroform is a much more potent agent than sulphuric ether, its action as an anæsthetic is essentially the same; MM. Duméril and Demarquay in their experiments on animals state, that ether and chloroform are rapidly fatal, when inhaled in very large quantity. Dogs were destroyed in thirty-five or forty-five minutes, and even in less time, by chloroform. When the inhalation of chloroform, like that of ether, is carried beyond a certain point, it is capable of producing death; and if not to this extent, convulsions and profound insensibility. Certain persons appear, too, peculiarly susceptible to its influence, so that disagreeable, and even dangerous phenomena may present themselves, when least expected. Many such cases have been recorded;—the disagreeable effects being chiefly,—vomiting, especially when the inhalation has been used soon after eating; headache, continuing for several hours; hysteric or tetanic convulsions, and formidable depression of the heart's action. The ordinary effects are described by Dr. Christison[11] as follows:—When inhaled in the dose of twenty or thirty minims from a handkerchief, it speedily occasions whizzing and pulsation in the head; a change in the apparent colour of objects; pleasurable ideas and visions; loss of consciousness, or a semi-conscious state, and either soft sleep, or tendency to laughter and jocularity, or propensity to incoherent talking, or boisterous turbulence; and when this state passes off, which happens in five or six minutes at most, there is little or no recollection of what has passed, and no remembrance of pain, even although pain may have

[1] Monthly Journal of Med. Science, Dec. 1847.
[2] Lancet, Feb. 12, 1848, and May 13, 1848. [3] Comptes rendus, p. 802. [4] Ibid.
[5] Bulletin des Académies. [6] Comptes rendus, Nov. 29, 1847.
[7] Comptes rendus, p. 803.
[8] Ibid. p. 806. See, also, Amer. Journ. of the Med. Sciences, July, 1848, p. 227.
[9] Lond. Med. Gaz., Feb. 1848.
[10] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 38.
[11] Dispensatory, Amer. edit., by R. E. Griffith, p. 975, Philad. 1848. See, also, a letter from Dr. Christison to M. Dumas, in Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 76.

been expressed. These phenomena closely resemble in nature and variety the effects of the inhalation of nitrous oxide gas. The effect on the heart's action is variable. The most frequent deviation, witnessed by Dr. Christison, is, some increase in the frequency and diminution in the force of the pulse; but often no distinct change takes place, and occasionally the pulse is strengthened. When a dose of a fluidram or more is inhaled in the same manner, the most frequent effect is the rapid induction of coma, with complete relaxation of the muscles; slow and often stertorous breathing; upturning and fixing of the eyes, and total insensibility to agents which cause, in ordinary circumstances, the most acute suffering. The pupils are variously affected, but always contractile. Frothing at the mouth is not unusual. Slight convulsive twitches of the face and limbs are more rare. The insensibility may begin in fifteen seconds, and is rarely postponed beyond two minutes, if the chloroform be skilfully applied. It continues usually between five and ten minutes, but sometimes for two hours, if the inhalation has been kept up for some time by renewing the chloroform on the handkerchief. Sometimes quiet sleep succeeds; more generally a drowsy, dreamy state, but not unfrequently rapid, complete consciousness and activity. In general, no recollection is retained of any occurrence during the state of insensibility. For the most part, there is no remarkable subsequent effect; no lassitude; no headache; no sickness; no loss of appetite; but occasionally there is a little weariness or sickness.

Such is the statement of one who is partial to the administration of chloroform. He admits, however, that other results have been observed, which he regards as anomalies, depending upon constitutional peculiarities or impurities in the chloroform. "I have witnessed," he remarks, "violent tetanic spasm twice in the healthy state; and once in delirium tremens, but without any ill consequence: hysteric agitations, contortions, and screaming, have also been witnessed, but without any ultimate harm; and during both of these affections there has been no recollection afterwards of any uneasiness. Sickness and vomiting have sometimes occurred, chiefly, according to my observation, when the remedy was used too continuously so as greatly to obstruct the breathing. Relaxation of the sphincters is an untoward accident, which is not so frequent as might be expected. The only really formidable affection is sinking of the pulse, as in the case adverted to above; and this seems a rare occurrence."

It is undoubted, however, that unpleasant and even alarming phenomena have been produced by it in the experience of Mr. Beales,[1] Mr. R. Stewart,[2] Mr. W. W. Gull,[3] Dr. Mitchell,[4] Dr.

[1] Lond. Med. Gaz., Dec. 24, 1847. [2] Ibid. Jan. 1848. [3] Ibid. Dec. 1847.
[4] Ibid. Jan. 1848, from Dublin Med. Press.

Nevins,[1] Dr. Reed,[2] Mr. Tomes, Dr. Webster,[3] (insanity induced,) Dr. John Snow,[4] Dr. C. H. Cragin,[5] M. Michon,[6] Delarue,[7] and others, and fatal cases ascribed to its deleterious agency have been recorded by Mr. Meggison,[8] Dr. R. Jamieson,[9] Mr. Robinson,[10] M. Gorré,[11] Dr. Anderson,[12] M. Robert,[13] R. O. Johnston,[14] M. Confevron,[15] and others.[16]

According to M. Gruby, during the inspiration of chloroform, the arterial blood retains its florid hue, and if, under asphyxia, it assumes the dark venous character, the red colour is speedily restored; yet by others[17] a highly venous appearance of the blood issuing from the arteries has been noticed; and M. Robin[18] ascribes the anæsthesia induced by it and ether to their preventing the complete conversion of venous into arterial blood. Like ether, chloroform is capable of inducing local anæsthesia,[19] by dipping the part in it, or applying it externally by means of lint,—a fact, which was noticed before it was employed as an anæsthetic in the way of inhalation, and led to its use as a local agent by Mr. Tuson and others. Its influence in deadening the sensibility of a part has been recorded also by M. Gruby,[20] Mr. Nunnely,[21] Dr. Simpson,[22] Mr. Spry,[23] M. Jules Roux,[24] Mr. Higginson[25] and others.

No sooner were the anæsthetic properties promulgated by Prof. Simpson than it was employed in all the cases in which the inhalation of ether had been prescribed. It was given in the various *Neuroses*. In

[1] Lond. Med. Gazette, Mar. 1848. [2] Lancet, April 29, 1848.
[3] Lond. Med. Gazette, Jan. 1850, and Psychological Journal, April, 1850.
[4] Edin. Med. and Surg. Journal, cited in Amer. Journ. of the Med. Sciences, July, 1850, p. 169. [5] Med. Examiner, April, 1848, p. 223.
[6] Archives Générales de Médécine, Juillet, 1850, p. 370.
[7] Ibid. Sept. 1850, p. 105.
[8] Med. Times, Feb. 5, 1848. [9] Lond. Med. Gaz., Feb. 26, 1848.
[10] Medical Times, cited in Ranking's Half-yearly Abstract, Amer. edit. viii. 220, Philad. 1848.
[11] Lancet, July 4, 1848. See a fatal case, occurring in Cincinnati, in Western Lancet, Mar. 1848; and another at Hyderabad, in Scinde, in ibid., July 22, 1848. [12] Ibid.
[13] Cited in Medical Times, July 22, 1848.
[14] Provincial Medical and Surgical Journal, July 26, 1848.
[15] Cited in Lancet, Nov. 17, 1849.
[16] Lond. Med. Gazette, Jan. 1849. See, on the injurious and fatal effects of chloroform, J. C. Warren, Amer. Journ. of the Med. Sciences, April, 1849, p. 379; and Effects of Chloroform and of strong Chloric Ether, as narcotic agents, Boston, 1849; Dr. Snow and others, in Amer. Journal of the Med. Sciences, July, 1849, pp. 274–278; also, a Discussion before the Academy of Medicine of Paris, on the action of Chloroform, by MM. Malgaigne, Amussat and Guérin, cited in Med. Times, Nov. 25, and Dec. 2, 1848, and Lancet, Feb. 2, 1849; and in Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 90.
[17] Provincial Med. and Surg. Journ., Feb. 9, 1848.
[18] Archives Générales de Médecine, Février, 1850, p. 238.
[19] Boston Med. and Surg. Journal, April, 1848.
[20] Lond. Med. Gazette, Dec. 24, 1847.
[21] Provincial Medical and Surgical Journal, June 28, 1848.
[22] Monthly Journal of Med. Science, 1847–48, p. 451.
[23] Provincial Medical and Surgical Journal, Aug. 28, 1848.
[24] Gazette des Hôpitaux, 7 Nov., 1848.
[25] Lond. Med. Gazette, Jan. 1849.

Tetanus, successful cases were recorded by Mr. Geo. Sloman,[1] Mr. R. L. Baker[2] and Dr. E. H. Clarke.[3] M. Forget[4] and M. Jules Roux[5] refer to seven cases of cure, against six of want of success. Dr. C. A. Worthington[6] has reported a case in which it afforded great relief, but did not prevent the fatal termination.

Hydrophobia. One case of this almost intractable malady has been recorded in which it was successful; and others[7] in which it greatly relieved the intense suffering from the spasms; but on the other hand, in a case by Mr. S. B. Denton[8] it augmented them. A case of *hydrophobic mania* was treated happily with it by Mr. R. Y. Ackerley;[9] and one of presumed hydrophobia, under the care of Professor Jackson[10] of Philadelphia, is reported as having been cured by it. Dr. Jackson inclines to the belief that the case was one of true hydrophobia; but the published details do not lead the author to the same conclusion. In

Neuralgia, it was prescribed with advantage, by Dr. Protheroe Smith, Mr. Sibson[11] Dr. D. Brainard,[12] and others; and in

Chorea, by Mr. Harris[13] and Mr. Sibson.[14]

In *delirium tremens*, by Dr. P. Smith; and it was used with great success in inducing sleep, by Dr. Joseph Parrish[15] and Dr. Whiting.[16]

Insanity. Dr. M'Gavin[17] and Dr. E. B. Moore[18] found it an excellent sedative and hypnotic; and in *sick headache*, Dr. P. Smith prescribed it with advantage. It was also given with great benefit in *typhus*, as a sedative and hypnotic, by Dr. Fairbrother,[19] in

Asthma, by Mr. Chandler,[20] Mr. Greenhalgh,[21] and Dr. Cragin;[22] in

Hooping cough, by Dr. Protheroe Smith; in

Colic, by the same gentleman, and by Dr. Cragin;[23] in

Nephritic colic, by Drs. Bowditch and A. Stillé;[24] in

[1] Provincial Med. and Surg. Journ., Sept. 5, 1849.
[2] Ibid., May 31, 1848, and Lancet, June 3, 1848.
[3] Amer. Journ. of the Med. Sciences, July, 1849, p. 75.
[4] Cited in Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre, 1849, v. 190, Erlangen, 1850.
[5] Revue Médico-Chirurg. Nov. 1848, cited in Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 101. [6] Provinc. Med. and Surg. Journ., April 19, 1848.
[7] Ranking's Half Yearly Abstract, &c., viii. 212, Amer. edit., Philad. 1848, and T. T. Smiley, Med. Examiner, April, 1848, p. 223.
[8] Provincial Med. and Surg. Journ., Oct. 31, 1849. [9] Lancet, July 29, 1848.
[10] Transactions of the College of Physicians of Philadelphia for January and April, 1849. [11] London Med. Gazette, March 31, 1848.
[12] North-Western Med. and Surg. Journal, Sept. 1849.
[13] Lancet, June 3, 1848. [14] London Med. Gaz., Feb. 4, 1848.
[15] New Jersey Medical Reporter, July, 1848.
[16] Ohio Med. and Surg. Journ., March, 1849. See, also, Zeitschrift für die Gesammt. Medicin, April, 1850, No. 4, S. 553.
[17] Report of Montrose Asylum, 1848, cited in Monthly Journal of Med. Sci., Oct. 1848.
[18] Boston Med. and Surg. Journal, April 4, 1849.
[19] Lancet, Jan. 28, 1848. [20] Provinc. Med. and Surg. Journal, Jan. 29, 1848.
[21] Lancet, Dec. 4, 1847. [22] Medical Examiner, April, 1848, p. 227. [23] Ibid.
[24] Transactions of the College of Physicians of Philadelphia, vol. ii. No. 6.

Biliary calculus, by Dr. P. Smith; in

Dysmenorrhœa, by the same gentleman, and by Drs. J. H. Bennett[1] and Dr. Withers;[2] in

Bronchitis, by Mr. Brown;[3] in

Cholera morbus, it has been employed successfully by Mr. Brady and Mr. Plummer;[4] and in

Cholera, by Dr. James Hill, Dr. Ferguson,[5] and Dr. A. Bournonville.[6] With others, however, as Dr. W. Robertson,[7] it has only succeeded in relieving the distressing cramps. Lastly, in

Feigned diseases, it has been used in the way of detection; but the same objections apply to it as to other anæsthetics. (See page 71.)

In regard to the employment of the inhalation of chloroform as an anæsthetic in surgical operations, the same remarks are applicable as were made on sulphuric ether. Wherever a powerful anæsthetic, anodyne and relaxant was needed, chloroform has been had recourse to, and the highest testimonials have been brought forward in its favour by the most distinguished surgeons of all countries. On this side the Atlantic, ether inhalation is, perhaps, more employed, and is generally considered safer; but there are many who prefer chloroform.[8] In obstetrical practice it has been largely administered; and the same objections have been urged against its employment in a *natural* process, as in the case of sulphuric ether.[9] Since its first introduction by Dr. Simpson, it has been extensively used in Edinburgh, to subdue the sufferings of childbearing; and it is impossible to extol any agent more highly than it has been. "Its effect," says Dr. Christison,[10] "is perfect, and may be maintained uninterruptedly for many hours, without influencing the frequency or force of the uterine contractions, and without any eventual harm. It is only when the deepest coma, with suffocative stertor, is brought on, that the uterine contractions are apt to be arrested for a time;—a property which may be taken advantage of to facilitate the operation of turning."

From a careful and dispassionate inquiry into its effects in such cases, Dr. Murphy[11] is of opinion, that it does not interfere with

[1] Lancet, Feb. 19, 1848. [2] Western Journal of Med. and Surg., Feb. 1849.

[3] Lancet, Dec. 4, 1847.

[4] London Med. Gazette, Sept. 16, 1848. [5] Dublin Med. Press, Nov. 8 and 18, 1848.

[6] Medical Examiner, Aug. 1849. [7] Monthly Journal of Med. Science, Dec. 1848.

[8] On the Value of Anæsthetics, and especially of Chloroform in Surgery. See Surgical Experience of Chloroform, by James Miller, F.R.S.E. Edinburgh, 1848. Prof. Lizars, Med. Gazette, June 8, 1849, and the Reports of the Committees on Surgery in Transactions of the American Medical Association, vols. i. and iii. Philad. 1848-50.

[9] See page 72, and Ranking's Half-yearly Abstract, vii. 252. American edition, Philad. 1848, for the views of Drs. Ranking, Simpson, Roland, Tyler, Smith, and others; and Ibid. viii. 241. Philad. 1849.

[10] Dispensatory, edit. cit. p. 976. Philad. 1848.

[11] Chloroform in the Practice of Midwifery, cited in Ranking, loc. cit., and Monthly Journal of Medical Science, Dec. 1849.

the parturient action of the uterus, unless given in large and unnecessary doses;—that it causes greater relaxation of the passages and perineum, and a greater secretion from the mucous membrane of the vagina; subdues nervous irritation, caused by severe pain; restores nervous energy; secures the patient perfect repose for some hours after delivery,—and that its injurious effects, when an ordinary dose is given, seem to be dependent upon constitutional peculiarities or improper management.

Its value in natural labour and operative midwifery has been deposed to by numerous observers;—by Mr. Brown,[1] Dr. Nevins,[2] Messrs. Clifford, Fearn, Wilson, M. Richet,[3] Dr. Protheroe Smith,[4] and by Drs. Keith, Moir, Malcolm, Thompson, Purdie, Cumming, and numerous others, cited by Dr. Simpson,[5] as well as by Dr. Denham,[6] Dr. Henry Bennett,[7] Dr. Geo. N. Burwell,[8] Dr. J. P. White,[9] Dr. Channing,[10] Dr. C. H. Cragin,[11] Dr. Lindsly,[12] Dr. Beatty,[13] Dr. Trask,[14] and others.

In labours complicated with *puerperal convulsions*, good effects have resulted from it in the practice of Mr. W. J. White,[15] Mr. Fearn,[16] Mr. Clifton, Dr. J. P. White,[17] Dr. Channing,[18] Dr. S. N. Harris,[19] Dr. Harding,[20] Dr. Keith,[21] and others.

Dr. Ranking[22] has recently remarked, that if he may judge from the tenor of numerous private communications, there seems to be a growing indisposition, in England at least, to the employment of anæsthetics in natural labour, although he is not prepared to say, that the trouble attending the use of the agent has not something to do with the objection. In instrumental and other forms of complicated labour, he believes they are still much employed by the leading accoucheurs of England; whilst, in Scotland, the withholding of them, even in natural labour, is almost the excep-

[1] Lancet, Dec. 4, 1847. [2] London Med. Gazette, March, 1848.
[3] Ranking's Half-yearly Abstract, vii. 255. Philad. 1848.
[4] Lancet, Nov. 27, 1847.
[5] Monthly Journal of Med. Science, October, 1848; and Ranking, op. cit., viii. 242. Philada. 1849. [6] Dublin Quart. Journal of Med. Science, Aug. 1849.
[7] London Journal of Med., March, 1850. [8] Buffalo Med. Journal, Nov. 1848.
[9] Ibid. Sept. 1848. [10] Dr. Parkman, Amer. Journ. of Med. Sci., July, 1849, p. 41.
[11] Medical Examiner, April, 1848, p. 228.
[12] Ibid. June, 1848, p. 340; and Report of the Committee of Obstetrics, Dr. Lindsly Chairman, in Trans. of the Amer. Med. Association, i. 228, Philada. 1848, and Supplement, containing the favourable Testimony of Prof. Channing, Dr. E. J. Marsh, Dr. J. C. Bennett, Dr. M. B. Wright, Dr. Moultrie, Dr. Gross, Dr. Jas. Stewart, &c.; also, Report of the same Committee, Dr. Gilman, Chairman, in Transactions, &c., ii. 241. Philad. 1849.
[13] Dublin Quart. Journal of Med. Science, Aug. 1850, p. 341.
[14] Amer. Journal of the Med. Sciences, July, 1850, p. 341.
[15] Lancet, March, 1848. [16] Lond. Medical Gazette, Feb. 11, 1848.
[17] Buffalo Med. Journal, Sept., 1848.
[18] A Treatise on Etherization in Childbirth, Boston, 1848.
[19] Charleston Med. Journal, Sept., 1848.
[20] Boston Med and Surg. Journal, Feb. 21, 1849.
[21] Monthly Journal of Med. Science, August, 1850.
[22] Half-yearly Abstract, &c., x. 266, Amer. edit. Phila. 1850.

tion. Dr. Rigby is satisfied, that a sufficient immunity from suffering may be attained without annihilating consciousness, and advises, that not more than ten or fifteen drops should be used at a time, by which the patient may have the sensations of pain much mitigated, and, at the same time, be perfectly conscious of its occurrence; and a similar view is entertained by Professor Lindsly,[1] of Washington, and by Professor T. E. Beatty,[2] of Dublin. It would appear, from the observations of Drs. Murphy and Beatty, that the first effect of a good dose of chloroform is to arrest uterine action for a short time, so that if the pains be slow and feeble, they may be more certainly interfered with; and to obviate this result, Dr. Beatty[3] associates with it ergot, which he has found to answer a valuable purpose.

MODE OF ADMINISTRATION.

The dose in which Mr. Tuson administers chloroform is from one to four or five drops; but others go as high as a tea-spoonful, diluted with water, or sugar and water, or mucilage. In neuralgic affections it appears to have given the greatest relief in the form of liniment, composed of *linimentum saponis* seu *linimentum camphoræ*, f ℥ij., *chloroform.* f ʒj., to be carefully rubbed over the affected part; or the chloroform may be applied by means of a rag wetted with it.

As a wash, injection, and gargle, Mr. Tuson prescribed it diluted with water, in the proportion of one or two drams to the pint; but as an application to the sound skin, it is generally used undiluted—being applied by means of lint or soft rags, covered with oiled silk to prevent evaporation. When employed undiluted, it ought to be pure, as, according to Mialhe and others, when it contains absolute alcohol it acquires caustic properties, and excoriates the surface with which it is made to come in contact. Dr. Hayward,[4] indeed, ascribes such properties to the chloroform itself.

The dose for inhalation is a fluidram at a time, which must be renewed in two minutes, if the desired effect be not induced. According to Dr. Christison,[5] there seems to be no limit to the safe repetition of it. Dr. Simpson has used eight fluidounces in thirteen hours, in a case of labour. The patient, he says, experiences least annoyance, and is least apt to show a precursory stage of excitement, when a full dose is used at once. Professor S. Jackson[6] has related the case of a lady, labouring under stricture of the upper portion of the rectum, with convulsions and peculiar spasms, who, by gradually increasing the quantity as the effects

[1] Medical Examiner, June, 1848, p. 340.
[2] Dublin Quarterly Journal of Med. Science, Aug. 1850, p. 6. [3] Ibid. p. 8.
[4] Remarks on the Comparative Value of the different Anæsthetic Agents. Bost. 1850.
[5] Dispensatory, American edit., by R. E. Griffith, p. 977. Philad. 1848.
[6] Transactions of the College of Physicians of Philadelphia, vol. ii. No. 6.

diminished, inhaled, in the course of an evening, two ounces; then two ounces more, and another ounce in the course of the night—making five ounces, from 5 o'clock, P. M. until 10 o'clock the next morning. Dr. Jackson, having been sent for in consequence of the mother's alarm at the quantity of chloroform used, found her with a feeble pulse, diminished temperature of the body, and considerable mental excitement. She remained cold and nearly pulseless for forty-eight hours, when the effects disappeared.

As in the case of the inhalation of sulphuric ether, various forms of apparatus have been invented for the inhalation of chloroform, some of which have been figured in another work.[1] They are all, however, admitted to be unnecessary. A small muslin or silk handkerchief, twisted into a hollow cone, or into the form of a bird's nest, moistened with chloroform, and held near the nose or mouth of the patient, is the arrangement adopted by Dr. Simpson, and most operators. In this way, a due admixture of atmospheric air may be insured, and the risk of apnœa avoided. When the effect produced is greater than is desired, the patient should be placed in the horizontal posture; cold air be fanned across the face, and cold water be dashed or poured over the forehead and head. Ammonia may be inhaled; and, in more urgent cases, it has been advised, that the physician should blow into the mouth of the patient for the purpose of artificial respiration, if no apparatus be at hand. It has been suggested, too, that it would not be an idle provision to have an electro-magnetic machine in operation. As soon as the patient is able to swallow, stimulants may be administered internally; but under the apprehension that the respiration might otherwise be farther embarrassed,[2] it has been recommended that they should not be given until he has revived in some measure.[3]

Like ether, chloroform vapour has been administered *per anum* by Pirogoff, Brömme, Körner, and Seifert.[4]

Under the names CONCENTRATED CHLORIC ETHER, and STRONG CHLORIC ETHER, a compound of pure *chloroform* and nearly *absolute alcohol*, composed of one-third of the former to two-thirds of the latter has been employed by Dr. J. C. Warren[5] and others; but Dr. Bache[6] has properly suggested that, as the name chloric ether was originally applied by Dr. T. Thomson to the "Dutch liquid," or "chloride of olefiant gas," it would be well to abandon the appellation for either chloroform or its union with alcohol. Correct names, as he remarks, for the latter combination would

[1] General Therapeutics and Mat. Med. 4th edit. i. 386. Philad. 1850.
[2] C. H. Cragin, Med. Examiner, April, 1848, p. 227.
[3] Christison, Dispensatory, p. 977.
[4] Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre 1849, v. 190, Erlangen, 1850.
[5] Effects of Chloroform and of strong Chloric Ether, as narcotic agents. Boston, 1849.
[6] The Dispensatory of the United States of America, 8th edit. p. 1245. Philad. 1849.

be either *alcoholic solution of chloroform*, or *tincture of chloroform*.

By Dr. Warren, and others, this preparation has been regarded as safer than chloroform, and more agreeable than sulphuric ether; but if the unpleasant effects of chloroform be owing, as has been supposed by some, to its not being pure, it is not easy to see how the chloric ether can be safer than chloroform.[1] The preparation sold in London and elsewhere under the name "chloric ether," is said to be a weak tincture of chloroform, of variable quantity, containing at most but 16 or 18 per cent. of chloroform, and at times not more than 5 or 6 per cent.

According to a Report of the Standing Committee on Surgery of the American Medical Association, of which Dr. Mussey was chairman,[2] there are two kinds of chloric ether—the chloric ether of commerce, consisting of one part of *chloroform* to fifteen of *alcohol;* the other, more concentrated, composed of *chloroform* one part, and *alcohol* nine parts—the latter, the one employed for anæsthetic purposes. It is a much weaker article than those above mentioned. Cases of the successful use of chloric ether, as an anæsthetic in surgical operations, are given by Dr. Warren;[3] and Dr. Channing[4] employed it successfully in obstetric practice. Dr. Hayward,[5] however, states that he cannot divest himself of the belief, that chloric ether is an unsafe anæsthetic, when he considers that it is simply chloroform diluted with alcohol. "It is true," he remarks, "that as far as we know, no fatal effects have hitherto followed its inhalation; but it is also true, that it has as yet been used to a very limited extent, and in all the cases in which it has been exhibited, that have come to my knowledge, it has been managed with great caution and judgment. But I fear, that if it be used with the same freedom that sulphuric ether is, we shall soon have to record some very different results. We cannot feel confident that it will always be confided to skilful hands only, nor by any means certain that death, when not looked for, may not follow its exhibition."

When it comes in contact with the unprotected skin, it acts upon it—Dr. Hayward says—in the same manner as chloroform. He thinks, too, that it is more apt to induce disagreeable encephalic disorder than ether.

[1] Hayward, Remarks on the Comparative Value of different Anæsthetic Agents. Boston, 1850.

[2] The Transactions of the American Med. Association. iii. 323, Philad. 1850; and Amer. Journ. of the Med. Sciences, April, 1849, p. 379.

[3] Op. cit. and Transactions of the Amer. Med. Association, iii. 385.

[4] A Treatise on Etherization in Childbirth, illustrated by five hundred and eighty-one cases, Boston, 1848; and Dr. S. Parkman, Amer. Journ. of the Medical Sciences, July, 1849, p. 42.

[5] Remarks on the Comparative Value of the different Anæsthetic Agents. Boston, 1850.

A COMPOUND ETHER has also been employed, which consists of a solution of *chloroform* in *sulphuric ether*. It was formed on the suggestion that ether alone is too slow and uncertain, whilst chloroform itself is too rapid and hazardous in its effects; and hence, the union of the two, it was conceived, might act more gradually and safely. Under its influence, amputations were performed by Dr. Cox at the Bellevue Hospital with favourable results.[1]

Sulphuric ether, chloroform, and chloric ether, and compound ether are the anæsthetics most frequently employed; and it may be interesting to state the preferences of different practitioners for one or other of them, as enumerated in the Report of the Standing Committee on Surgery of the American Medical Association, of which Dr. Mussey, of Cincinnati, was chairman.[2] Dr. Hayward, of Boston, expresses a strong preference for sulphuric ether. It is preferred, too, by Dr. Horner, of Philadelphia. Dr. J. C. Warren, and his son, Dr. John Mason Warren, Professor Knight, of Yale College, and Dr. A. L. Pierson, of Salem, Massachusetts, employ chloric ether exclusively. Dr. D. M. Reese, of the Bellevue Hospital, New York, uses a mixture of one part of chloroform with two parts of sulphuric ether, by weight; and when the patient is less impressible, chloroform alone. Dr. Pope, of St. Louis, employs either chloroform alone or in combination with ether. Dr. Brainard, of Chicago, uses pure ether, or three parts of ether to one of chloroform. Dr. Washington L. Atlee, two parts of ether to one of chloroform, liquid measure. Dr. Howard, of Columbus, Ohio; Dr. Twitchell, of New Hampshire; Dr. Eve, of Augusta, Georgia, now of Louisville; Dr. Gross, of Louisville, now of New York; Dr. Shipman, of Syracuse, New York; Dr. Hamilton, of Buffalo, and Dr. Mussey, prefer chloroform; and the last gentleman remarks, that were he to employ any other anæsthetic than simple chloroform, he would select the mixture of it with ether—one measure to two, as employed by Dr. Atlee; as from several trials he has made, he thinks the pulse is rather better sustained than under chloroform alone.

It appears then that each of these anæsthetics has its advocates; and, perhaps, under careful management no decided preference need exist.

The vapours of sundry other substances—of *chlorohydric* and *nitric ethers*, of *bisulphuret of carbon*, of *chloride of olefiant gas*, of *benzin*, *aldehyde*, *light coal tar naphtha*,[3] &c. &c.,

[1] Channing, a Treatise on Etherization in Childbirth, p. 30. Boston, 1848.
[2] Transactions of the American Medical Association, iii. 323. Philad. 1850.
[3] Professor Simpson, Monthly Journal of Medical Science, April, 1848. Bouchardat, Annuaire de Thérapeutique pour 1849, p. 107—111. H. J. Bigelow, Transactions of the Amer. Med. Association, i. 197, Philad. 1848; and Report of the Committee on Surgery, Dr. N. R. Smith, chairman, Ibid. vol. 2, p. 213. Philad. 1849.

have been inhaled, and produced anæsthetic effects analogous to those of ether and chloroform, but they are not employed.[1]

LIX. CHONDRUS.

Synonymes. Fucus Crispus seu Irlandicus, Lichen Carrageen, Chondrus Crispus seu Polymorphus, Sphærococcus Crispus, Ulva Crispa, Irish Moss, Carrageen, Carragaheen or Corigeen Moss.

French. Mousse d'Irlande, Mousse Perlée.

German. Krauser Tang, Seetang, Carragaheenmoos, Irländisch Moos, Irländisch Perl-oder Seemoos, Geperltes Seemoos, Krauser Knorpeltang.

Although Carrageen or Irish moss has long been used in Ireland, it was but little employed in other parts of Europe, or in this country, until within the last few years. Of late, it has been used precisely in those cases in which *Lichen Islandicus* or Iceland moss has been deemed appropriate. In Germany, the first trials were made with it in the year 1833, by Von Gräfe of Berlin, and the results were given to the world in his report for that year,[2] of the Clinical, Surgical and Ophthalmic Institute, attached to the Frederick William University.

Chondrus, which belongs to the Natural Family Algæ, exists in the Atlantic Ocean, on the coasts of England, Ireland, western France, Spain, and Portugal, and as far as the tropics. It is also said to be a native of the United States. It is met with more abundantly, however, in Ireland, especially in Clare, where it is used by the poor as an article of diet. It is thrown on the shore by the waves, and is gathered at the time of the ebb.[3]

Irish moss, when fresh, is of a purple-brown or purple-red colour, and somewhat resembles Iceland moss; but when dried, as we meet with it in commerce, it is mostly yellowish or dirty white, but intermixed with purplish-red particles, and resembles laminæ of horn: it is crisped, translucent, and frequently contains small shells, calcareous concretions, and grains of sand. It has not much taste; the smell seems to betray iodine, which, however, has not been detected in it. When the moss is chewed, it feels like so much cartilage, but, by the moisture and warmth of the mouth, it soon loses its brittleness. It contains a little chloride of sodium.[4]

The jelly obtained from it is transparent and colourless, its

[1] Amer. Journ. of the Med. Sciences, April, 1849, p. 528. Nunneley, Provincial Med. and Surg. Journ. March 7, 1849.

[2] Bericht über das klinische chir. augenärztliche Institut. der k. Friedr. Wilh. Univers. für d. J. 1833. Berl. 1834.

[3] Pereira, Elements of Materia Medica and Therapeutics, ii. 874. Lond. 1842; or 2d Amer. edit., by Carson. Philad. 1846.

[4] E. Gräfe in Art. Fucus. Encyclopäd. Wörterb. der medicinischen Wissenschaft. xiii. S. 1. Berlin, 1835.

taste is by no means disagreeable; it keeps several days, and is not converted by muriatic acid into mucus, like the jelly which is obtained from land plants. It exists in the proportion of 79.1 *per cent.*, and has been considered to consist of pectin in large proportion, and starch; but Dr. Pereira[1] esteems it a peculiar principle, and gives it the name *Carrageenin*. It is easy of digestion, is readily borne by weak and irritable stomachs, and exerts a soothing influence on the air-passages and the intestinal canal. In order to obtain it, the moss is cut small, carefully cleared from impurities, boiled with the selected vehicle, and strained. Von Gräfe obtained from nine ounces of milk boiled with half a dram of the moss, five ounces of jelly; and as much from a dram and a half of the moss and twelve ounces of water. The formula, commonly used by him, is given below. To this jelly may be added any dietetic or remedial agent, which may be considered indicated in the particular case.[2]

Chondrus is in the secondary list of the Pharmacopœia of the United States,—cetraria in the *primary;* but the assignment appears to be arbitrary, as one is perhaps as valuable an agent as the other.[3]

EFFECTS ON THE ECONOMY.

Chondrus is used in the affections that are considered to be benefited by Iceland moss. As a diet, it is given in *consumptive cases*, and wherever there is *erethism in the respiratory or digestive apparatus*. It is sometimes prescribed in *diarrhœa*, along with astringent or other remedies. The jelly has been advised as a diet in *scrofulous* cases. Von Gräfe affirms, that he has often found it serviceable in *hoarseness*, *dry spasmodic cough*, *consumption*, *diarrhœa*, and *dysentery*, in the *intestinal pain which remains after inflammation and ulceration of these parts*, *and after poison has been taken;* in *diseases accompanied by much emaciation*, and in the *prostration ensuing on serious diseases and operations*. In similar affections it has been extolled by Hufeland.[4] On the other hand, Heyfelder affirms, that he, and many physicians of his acquaintance, have used the moss without either good or evil results in *phthisis*, as well as in *erethism of the respiratory and digestive organs;* and Riecke[5] remarks, that as it makes a very agreeable jelly, when boiled with milk, and with the addition of a little of the *aqua laurocerasi*, it may do for cases where we must prescribe "ut fecisse aliquid videamur." The truth is, that it can render no more service than other substances that contain a similar principle; and,

[1] Op. cit.
[2] L. Feuchtwanger, in Philad. Journ. of Pharm. vi. 204. Philad. 1833–4.
[3] See the author's General Therapeutics and Mat. Med., 4th edit. i. 253. Philad. 1850.
[4] Hufeland und Osann's Journ. der practisch. Heilkund. B. 77, St. 5, p. 135.
[5] Die neuern Arzneimittel. Stuttgart, 1837, S. 235.

accordingly, but few prescribe it with any other view than as a demulcent and nutritious aliment in cases where such is needed.

MODE OF ADMINISTRATION.

Decoctum chondri.

Decoction of Irish moss.

℞. Chondri (elect. et concis.) ʒss.
Lact. recent. f ℥ix.
Coq. ad remanent. colatur. f ℥v.
Adde
Sacchar. ℥ss. ad ℥j.
Aq. amygdal. amar. concentr. ℈j.

To be taken in the course of the day. *Von Gräfe.*

℞. Chondr. (elect. et concis,) ʒiss.
Coq. cum aq. font. f ℥xij. ad remanent. colat. f ℥v.
Syrup. rubi idæi f ℥iss. ad f ℥ij.
Aq. amygd. amar. concentr. ℈j.

To be used through the day. When employed as diet, Von Gräfe allows from ten to eighteen ounces of the jelly in the day.

℞. Chondr. (elect. et concis.) ʒss.
Coque cum aq. font. q. s. ad reman. f ℥vj.
Colatur. adde
Sodæ phosphat. ʒiss.
Syrup opii f ʒij. ad f ʒiij.

Dose.—A spoonful every two hours in cases of *hæmoptysis*, between the attacks. *Clarus.*

℞. Lactis f ℥xxiv.
Chondr. (elect. et concis.) ℈iv.
Sacch. ℥j.
Cinnam. cont. ℈j.
Coque per minut. x. leni igne; filtr. et exprime.

Béral.

℞. Chondr. (elect. et concis.) ʒij.
Coque cum lactis Oj. ad consist. gelatin.
Tere cum
Sacch. ℥ij.
Amygdal. amar. No. 2.

To be used in the course of the day, and daily. *Hufeland.*

LX. CIMICIF'UGA.

Synonymes. Cimicifuga Racemosa seu Serpentaria, Actæa Racemosa, Macrotrys Racemosa, Black Snake-root, Cohosh, Bugbane, Cohort.
French. Actée, Herbe Saint Christophe.
German. Traubenförmiges Christophskraut, Schwarze Klapperschlangenwurzel.

This plant is a native of the United States, growing in shady and rocky woods from Canada to Florida. Sexual System, Polyandria Di-Pentagynia; Natural Order, Ranunculaceæ. The root is the part used in medicine. It yields its virtues to

boiling water, and was found by Mr. Tilghman, of Philadelphia. to contain gum, starch, sugar, resin, wax, fatty matter, tannic and gallic acids, a black colouring matter, a green colouring matter, lignin, and salts of potassa, lime, magnesia, and iron.'

EFFECTS ON THE ECONOMY.

Cimicifuga belongs to the class of acro-narcotics. Until recently, it is said to have been employed chiefly in domestic practice, as a remedy in *rheumatism*, *dropsy*, *hysteria*, and in various *affections of the lungs*, especially such as resemble consumption.[2] It is noticed here, however, chiefly in consequence of the encomiums that have been passed upon it, of late, as a remedy in *chorea*. Several cases of this disease, reported by Dr. Jesse Young to have been cured, were published some years ago; and at the same time it was stated, that Dr. Physick had known it prove successful in many instances.[3] Dr. Wood[4] also states, that he administered it in a case of chorea, which rapidly recovered under its use, after the failure of purgatives and metallic tonics. He also remarks, that he had derived the happiest effects from it in a case of *convulsions*, occurring periodically, and connected with uterine disorder. Dr. T. S. Kirkbride,[5] has published some cases of success, obtained in the same disease, from its administration, after free purging had been employed. In one successful case, in a girl, nine years old, whose mental faculties were much disordered, and who had lost nearly all power over both her left extremities,—there being, at the same time, irregularity of the bowels, headache, and pain frequently shooting down the left arm, cups were applied to the back of the head and neck once; stimulating pediluvia were prescribed, with friction with salt over the surface of the body, and she was moderately purged every day for a week before the Cimicifuga was begun with. Dr. Kirkbride refers to a very intractable case, that fell under the care of Dr. Otto, and that yielded ultimately to this drug. He always purges before he has recourse to it, and general frictions with salt or the flesh brush, and pustulation with croton oil over the spine, he believes to be of much value in chronic cases. Dr. Beadle[6] of New York treated a case successfully in a girl eighteen years of age. There was considerable *gastric derangement, with suppression of the catamenia*, for nearly five months, from pregnancy. She was put upon the use of Cimicifuga, five grains of the powder being given every three

[1] Journal of Philadelphia College of Pharmacy, vi. 20; and Wood, in Dispensatory of the United States, by Wood and Bache, Art. Cimicifuga.

[2] F. J. Garden, Amer. Med. Recorder, Oct. 1823.

[3] Amer. Journ. of the Med. Sciences, ix. 310.

[4] Op. citat.

[5] American Journal of the Medical Sciences, February, 1840, p. 289.

[6] New York Journal of Medicine and Surgery, July, 1840, p. 191. See also C. C. Hildreth, Amer. Journ. of the Med. Science, Jan. 1843, p. 61; and F. J. Garden, Ibid. p. 247.

hours, and no other remedy except an occasional dose of sulphate of magnesia. There was little improvement in her condition during the day, for nearly a week, after which she improved rapidly and was well in three weeks. The medicine produced no sensible effect.

Allusion has been made to the employment of Cimicifuga in popular practice, in cases of *rheumatism*. Like other narcotico-acrids, when pushed so as to produce catharsis, and even slight narcosis, it may unquestionably be of service in acute forms of the disease.[1] Dr. F. N. Johnson has, at different times, selected more than twenty cases of *acute rheumatism*, including the severest forms, and treated them with cimicifuga for the purpose of testing its powers in that disease. The results were in the highest degree satisfactory, "every vestige of the disease disappearing in from two to eight or ten days, without inducing any sensible evacuation, or leaving behind a single bad symptom." These trials were repeated by Dr. Johnson, Dr. N. S. Davis, and others, until they had no more doubt of the efficacy of cimicifuga in the early stages of acute rheumatism than they had of the power of vaccination as a preventive of variola! Dr. Johnson found the most acute and severe cases yield to its influence not only more speedily, but more perfectly, and with less danger of metastasis to other organs, than to any other form of treatment.[2] The author has always classed it among sedatives; and the observations of Dr. Davis are in favour of this.

In some parts of the country, cimicifuga has become a very popular remedy in *coughs;* and Dr. E. G. Wheeler[3] affirms, that he has found it useful in several cases of severe and *protracted cough;* especially in the *chronic cough* or *bronchitis* of old people. Dr. Wheeler states farther, that by some eminent physicians, it has been thought to be a good substitute for ergot in *parturition*, being dissimilar, however, in its mode of action,—relaxing the parts, and thereby rendering labour short and easy. This, however, requires confirmation.

It has been advised by Dr. C. C. Hildreth[4] in "*acute phthisis*, uncomplicated with much inflammation in the vesicular structure, or pulmonary mucous or serous membranes;" who states, that he has "often seen the most prompt action of the decoction alone, in throwing off febrile excitement or the hectic paroxysm, allaying cough, reducing the rapidity and force of the pulse, and inducing gentle perspiration." "In those intercurrent congestions and

[1] E. A. Anderson, and Alexander Vedder, in American Medical Intelligencer, vol. ii. p. 296, Philadelphia, 1839. Also, Boston Medical and Surgical Journal, Oct. 2, 1839, p. 126.

[2] Report of the Committee on Indigenous Botany; Dr. N. S. Davis, Chairman; in Transactions of Amer. Med. Association, i, 353, Philad., 1848.

[3] Boston Med. and Surg. Journal, Sept. 4, 1839, p. 65.

[4] Amer. Journ. of the Med. Sciences, Oct. 1842, p. 288.

inflammations, so frequent in the second and third stages of phthisis, from atmospheric exposures," he states, that he has "often seen the same happy influence exerted;" but the testimony in regard to its beneficial action in these cases is certainly wanting in precision.[1]

MODE OF ADMINISTRATION.

The dried root of cimicifuga may be given in powder. Dr. Kirkbride administered it in the dose of a tea-spoonful; and Dr. Wheeler in the dose of ʒj. from three to five times a day. Dr. Davis recommends it in the dose of from thirty to sixty drops of the tincture, or twenty grains of the powder repeated every two hours "until its effects are manifest." It is most commonly, however, given in the form of the

Decoctum cimicifugæ.

Decoction of black snake-root.

℞. Cimicifug. contus. ℥j.
Coque paulisper in
Aquæ Oj.

Dose.—One or two fluidounces—two to four table-spoonfuls—several times a day.

Tinctura cimicifugæ.

Tincture of black snake-root.

℞. Cimicifug. contus. ℥iv.
Alcohol. (.835,) Oj.

Dose.—Twenty drops three or four times a day. An idea prevails, that the stronger the alcohol the better is the preparation; but this may be questioned.

LXI. CINCHO'NIA.

Synonymes. Cinchonina, Cinchoninum, Cinchonin, Cinchonine.
French. Cinchonine.
German. Cinchonin.

Although Duncan, of Edinburgh, Reuss, of Moscow, and Gomez,[2] of Lisbon, had endeavoured to separate the active principle of the cinchonas, and had given the term *cinchonine* to a resinous extract obtained in their investigations, the honour of discovering both cinchonia and quinia, and of applying them to practical purposes, belongs to the French chemists—Pelletier and Caventou.[3]

Cinchonia is commonly obtained from the gray or pale varieties

[1] See the author's General Therapeutics and Mat. Med., 4th edit. ii. 196. Philad. 1850.
[2] Richter's Specielle Therapie, B. x. S. 325, Berlin, 1828; and Magendie's Formulaire.
[3] Annales de Chimie et de Physique, xv. 289 and 337.

of cinchona; the yellow furnishing the quinia, and the red both cinchonia and quinia. It is an alkaloid strikingly analogous to quinia in its chemical and medical relations, but is not as much used.

METHOD OF PREPARING.

Cinchonia is obtained by boiling *cinchona* in *alcohol*, until it loses all its bitterness; the alcoholic solution is then evaporated to dryness in a water bath; the extract, thus obtained, is dissolved in *boiling water*, strongly acidulated with *muriatic acid;* an excess of *calcined magnesia* is added, which, after a few minutes' boiling, will fix all the red colouring matter, and render the liquid clear. When cold, the liquid is filtered, and the magnesian precipitate washed with *cold water;* it is then dried in a stove, and all the bitterness separated by repeated digestions in *boiling alcohol;* the alcoholic liquors are mixed, and the cinchonia crystallizes as the fluid cools. Cinchonia, 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 thus be defeated.[1]

Cinchonia may also be obtained by treating *pulverized pale cinchona* by weak *sulphuric acid*, precipitating the solution by means of *lime* in excess; collecting the precipitate on a filter, washing, and treating it, after drying, with *boiling alcohol.*[2]

Cinchona is white, translucent, crystallizing in needles; requiring, for its solution, 700 parts of cold water, according to Magendie; according to others, 2500 parts of boiling water. On account of its very sparing solubility in water it has but a slightly bitter taste. In alcohol, it is readily soluble, and the solution is extremely bitter, as well as the salts formed by its union with acids, which resemble the salts of quinia. It does not dissolve readily in fixed or volatile oils, or in ether. At a certain temperature, it volatilizes; a great part, indeed, is destroyed by the operation, yet a sensible portion escapes the decomposing power of the caloric.

In medicine, pure cinchonia, as well as the sulphate and acetate, is prescribed. The sulphate is soluble in 54 parts of water, and in 6.5 parts of alcohol (s. g. .815:) it is not soluble in ether. It forms crystals and tastes bitter. The acetate, on the other hand, does not crystallize; and is less soluble in water than the sulphate; but an excess of acid facilitates the solution.

EFFECTS ON THE ECONOMY.

It is not necessary to say much on the application of cinchonia and its preparations to disease, as they have been almost wholly superseded by quinia and its salts. It is a weaker article, and

[1] Magendie, Formulaire, &c.
[2] Pharmacopée Universelle, i. 414, Paris, 1828.

therefore requires to be given in larger doses; Magendie and Gittermann assert that it has been found ineffective as an antiperiodic. Bally,[1] Chomel,[2] Mariana,[3] Wutzer,[4] and others, however, have exhibited it successfully.[5] Dufresne[6] frequently prescribed it, and he assigns it this claim to preference, that it is almost tasteless, or at least that the bitter taste is but tardily developed; and that it need not be given in combination with acids, as the acid contained in the gastric secretions will render it soluble.[7] He gave it in *intermittents*, during the apyrexia, in the quantity of from six to twenty grains, and found it of marked use in the cases of *gastralgia with formation of acid*, which are so often met with in young females, and are not unfrequently associated with leucorrhœa, hypochondriasis, melancholy, &c.

MODE OF ADMINISTRATION.

The following formulæ have been recommended, but, as before remarked, they are rarely used, the preparations of quinia being now almost universally prescribed.

Syrupus cinchoniæ.

Syrup of cinchonia.

℞. Cinchoniæ sulphat. gr. xlviii.
Syrup Oj. M.

Used in the same cases as the *Syrupus quiniæ;* a table-spoonful for a dose. *Magendie.*

Vinum cinchoniæ.

Wine of cinchonia.

℞. Cinchoniæ sulphat. gr. xviij.
Vini Maderens. Oij. M.

Magendie.

Tinctura cinchoniæ.

℞. Cinchoniæ sulphat. gr. ix.
Alcohol (34° or s. g. ·847,) f ℥j. M.

Magendie.

Magendie recommends, that this tincture should be used for preparing, extemporaneously, *wine of cinchonia*, by adding two ounces of the tincture to a pint of Madeira wine.

[1] Nouv. Biblioth. Médicale, ix. 189. [2] Nouv. Journ. de Médecine, Mars, 1821.
[3] Osservaz. sulla Pratica del Solfato de Cinconina, &c.
[4] Rust und Casper's Krit. Repert. B. xxi. and Bulletin des Sciences Médic. Sept. 1827.
[5] Art. Cinchonine, in Mérat and de Lens, Dict. de Mat. Méd.
[6] Bibliothèque Universelle, Mai, 1831, p. 89.
[7] See, also, Ganz, in Bulletino delle Scienze Mediche di Bologna, Agosto et Settembre, 1836, p. 121.

Boli cinchoniæ.

Boluses of cinchonia.

Boli antifebriles.
Febrifuge boluses.

℞. Cinchoniæ sulphat. gr. iij.
Micæ panis,
Mellis,
Glycyrrhiz. āā. q. s. ut fiat bolus.

Dose.—One, every two hours. *Brera.*[1]

Mistura cinchoniæ.

Mixture of cinchonia.

℞. Cinchoniæ sulphat. gr. vi. ad xlviij.
Potassæ acetat.
Sacchar. āā. ℥ss.
Solve in
Aquæ anthemid. ℥vj.

Dose.—A table-spoonful every two hours, in *intermittents*. *Sundelin.*

For the iodide and other preparations of cinchonia, see the corresponding preparations of Quinia.

LXII. CODEÏA.

Synonymes. Codeina, Codeinum, Papaverinum, Codeine.
French. Codeine.
German. Kodein.

Although opium had been repeatedly examined by the chemists, and certain of its active constituents separated from it, it was not until within the last twenty years, that the article, whose name is at the head of this paragraph, had been obtained from it. It was discovered by Robiquet in 1832,[2] and as it has been exhibited as a therapeutical agent, it requires notice.

METHOD OF PREPARING.

According to Winkler,[3] this new alkaloid may be prepared in the following manner. Morphia is first thrown down from a solution of *opium*, made in the cold, by means of *ammonia;* the meconic acid is precipitated by the *chloride of calcium;* for the removal of the colouring matter, the fluid is then treated with the *extract* or *subacetate of lead;* and the extract of lead, contained in the fluid poured off from the precipitates, is afterwards decomposed by *sulphuric acid;* the fluid, separated from the sulphate

[1] Ricettario Clinico di Brera. Padov. 1825.
[2] Journal de Pharmacie, xix. 91 and 162. Paris, 1833.
[3] Buchner's Report, xlv. p. 459, cited in Journal de Pharmacie, xxi. 251. Paris, 1835.

of lead, is now treated with an excess of *caustic alkali;* the mixture is exposed to the air until the excess of free alkali has attracted carbonic acid from it: it is then agitated and digested with ether, and left to evaporate spontaneously, after which a yellowish, highly transparent, but not crystalline compound remains, which forms with muriatic acid a crystalline salt, and resembles exactly the codeia of Robiquet.

Merck[1] procures codeia in a very simple manner. He treats morphia, precipitated by soda, with *cold alcohol;* the spirituous tincture is carefully saturated with *sulphuric acid;* the alcohol drawn off, and the residue treated with *cold water* as long as it is turbid; it is then filtered, and the filtered liquid evaporated until it has the consistence of syrup: on cooling, *ether* is poured over it in a large flask; *caustic alkali* is added in excess, and the whole strongly agitated. The ethereal mixture is then so saturated, that codeia crystallizes from it in a few hours. By evaporating the ether, and treating the residue with *alcohol,* the codeia is obtained, by degrees, wholly pure, and separated from an oily matter, which is a great obstacle to crystallization.

Codeia, according to Pelletier, consists of 31 parts of carbon; 40 parts of hydrogen; 5 parts of oxygen, and 2 of nitrogen. It is an alkaloid, soluble in water, alcohol and ether; but not so in alkaline solutions. It unites readily with acids, and, with the chlorohydric especially, forms a salt, which crystallizes with great facility. When the crystals of codeia are heated on a plate of platinum, they burn with a flame without leaving any residue. Heated in a tube, they melt at about 150° centigrade; and, if allowed to cool immediately, form a crystalline mass; if, however, the heat be continued, the oleaginous fluid rises along the sides of the tube, appearing to shun the heat; but it does not volatilize. When dissolved in water, codeia communicates to it decidedly alkaline properties. 1000 parts of water at 60° Fahrenheit, dissolve 12·6 parts of it; the same quantity at 100°, 37 parts, and at 212°, 58·8 parts. If more codeia be added to boiling water than can be taken up, the surplus melts, and forms, like meconin, an oleaginous layer on the bottom of the vessel. This aqueous solution, by careful refrigeration, affords a translucent and uncommonly well defined *metal.* Tincture of galls forms a copious precipitate with a solution of codeia, in which respect, the latter differs essentially from morphia, as it does in many other of its properties,—as in being soluble in ether, but insoluble in a solution of potassa; in not decomposing iodic acid, nor forming a red compound with nitric acid; whilst it is not precipitated from the dilute solution of its salts by means of ammonia.[2]

[1] Journal de Pharmacie, cited in American Journal of Pharmacy, new series, i. 171 Philad. 1835.

[2] Ballard and Garrod, Elements of Mat. Med. and Therap. p. 169. Lond. 1845.

EFFECTS ON THE ECONOMY.

As morphia does not represent the whole of the activity of opium, Robiquet concluded, that other substances might concur therewith, and he conjectured that codeia might be one of them. Under this idea, Kunkel[1] instituted experiments with it on rabbits and dogs, from which he obtained the following results. *First*. Codeia differs from morphia in this—that it does not, like the latter, paralyze the lower extremities. *Secondly*. It appears to exert a powerfully excitant action. It occasions convulsions of the limbs, and muscles of the neck, and when it produces death, this seems to be owing to its action on the cerebellum and medulla oblongata; twice, he noticed symptoms of backward progression under its use, and those parts after death were found turgid with blood. To judge from the condition of the heart and lungs, it affects likewise the circulatory organs. It occasions inflammation of the tissues, with which it comes in immediate contact. Its action is more energetic, when introduced into the areolar membrane, than into the stomach. It seems, also, to exhibit a special action on the urinary organs, for animals to which it is given never evacuate their bladder as long as they are under its influence. *Thirdly*. Codeia differs from the watery extract of opium, in not paralyzing the hinder extremities; but it approximates it in this, that it acts, as has been said, more powerfully when introduced into the areolar membrane than into the stomach, and accelerates respiration and circulation. Kunkel, however, remarks upon the results of his experiments, that they demand repeated trials for confirmation, as he was only able to experiment with a very small quantity of the substance. Robiquet observes that Kunkel's experiments have led to the inference, that when codeia is combined with acids, it loses much of its efficacy—the very opposite, by the way, to the inferences of Magendie.

Barbier[2] has taken considerable pains to fix the value of codeia as a remedial agent. He prescribed it in the dose of one or two grains in a *syrup*, prepared with the aqueous solution of the alkaloid, of such strength that a table-spoonful of half an ounce contained one grain of codeia. In his opinion, it exerts a peculiar agency on the nerves of the ganglionic system, whilst it appears to possess but little influence on the hemispheres of the brain, and to make no impression upon the spinal marrow. In the epigastric region, he remarks, its agency is powerfully manifested; and here in the centre of the ganglionic system, its effects may be investigated, and their extent and magnitude appreciated. If a spoonful, or, at an interval of from one to two hours, two spoonfuls of syrup of codeia be administered to one affected with the symptoms to be described immediately, it will be found,

[1] Journal de Chimie Médicale, ix. 223. [2] Gazette Médicale, 8 Mars, 1834.

that it exhibits a considerable and remarkable effect upon the economy. If the person complains of pain in the epigastric region, beneath the lower extremity of the sternum, and stretching to the sides and back; and if, with these symptoms, there is combined a feeling of heat, with indescribable anxiety, marked debility, paleness, decided alteration of the features, a sense of painful traction sometimes on one side, at others on the other, of the epigastric region, with tendency to syncope, frequent sighing, despondency, and more or less sensibility to pressure in the epigastric region, &c., Barbier considers the seat of the disease to be the epigastric nervous plexus; and in such cases, he says, he has found no remedy superior to syrup of codeia. He has observed it afford decided relief, where the coats of the stomach were manifestly in a state of degeneration. A common effect of codeia is sleep; which is never accompanied by heaviness of the head, nor by determination of blood to the brain. When the persons awake from the sleep produced by it, the countenance is bright and lively, and there is a tendency to laughter. Barbier was led to believe, that it does not affect the nervous cords connected with the vertebral portions of the centre of the nervous system. In his observations at the hospital of Amiens, he often noticed the neuralgic affection of the abdomen above mentioned to be accompanied by pains in the head, loins, and limbs, and whilst codeia relieved the abdominal uneasiness, it left the others untouched,—a singular circumstance, if true, but requiring fresh observation before we can esteem it to be established. He remarks farther, that almost all the patients who were benefited by codeia had used laudanum unsuccessfully. Codeia, he adds, occasions no manifest change in the circulation and respiration; it does not disturb the digestive function; seems merely to diminish the feeling of hunger, and occasions no constipation. During its use, itching of the surface is frequently experienced. When applied to the skin, it induces no striking phenomena. When placed, in the quantity of two grains, on a blistered surface, it excites a painful sensation of burning, without any other change,—the neuralgic pains, for the removal of which it may have been thus employed, not appearing to be modified by it.

Dr. W. Gregory made experiments upon himself and some of his pupils with NITRATE OF CODEIA. None of them experienced any effect from a dose of three grains and under; from four to six grains, however, occasioned striking symptoms—quickness of pulse, sense of heat in the head and face, remarkable excitement, like that following the use of intoxicating liquors; agreeable, and apparently permanent, stimulation, accompanied by considerable itching, which began at the head and extended over the whole body. To this succeeded, in the course of a few hours, a disagreeable sense of relaxation, with nausea, and often vomiting.

None of the experimenters felt the slightest inclination to sleep, until after the feeling of relaxation. Riecke[1] thinks that these experiments confirm Kunkel's observations, that codeia loses its efficacy when combined with acids.

In the year 1834, M. Martin Solon, at one of the sittings of the Académie Royale de Médecine, when the experiments of Barbier with codeia were the subject of discussion, confirmed his views regarding its soporific property. It appeared to him to allay the *cough of the consumptive*. He remarked, however, that he had not observed the effects on the ganglionic nervous system, which Barbier had witnessed.

Magendie[2] took a grain of codeia, dissolved it in a little water, and injected it into the jugular vein of a middle-sized dog, which was immediately thrown into profound sleep—readily broken, however, by any strong noise made in the vicinity of the animal; but the interruption was of brief duration,—sleep soon recurring. This condition persisted for several hours without being accompanied by any unpleasant symptoms. The effect was not the same with the muriate of codeia: a single grain of this salt, introduced in the same manner into the organism, suddenly induced deep sleep; but, after the animal had slept five or six hours, it died. Several similar experiments afforded a like result. Magendie administered codeia in the Hôtel Dieu to different patients. He found that one grain, given once or twice, succeeded, in many cases, in inducing a quiet and soft sleep, to which no confusion succeeded the next day, as is commonly the case with morphia. As respects intensity of action, he compares one grain of codeia with half a grain of morphia. Two grains often excited nausea, and even vomiting. Magendie found the muriate to be decidedly stronger than pure codeia. Two grains commonly induced, besides sleep, vertigo, nausea, and even vomiting; but this dose succeeded like a charm, in cases of *neuralgia faciei* and in *sciatica*, that had resisted the most valued agents.[3]

Dr. Miranda, of the Havana, has published[4] the results of his experience with codeia in what he calls *powerful nervous irritations of the mucous membrane of the stomach*, and he affirms, that he cured eleven cases by the syrup of codeia alone. He began with a dram, night and morning, and gradually increased it to an ounce in the twenty-four hours. His success was so striking that he is induced to "regard the discovery of codeia to be fortunate for humanity, especially in climates like that of the Havana, in which gastrites are so multiplied."

[1] Die neuern Arzneimittel, u. s. w. S. 140. Stuttgart, 1837.

[2] Formulaire pour la préparation et l'emploi de plusieurs nouveaux médicamens. Edit. 3me. Paris, 1836.

[3] Gully's Translation of the 8th edit. of Magendie's Formulaire. Lond. 1835.

[4] Journal de Pharmacie, xxiv. 145. Paris, 1838.

Syrupus codeiæ.

Syrup of codeia.

This is directed by M. Cap[1] to be prepared in the following manner:—

℞. Codeiæ gr. xxiv.
Aquæ destillat. f ℥iv.
Sacchar. ℥viij.

Reduce the codeia to an impalpable powder in a glass or porcelain mortar. Triturate with one-third of the water, allow it to settle and decant. Treat the residuum with another third of the water, and again with the remainder. Put the whole into a small mattrass, covering the opening with a piece of moistened parchment perforated with a pinhole. Heat in a water bath until the codeia has entirely disappeared. Remove the mattrass from the fire to add the sugar; cover the opening again; agitate, and put the vessel again in the bath, until the sugar is completely dissolved. Each ounce of the syrup contains two grains of codeia.

M. Levrat, aîné,[2] of Lyons, obtained excellent effects from the use of the syrup in the "ataxic form" of *typhoid fever*. He gave it to adults in the dose of two drams, and of one dram to a child.

Muriate of Codeia has been used in this city, but it has not been found to possess any virtues which the salts of morphia do not; whilst its price has been enormous—as much, we are informed, as four dollars the dram.

LXIII. COL'CHICUM.

Synonymes. Colchicum Autumnale, Meadow Saffron.
French. Colchique, Tue-Chien, Mort aux Chiens, Safran des Prés, Safran Bâtard, Vieillotte.
German. Herbstzeitlose, Zeitlose, Wiesensafran, Herbstblume, Wilder Safran, Spinnblume.

Meadow saffron is a well-known plant in the temperate parts of Europe, where it grows wild in moist meadows. It belongs to the Family Colchicaceæ: Melanthaceæ (*Lindley;*) and to Sexual System Hexandria Trigynia. It is avoided by cattle; and its active poisonous properties have been long known; fatal cases, indeed, still occur every now and then from its employment, not only in animals, but in consequence of its too free use in the treatment of gout. Reynolds, the inventor of the wine of Colchicum, commonly called "*Reynolds's Specific*," is said to have killed himself by an overdose of it. A case is given of a man

[1] Journal de Pharmacie, xxiii. 418. Paris, 1837.
[2] Archives Générales de Médecine, Mai, 1847, p. 112.

who took, by mistake, an ounce and a half of the tincture, and died in forty-eight hours, after suffering much from vomiting, acute pain in the stomach, colic, purging, and delirium.[1] The cases of two children are also on record, who were poisoned by a handful of the seeds, and who died in the course of the day, death being preceded by violent vomiting and purging. Considerable redness of the mucous coat of the stomach and small intestines was found: in other cases, no morbid appearance has been detected.[2]

A fatal case has been published by Dr. Blumhardt, from the papers of Dr. Neubrandt. The patient, a man aged thirty-two, took, by mistake, a decoction made of a large table-spoonful of the seeds to three pints of water. He was soon afterwards attacked by vomiting, purging, and died two days afterwards under symptoms of narcosis and endo-enteritis. Another fatal case, which was caused by the leaves,[3] is referred to in the same Journal;[4] and, more recently, one, from the administration of the tincture, has been published by Professor A. T. Thomson.[5]

Colchicum is not of modern introduction. It is the *Hermodactyl* of the ancients. It had, however, almost wholly fallen into neglect, when its use was revived in Great Britain, in the first quarter of the present century, as an excellent agent in rheumatic and gouty affections. That it is highly esteemed as a therapeutical agent, is shown by the number of officinal works into which it has been admitted: amongst others, the Pharmacopœias of the United States, Austria, Amsterdam, and Anvers, and in the Batavian, Belgic, Brunswick, Danish, Dublin, Spanish, Edinburgh, Paris, Ferrara, Geneva, Hamburg, Hanoverian, London, Lisbon, Russian, Saxon, Swedish, and Wirtemberg.

Several chemists have investigated the composition of the plant. Pelletier and Caventou believed, that they had found veratria in it; but, from the examinations of Geiger and Hesse, it appears that the alkaloid, discovered by those gentlemen, was not veratria, but a peculiar principle, *colchicia* or *colchicine*, which is found in every part of the plant; crystallizes in slender needles; is inodorous, and of a very bitter, and, afterwards, biting taste. Introduced into the nose, it does not occasion sneezing like veratria. It has a feeble alkaline reaction; but neutralizes acids completely, and forms with them crystallizable salts, which have also a bitter, pungent taste. It dissolves with tolerable facility in water.

For therapeutical purposes, the root or bulb, (*cormus*,) as well

[1] Edinb. Med. and Surg. Journal, xiv. 262.

[2] Christison on Poisons, 3d edit. p. 791. Edinb. 1836.

[3] See a case of over-dose of Colchicum, by T. A. Henderson, in London Med. Gaz., Aug. 17, 1839, p. 763.

[4] Medicinisches Correspondenzblatt, 1840, cited in Encyclographie des Sciences Médicales, Mai, 1840, p. 492.

[5] London and Edinb. Monthly Journal of Med. Science, June, 1843, p. 537.

as the flowers and seeds, have been administered. The fresh root has a somewhat disagreeable smell, and a bitterish acrid taste. When chewed for any length of time, it excites the secretion of saliva and thirst; destroys the sense of feeling in the tongue; causes a sense of burning in the mouth and lips; constriction of the fauces, hiccup, violent pains in the abdomen, vomiting, diarrhœa, and discharge of blood upwards and downwards.

By drying, the cormi lose somewhat of their efficacy. Dr. Houlton[1] recommends the following method to ensure their drying spontaneously without being sliced. They are to be stripped of their loose, dry coats, and the bud or little bulb, the rudiment of the future plant, is to be carefully picked out. This part, according to him, has a high vital endowment; is very tenacious of life, and, unless removed, the cormi will not readily become dry: yet, when it is removed, and they are put in a dry place, they will dry without any trouble, and in a short time.

The seeds have of late come much into use. They are inodorous, but of a very acrid taste. Their agency is like that of the bulb, and—some think—they are more equable in their effects. To ensure this, however, they must be gathered wholly ripe, when they first become entirely black. They have been highly recommended by Dr. Williams and others.

The flowers are the mildest part of the plant. They have been successfully administered by several English physicians.

EFFECTS ON THE ECONOMY IN HEALTH.

In its effects, colchicum resembles digitalis in one thing, that it renders the pulse less frequent,[2] according to Thomson and Willis; but, in other respects, Osann and Riecke[3] think it agrees more with squill.[4] In moderate doses, the different parts of the plant that have been mentioned act as diaphoretics, diuretics, and cathartics. On the digestive organs, they are conceived to produce less debilitating effects than squill.

Sir Everard Home ascribes much of the griping and nauseating effect which sometimes follows the use of the vinous and other tinctures of colchicum that have not been carefully filtered, to the sediment which forms in them, and which may be removed without injury to the desired effect of the medicine.[5] Sir C. Scudamore,[6] however, found the sediment to be inert. Several experiments were made with colchicum on healthy individuals. In the first case, 160 drops of the vinous tincture of the seeds were taken

[1] Pharmaceutical Transactions, July 1, 1844.
[2] Art. Colchicum, Encyc. Wörterb. der Med. Wissensch. viii. 136. Berlin, 1832.
[3] Op. cit. S. 142.
[4] See the author's General Therapeutics and Materia Medica, 4th edition, i. 290. Philada. 1850.
[5] Brande's Dictionary of Materia Medica, p. 189. London, 1839.
[6] Treatise on Gout, 3d edit. p. 513.

in 24 hours, by a young man aged 18;—the first dose being 50 drops, the last, 60. Seven copious evacuations were produced, with loss of appetite and debility for twenty-four hours. In the second case, a youth, 17 years old, took 170 drops in 9 hours, in doses of 70, 60, and 40 drops: nausea and vomiting, and six copious evacuations followed. Third case; a youth, aged 15, took 130 drops in 10 hours, in 4 doses; the first, of 40 drops, and, the last three, of 30; vomiting and only one evacuation were the result. Fourth case; a youth, aged 12, took 60 drops in two doses, after an interval of eight hours: nine copious watery evacuations were produced. Fifth case; a youth, aged 17, took 40 drops at bed-time, 30 drops next morning, and 30 drops seven hours after,—in all, 100 drops in 19 hours: vomiting and faintness, and five copious evacuations were the result. The same boy afterwards took 70 drops at one dose, which were followed by vomiting and headach, but not by purging. Sixth case; a boy, aged 10, took 80 drops in 24½ hours, in four doses, of 20, 15, 25, and 20 drops: great sickness and vomiting, and nine evacuations resulted.

Dr. John Aldridge[1] states, that he has seen three cases in which profuse ptyalism followed the use of half a dram of the tincture of the seeds taken for some time thrice a day. In one of these cases at least, mercury had never been taken; nor had the patient ever been salivated. They were all cases of ophthalmia.

EFFECTS ON THE ECONOMY IN DISEASE.

The diseases in which colchicum is recommended, are as follows:

In *gouty* and *rheumatic cases*, it has been supposed to be almost a specific. Numerous practitioners have testified to its valuable agency in such affections; among these, may be named Mr. Want, Dr. Johnson, Dr. Williams, Mr. Battley, Dr. Armstrong, Sir Everard Home, Sir C. Scudamore, Mr. Haden, Dr. Copland, Dr. Graves, Sir Henry Halford, Dr. Wallis, Dr. Barlow,[2] Mr. Wigan,[3] Dr. Holland,[4] Dr. Gairdner,[5] Dr. Seymour,[6] and others in England; and Locher-Balber, Kahleis, Gumpert, Plasse, Weber, Klokow, Biermann, &c., in Germany.[7] Colchicum is presumed to be the active ingredient of the celebrated gout remedy—*Eau médicinale d'Husson*—which has been considered to be formed of two ounces of *colchicum root*, macerated in eight ounces of *sherry wine;* the dose being from twenty to eighty drops.

[1] Dublin Hospital Gazette, Oct. 1, 1845; cited in Amer. Journal of the Medical Sciences, Jan. 1846, p. 215.

[2] Art. Gout, in Cyclopædia of Practical Medicine, Amer. edit. Philad. 1845.

[3] Lancet and Med. Gaz., June 30, 1838.

[4] Medical Notes and Reflections, 2d edit., p. 124, Lond. 1840.

[5] On Gout; its History, its Causes, and its Cure. London, 1849.

[6] Thoughts on the Nature and Treatment of several Severe Diseases of the Human Body, i. 93. London, 1847.

[7] Riecke, Op. cit., and Richter's Specielle Therapie, x. 180. Berlin, 1828.

Dr. R. B. Todd[1] considers colchicum to be chiefly applicable to the sthenic form of gout, which occurs in robust constitutions, and in the prime of life, and that it is almost inadmissible in persons advanced in years, who have had several attacks, and in whom the malady would seem to be too deeply rooted to be influenced by the temporary administration of this remedy; and Dr. Seymour[2] affirms, that "in gout, especially in gout originated from excess; in strong, violent, painful gout, it may be given not only without fear, in moderation, but with almost an absolute certainty of relief, without any bad effects either immediately or remotely following its use."

In *acute rheumatism*, as well as in *various inflammatory affections*, colchicum was proposed by the author's friend, Mr. Charles T. Haden,[3] as an excellent sedative to reduce excited organic action, which he conceived it capable of effecting to such an extent, that blood-letting might generally be rendered unnecessary in febrile and inflammatory disorders;[4] yet, in the very cases in which it was esteemed so appropriate by Mr. Haden and by Carminati,[5] it is regarded unadvisable by others. Thus, Riecke,[6] speaking of its use in acute rheumatism, says, that it was at one time given in that disease under the most opposite circumstances, but that it was soon found necessary to restrict its employment within narrower limits, and to pretermit it when any considerable febrile condition existed.

The author has often exhibited the different preparations of colchicum in gout, and, frequently, with decided advantage; but very often it has failed altogether. In his own person, it has never appeared to prevent or to modify the paroxysm. In acute—and the same may be said of chronic—rheumatism, its advantages have not been by any means clearly marked in his experience: many physicians, however, testify most strongly in its favour. Like other acro-narcotics, as the cimicifuga, when pushed to the extent of slightly affecting the system, as shown by nausea, with some cerebral confusion, it has, at times, effected a revulsion, which has broken in upon the morbid chain in acute rheumatism. A severe case, under the author's care, yielded rapidly to it when pushed to the extent of inducing painful diarrhœa, accompanied by distressing tenesmus. In this case, twenty-five drops of the tincture of the seed were given three times a day. When the bowels become affected, the remedy must be discontinued altogether, or the quantity be diminished. By attending to these rules, Dr. Christison[7] affirms, that he has never had occasion to observe

[1] Practical Remarks on Gout, Rheumatism, Fever, &c., p. 105. Lond. 1843.
[2] Op. cit. p. 93.
[3] Pract. Obs. on Colchicum Autumnale in Inflammatory Diseases. London, 1820.
[4] See also Dr. Lewins, in Edinb. Med. and Surgical Journal, for April, 1837, or in Brit. and For. Med. Review, for Oct. 1837, p. 565.
[5] Memor. dell' Instituto del Regno Lombardo-Venet. 1819. [6] Op. cit. S. 43.
[7] Dispensatory, p. 355. Edinb. 1842.

any unpleasant effects from its use, or any symptoms which a dose of opium did not readily subdue. He adds, that he has never seen a case of rheumatism essentially benefited, till the patient suffered from colic and diarrhœa, on the one hand, or from frontal headach and giddiness, on the other. The ill success which some practitioners have encountered in using colchicum, he thinks, may have arisen from inattention to this circumstance. In chronic rheumatism, it has exhibited less marked results; yet there is no agent, perhaps, which is so much employed in rheumatic cases in general. In none of these, according to most observers, need any sensible evacuation be produced by it, although some, it has been seen, have affirmed—and such is the result of the author's observation—that it is more efficient when it evinces its influence upon the alimentary canal.[1] Such, too, is the experience of M. Monneret,[2] who found that the powerful revulsion on the bowels, caused by the tincture in the dose of one dram to four drams in the twenty-four hours, given in one, two or four divided doses, was sufficient to suspend or remove the disease,—the improvement always coinciding with the diarrhœa; and Dr. Wigan[3] asserts, that he gives colchicum powder in *rheumatic gout* in the dose of eight grains every hour, until "active vomiting, profuse purging, or abundant perspiration takes place, or, at least, until the stomach can bear no more," and, when thus administered, he pronounces it to be "the most easily managed, the most universally applicable, the safest, and the most certain specific [?] in the whole compass of our opulent [London] pharmacopœia." Yet, Dr. Upshur[4] has recently declared, that, in chronic rheumatism, he thinks he has sometimes derived great benefit from it, but, in the acute form, never. He adds, that it may be he has been "so unfortunate as always to get hold of an inferior preparation,"—a qualification which, however, applies equally to the results of his experience in the chronic form of the disease.

Mr. Anthony White,[5] himself a sufferer from gout, relies exclusively on a combination of colchicum and calomel, according to the formula given hereafter. He is of opinion, that "the main object to be pursued towards the effectual cure of the gouty paroxysm, by the removal of its immediate cause, is the restoration of the natural functions of the liver, as indicated by a copious discharge of bile through the bowels." On the other hand, Dr. Gairdner[6] maintains, that colchicum never more effectually relieves the patient than when it acts silently and peacefully, without producing any evacuation whatever, or in any way disturbing the patient's comfort and ease. It has been demonstrated, by

[1] See Wood and Bache's Dispensatory, Art. Colchicum; and Lewins, Op. citat.
[2] Archives Générales de Méd., Mar. 1844, cited in London Med. Gaz., May, 1844.
[3] London Med. Gaz. June 30, 1838. [4] Medical Examiner, Oct. 1850, p. 580.
[5] London Medical Gazette, August 18, 1848. [6] Op. cit.

Drs. Douglas Maclagan, Chelius and Lewins, that it causes a more copious discharge of urea from the system, and Dr. Gairdner found, in repeated investigations, that the increase of urea was attended by a great diminution of the urates in the urine.

The vinous tincture of the seeds has been extolled in the *tetanus* of warm climates, by Dr. W. G. Smith,[1] of Port-au-Prince. He begins with ʒss. and increases the dose every half hour, repeating it until emesis or catharsis has been produced. It is then discontinued.

In *dropsy*, colchicum was used of old with good results; and it has been employed in modern times. Carminati gives the details of a case of *dropsy supervening on scarlatina*, and Plasse, one of *hydrothorax*, in which it was advantageously prescribed. In such cases, it may be well to push the remedy until it affects the bowels. In *chronic bronchitis*, it has been given with advantage by many physicians, and especially by Drs. Armstrong[2] and Hastings,[3] and Dr. Pereira[4] found it of great service in *humoral asthma* and other *chronic bronchial affections*, especially when these complaints were accompanied with *anasarcous swellings*. By Drs. Eisenmann and Ficinus,[5] the vinum colchici has been given in *gonorrhœa*. The latter prescribes from twenty-five to thirty drops three times a day, combined with tinctura opii, low diet, the warm bath, &c. These means were attended with unprecedented success in the treatment of gonorrhœa and other inflammatory discharges from the urethra in the male, and from the vagina and uterus, in the female.

By Ritton[6] it has been advised as an extremely efficacious remedy in *leucorrhœa*, in the dose of five grains of the powder three times a day; and in several *spasmodic diseases* it has been extolled by Raven. Tait[7] speaks in exalted terms of it in *scarlatina*—the dose, to children from four to six years of age, being three or four drops of the vinum colchici every three or four hours. Mr. Fosbroke advises it in *ischuria;* Elliotson saw favourable effects from it in obstinate *prurigo;* Bullock gave it in *erysipelas;* by Chisholm and Baumbach[8] it was exhibited successfully against *tape-worm*, and Dr. Chapman[9] states that from ten drops of the tincture of the root repeated several times in the

[1] American Journal of the Medical Sciences, for Nov. 1835, p. 66.
[2] Pathology of Consumptive Diseases. London, 1822.
[3] Inflammation of the Mucous Membrane of the Lungs, London, 1821.
[4] Elements of Materia Medica, &c., ii. 947, London, 1842; or 2d Amer. edit. by Carson, Philad. 1846.
[5] Casper's Wochenschrift, Aug. 26, 1848; cited in Lond. Med. Gazette.
[6] Lancet, Aug. 2, 1844.
[7] Amer. Journ. of the Medical Sciences, May, 1838, p. 205.
[8] Rust's Magazin, B. xxi. S. 270; and Osann, in Art. Colchicum, in Encyc. Wörterb. der Medicin. Wissenschaft. B. viii. S. 136. Berlin, 1832.
[9] Lectures on the more Important Diseases of the Thoracic and Abdominal Viscera, p. 299. Philad. 1844.

twenty-four hours, and persisted in for some time, as much may be anticipated in *functional constipation*, with a view merely to the restoration of the lost susceptibility of the bowels, as from any thing else within his experience. He has rarely, indeed, seen it fail.

Colchicum is sometimes applied externally as a liniment to *rheumatic joints*, in the form of the tincture of the seeds or bulb.[1] It has been recommended by Mr. Wansborough in *gout*;[2] two drams of the tincture of the seeds being added to f ℥iv. of a spirit lotion. It is affirmed, however, that the local use of morphia had the same effect,[3]—the part being bathed in hot water for a minute, and then lint applied, spread with simple cerate, on which about three grains of acetate of morphia were distributed.

Mr. Laycock[4] has advised the tincture of the root as an external application in *rheumatism*, alone or combined with *tinctura camphoræ*. It was used in the author's Clinic at the Philadelphia Hospital, and often with advantage; but whether much, or any of the benefit was produced by the colchicum, he was unable to decide.

MODE OF ADMINISTRATION.

Colchicum is not so frequently given in substance, although it is often prescribed in this form. The dose of the powdered root is from three grains to ten, several times in the day. The officinal preparations of this country and Great Britain are:—*acetum colchici* (United States and London;) *oxymel colchici* (Dublin;) *syrupus colchici* (Edinburgh;) *vinum colchici radicis* (United States and London;) and *extractum colchici aceticum* (London;) than which, Dr. Holland[5] affirms, he knows no preparation more certain in effect, or better capable of fulfilling the peculiar purposes of the medicine. These are made from the bulb.

The officinal preparations from the seeds are *tinctura colchici seminis* (United States and Dublin;) and *vinum colchici seminis* (United States.) The London Pharmacopœia has likewise a *spiritus seminis colchici ammoniatus* or *tinctura colchici composita*, which is much used by the English physicians, and is formed by macerating two ounces and a half of *bruised colchicum seeds* in a pint of *aromatic spirit of ammonia*. Mr. Battley recommends an *extractum colchici e succo bulborum recenter expresso*, and such a preparation is in the Pharmacopœia of Austria.[6] The dose is two grains every two hours.

Dr. A. T. Thomson recommends a *saturated vinous tincture*, made by macerating an ounce and a half of the *dried bulb* in twelve

[1] Dict. de Matière Médic. par MM. Mérat and De Lens, ii. 361.
[2] Lancet, July 29, 1837. [3] Ibid. Aug. 5, 1837.
[4] London Medical Gazette, March 16, 1839, and June 8, 1839, p. 388.
[5] Medical Notes and Reflections, 2d edition, p. 153. London, 1840.
[6] Jourdan, Pharmacopée Universelle, i. 436. Paris, 1828.

ounces of *white wine*. From thirty to sixty minims are given to gouty patients when in pain.

The dose of the powdered root or seed is, as was said, from three to ten grains; of the *acetum colchici*, from thirty minims to one fluidram; of the *syrupus colchici*, from one fluidram to half a fluidounce; of the *vinum colchici radicis*, from fifteen minims to one and a half fluidrams; and of the *vinum colchici seminis* from one to two fluidrams.

Dr. Copland[1] suggested the use of the fresh flowers in the form of vinegar, tincture, &c., as milder than the seeds or bulbs, and yet equally efficacious in rheumatic and other affections; but they are not employed.

Haustus colchici et magnesiæ.

℞. Vin. rad. colchic. ℈j.
Magnesiæ ℈ss.
Mist. camphor. ʒx. M.
Fiat haustus.

To be taken twice a day in gout.

Seymour.

Mistura colchici.

Mixture of colchicum.

Scudamore's mixture.

℞. Magnes. sulphat. ℥j. ad ℥ij.
Solve in
Aquæ menth. crisp. f ℥x.
Adde
Acet. colchic. f ℥j. ad f ℥iss.
Syrup. croc. f ℥j.
Magnes. ℈viij. M.

To be well shaken. Three table-spoonfuls to be administered, so that from four to six evacuations may be produced in twenty-four hours. Given in paroxysms of *gout*. *Sir C. Scudamore.*

Guttæ colchici compositæ.

Compound drops of colchicum.

℞. Extract. aconit. ℈j. ad ʒss.
Solve in
Vin. colchic. sem. f ℥ss. M.

Fifteen, twenty, thirty, or forty drops to be given three times a day. *Weber.*

℞. Tinctur. colchic. sem.
——— guaiac. āā. f ʒiij. M.

Dose.—Thirty or forty drops three times a day in *chronic rheumatism*. *Blasius.*

℞. Tinct. colchic. sem.
——— digit. āā. f ʒij.
Sp. æther. nitric. f ʒss. M.

Dose.—Twenty drops, on sugar. *Hildenbrand.*

[1] Lond. Med. Repos. 1823.

Pilulæ colchici.

Pills of colchicum.

℞. Colchic. pulv. gr. iij.
Saponis q. s. ut fiat pilula.

Dose.—Three daily, increasing the quantity to five or six.

Ritton.

Pilulæ colchici compositæ.

Compound pills of colchicum.

℞. Extract. colchic. acet. gr. iij.
Pulv. ipecac. comp.
Ext. colocynth. comp. āā. gr. j—ij. M.
et fiat pilula.

In *gout.* *Sir H. Halford.*

℞. Ext. colchic. acet.
Hydrarg. chlorid. mit.
Aloes, āā. gr. j.
Ipecac. pulv. gr. ij. M.

Dose.—One every four hours in gout. Two or three are generally enough "to produce a considerable disgorgement of the liver." This is assisted by one or two doses of compound decoction of aloes.

A. White.

Linimentum colchici et camphoræ.

Liniment of colchicum and camphor.

℞. Tinctur. colchic. rad.
——— camphoræ, āā. partes æquales. M.

Laycock.

LXIV. COLLODION.

Synonymes.—Collodium, Ethereal Solution of Gun Cotton.

Professor Schönbein appears to have first shown the solubility of gun cotton in sulphuric ether. He states, that long before it was employed in this country, he had recommended for surgical use a fluid, which he termed, "*liquor constringens*" and "*ether glue;*" and that it had been employed in Switzerland three years previous to any notice of it in America.[1] Specimens of the solution were exhibited by Dr. C. F. Jackson before the Boston Society for Medical Improvement, in December, 1846, or January, 1847, to illustrate its use as a brilliant varnish. Soon afterwards, Dr. H. J. Bigelow[2] prepared a bottle of the solution according to Dr. Jackson's directions, and whilst employing it as a varnish, he accidentally smeared it on a fresh wound of the finger. The smarting that resulted drew his attention to the wound, and he immediately endeavoured to rub it off, but it had dried almost instantaneously, and remained on; the smarting soon ceased, and

[1] Lancet, Mar. 17, 1849.
[2] Boston Medical and Surgical Journal, Mar. 22, 1848.

when the film was removed, union had taken place. Dr. Bigelow at once had recourse to it as a dressing for wounds, especially such as it is desirable to unite rapidly by the first intention.

About the same time a young medical student, Mr. George P. Maynard,[1] of Boston, exhibited a similar liquid adhesive substance, which he had introduced as a substitute for the common adhesive plaster, over which it seemed to possess many advantages, and to be applicable to cases in which the latter is not; and in a letter to Dr. John D. Fisher, read before the Boston Society, Mr. Maynard[2] stated, that he had used the adhesive liquid, and seen it used by his preceptor, Dr. Whitney, in more than one hundred cases of surgery, some of them serious,—and in all successfully. Mr. Maynard appears to have first used it surgically in January, 1847: and it was, in consequence, known for some time under the name of "*Maynard's adhesive liquid;*" but, subsequently, it received the name *Collodion*—from κολλα, 'glue;'—by which it is now known.

METHOD OF PREPARING.

The formula generally adopted for the preparation of collodion is that of M. Mialhe. The plan recommended by Mr. Maynard was to treat *cotton* with *nitric* and *sulphuric acids;* washing the substance thoroughly, and afterwards dissolving it in pure *sulphuric ether*. Several French chemists, on repeating the process, failed to procure the cotton in a state in which it could be dissolved by ether, when M. Mialhe[3] ascertained, after many trials, that it was much more readily procured by using a mixture of *nitrate of potassa* and *sulphuric acid*. M. Mialhe's process is as follows:—Take of finely powdered *nitrate of potassa* 40 parts by weight; *concentrated sulphuric acid* 60 parts, *carded cotton*, two parts. Mix the nitric with the sulphuric acid in a porcelain vessel; add the cotton, and agitate the mass for three minutes by the aid of two glass rods. Wash the cotton, without first pressing it, in a large quantity of water, and when all acidity is removed, as indicated by litmus paper, press it firmly in a cloth. Pull it out into a loose mass, and dry it in a stove at a moderate heat. The compound, thus obtained, is not pure fulminating cotton—French, *fulmicoton:* it always retains a small quantity of sulphuric acid; is less inflammable than gun cotton, and leaves a carbonaceous residue after explosion; but it possesses, in a remarkable degree, solubility in ether, especially when mixed with a little alcohol. The collodion is made of this *prepared cotton*, 8 parts by weight; *rectified sulphuric ether*, 125 parts; and *alcohol*, 8 parts. The cotton is put with the ether into a well-stopped bottle, and the mixture is shaken for some minutes. The alcohol is added by

[1] Amer. Journal of the Medical Sciences, April, 1848.
[2] Boston Medical and Surgical Journal, Mar. 29, 1848.
[3] Lond. Med. Gazette, cited in Amer. Journ. of Pharmacy, Jan., 1849, p. 42.

degrees, and the mixture is shaken until it acquires a syrupy consistence. It may be then passed through a cloth, the residue be strongly pressed, and the liquid kept in a well-secured bottle.

Other modes of preparing it are given by Mr. J. B. Edwards,[1] and by Messrs. Charles S. Rand[2] and Edward Parrish.[3] Gun cotton will also dissolve in equal parts of ether and alcohol, and form as adhesive a solution as that in ether alone. It of course dries more slowly, and whilst it may not be as well adapted for holding the edges of incised wounds together as the latter, it may be preferable in certain cases,—as an application to abraded surfaces, for example.

Collodion has been used extensively by the surgeon as a retentive adhesive compound in all cases of solution of continuity,—either applied directly to the part, by being brushed over with a camel's hair pencil, or spread on strips of cotton. On *ulcers* and *abraded surfaces*—as in *superficial burns* it acts as an excitant; the ether evaporates, and a film is left, which protects them against the irritating and desiccative influence of the air.[4] It was suggested in *burns* by Dr. Payne, dentist, of Montreal; and Dr. Crawford[5] of that city employed it successfully, and since then its utility has been confirmed by others.[6] M. Briquet[7] used it successfully in a case of *erysipelas of the abdomen;* and Dr. J. W. Freer,[8] of Illinois, in an *epidemic erysipelas*, which prevailed there in the spring of 1839, applied it, by means of a feather, over the affected part.

By Mr. Erasmus Wilson[9] it was prescribed in various *cutaneous diseases*, and with advantage,—for example, in *chronic erythema of the face*, *intertrigo*, *chapped nipples* and *chapped hands; herpes labialis*, *h. præputialis*, and *h. zoster; lichen agrius; lupus non exedens*, and *l. exedens; acne vulgaris*, and several *affections of the sebiparous organs.* In these cases, it has the same action as in burns; and besides by its contraction, during the evaporation of the solvent, pressure is exerted on the part, which may be of essential service. As elsewhere remarked by the author,[10] in cases of *acne* and *follicular affections of the skin* in general, he has seen advantage from it. Occasionally, it has induced an inflammatory condition of the follicles, and at first seemed to aggravate the affection; but, subsequently, good has resulted from the modified nutrition induced. As a protect-

[1] Lond. Pharmaceut. Journ.: cited in Amer. Journ. of Pharmacy, July, 1849, p. 233.
[2] Amer. Journ. of Pharmacy, July, 1849, p. 209. [3] Ibid. October, 1849, p. 289.
[4] For a summary of the surgical and other cases in which it had been until that time employed, see Bigelow and Maynard, op. cit., and Lond. Journ. of Medicine, Feb., 1849; or Ranking's Half-yearly Abstract, Amer. edit., ix. 100, Philad., 1849.
[5] British Amer. Journ., Aug. 1848.
[6] Lambert, Gazette Médicale de Lyon; cited in Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 241; and Liman in Casper's Wochenschrift, Juli 27, 1850, cited in Keller und Tiedemann's Nord Amerikanischer Monatsbericht für Natur—und Heilkunde, S. 188, Nov. 1850.
[7] Bulletin de Thérapeutique, xxxviii., 322; cited in Brit. and For. Medico-chirurg., July, 1850, p. 275.
[8] North Western Medical and Surgical Journal, Jan., 1850. [9] Lancet, Nov., 1848.
[10] General Therapeutics and Mat. Med., 4th edit., i. 497, Philad., 1850.

ing, supporting and compressing agent, it appears to have been applied with advantage by M. Caballero[1] over a large aneurismal tumour of the subclavian artery; and Dr. Brainard[2] used it with advantage for the cure of *erectile tumours* (*nævi*) without operation. Dr. John Evans,[3] disheartened by the general want of success in preventing suppuration in *mastitis*, and satisfied that the most prominent indication of cure is to overcome the freedom with which blood is sent into the mamma, and by compression cause the absorption of the effused plasma, employed a coating of collodion to obtain the benefit of its contraction; and he affirms, that in no case, except one, had the slightest suppuration supervened. In every one, the relief was prompt, and no inconvenience resulted in any, except the slight smarting caused by its application. Mr. Wilson, as well as others, found that the film left by the evaporation of the solvent is liable to crack from want of elasticity, and consequently to peel off, a defect which is remedied by combining a certain portion of oil with it: by this means, the film is sufficiently elastic to follow the motion of the part to which it is applied, without separating into flakes. A farther improvement was considered to be effected by giving the solution a flesh colour. The coloured solution has been called *collodium tinctum*.

Dr. Simpson[4] employed it with perfect success in some cases of *painful fissures at the base of the nipple*. Having brought together the edges, he applied the collodion, which formed a protection against all irritating influences, and permitted the child to suck. The healing process took place rapidly. Equally good effects in cases of *sore nipple* were obtained by Mr. Brown.[5]

Dr. T. R. Mitchell[6] considers it superior in *ulceration of the os and cervix uteri* to nitrate of silver. It forms an artificial covering to the ulcer, and permits the healing process to go on beneath. In cases of *simple abrasion*, three applications have proved sufficient; in more obstinate cases, he has employed caustics first, and then covered the eschar with collodion, and has in this way cured *extensive ulcers* in half the time required by other methods. He has likewise found it beneficial in *inflammation of the vagina* without ulceration. In cases of *chancres*, which have become clean, and are in process of reparation, H. Lippert has seen the cicatrization rapidly effected by the application of collodion, several times a day, by means of a camel's hair pencil.[7]

In *bleeding from leech bites*, the hemorrhage was restrained by Mr. Tucker,[8] by compresses of lint dipped in collodion, and it

[1] Wahu, Annuaire de Médecine et de Chirurgie pratiques, pour 1850, p. 215.
[2] North Western Medical and Surgical Journal. Sept., 1849. [3] Ibid., Sept., 1850.
[4] Monthly Journal of Med. Science, July, 1849. [5] Lancet, Dec. 24, 1848.
[6] Dublin Med. Press, Oct. 4, 1848. [7] Lancet, Dec. 9, 1848.
[8] Casper's Wochenschrift, 16 Febr., 1850, No. 7, cited in Keller und Tiedemann, Op. cit., Dec., 1850, p. 221.

succeeded also with Mr. R. T. Wylde.[1] Dr. W. H. Ranking[2] applied it advantageously with the same view in the incisions made in cupping. By Dr. Muirhead[3] it was employed with great benefit in *bed sores;* and by Dr. W. H. Ranking[4] it has been suggested as a valuable application to the face for the purpose of excluding the air, and *preventing pitting in variola.* As a *stopping for teeth,* it was used by Mr. Ancell, and by Mr. J. Robinson,[5] dentist; the latter of whom affirms, that he has frequently applied collodion in severe cases of *toothache,* arising from exposure of the nerve, with perfect success, where no persuasion could induce the patient to submit to extraction.

By M. Hairion[6] it has been employed to glue the eyelids together, where it has been desirable, as in *keratitis* and *conjunctivitis,* to protect the inflamed surface from the contact of air, to prevent the movements of the eyelids over it, or to retain topical applications in contact with it. He usually applies it to the eyelids of one eye, and afterwards, if both eyes are diseased, to the other. The adhesion never continues longer than forty-eight hours. A little space may be left at the angle of the eye for the discharges from the inflamed surface to escape. In *perverted states of the eyelids—as trichiasis, districhiasis, entropion, ectropion,* &c., the ease with which the desired rectification can be secured renders it, M. Hairion considers, a most valuable palliative and even curative agent.

In pharmacy, collodion has been employed as a *coating for pills.* The pill is placed on the point of a needle and dipped in the solution. M. Durden[7] employs one of the specific gravity .810, and two immersions are sufficient. Pills of aloes and colocynth, thus coated, can be taken without the slightest taste of those nauseous articles being perceived.

Cantharidal Collodion, *Collodium vesicans* seu *cantharidale;* French, *Collodium cantharidal.* Under this name, a vesicating agent has been proposed by M. Ilisch,[8] of St. Petersburg. It is prepared by exhausting, by the method of displacement, a pound of *cantharides* coarsely powdered, with a pound of *sulphuric ether* and three ounces of *acetic ether.* In this manner, a saturated solution of cantharides is obtained. In two ounces of this solution twenty-five grains of cotton powder are dissolved. It may be preserved unchanged in well-stopped bottles.[9]

[1] Lancet, Jan. 6, 1849. [2] Ibid., January 13, 1849.
[3] Ibid., Jan. 27, 1849. [4] Op. cit. [5] Lancet, Dec. 30, 1848.
[6] L'Union Médicale, Nov. 29 & 31; cited in Brit. and For. Medico-chirurg. Rev. July, 1849.
[7] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 243.
[8] Canstatt und Eisenmann's Jahresbericht über die Fortschritte in der Heilkunde im Jahre 1849, S. 178. Erlangen, 1850, and Pharmaceutical Journal, Mar. 1, 1850, cited in Amer. Journ. of Pharmacy, July, 1850, p. 229.
[9] Bouchardat, Annuaire de Thérapeutique, pour 1850, p. 101.

Mr. Charles S. Rand,[1] of Philadelphia, who has made many experiments with this preparation, confirms the statements of M. Ilisch in its favour. Some improvements, he thinks, might be made in his formula. The proportion of cantharides is unnecessarily large, a tincture made with double the amount of ether being found to vesicate with equal power.

In employing M. Ilisch's preparation, it is sufficient to paint the part with a camel's hair pencil dipped in it; and if, after desiccation, which takes place in less than a minute, it appears that the skin is not entirely covered, the operation must be repeated. A more certain and rapid action is obtained, if the part be covered with a little lard or simple cerate. No longer time is required for the blister to be produced than in the case of the Emplastrum cantharides; and it has the advantage of not being disturbed by the movements of the patient.

According to Mr. Rand, the contraction induced by it, as in the case of simple collodion, is a serious objection,—owing to its not only causing pain in the sensitive vesicated surface, but retarding the necessary action; but the addition of Venice turpentine to the amount of about one per cent. effectually obviates this, "and renders the preparation perfect." When the blister is formed, the film of collodion loosens, and, curling at the edges, may, by a slight effort, be detached without rupturing the membrane beneath. If it be simply painted upon the skin, and the ether be allowed to evaporate, vesication does not take place sooner than with the officinal plaster; but if immediately on its application a piece of oiled silk be bound upon the part, and suffered to remain an hour, so as to prevent rapid desiccation, a blister will be formed in three hours, sometimes more quickly; and in one instance it formed in one hour.[2]

The cantharidal collodion has been frequently employed, and has met with much favour.

LXV. COMPRESSIO.

Synonymes. Compression, Methodical Compression.
German. Druck.

This valuable method of modifying the condition of the capillary or intermediate system of vessels, and, through it, the function of nutrition, has become more extensively employed in the treatment of disease. As a sorbefacient, in various *hypertrophies* and *dropsies*, anasarca, ascites, ovarian dropsy,[3] chronic hydrocephalus,[4]

[1] Amer. Journ. of Pharmacy, Jan., 1850, p. 20. [2] Rand, Op. cit.
[3] Mr. Isaac Brown, London Lancet, May 9, 1844, and April 5, 1845.
[4] Hirsch, Casper's Wochenschrift, cited in Provincial Med. and Surg. Journ. April 29, 1843. Engelmann, cited from Gaz. Méd. de Paris, Jan. 28, 1843, in Amer. Journ. of the Med. Sciences, Oct. 1843, p. 458.

&c., it has long been used wherever its agency was applicable, and its effects have been decided.[1] Of late years, it has been proposed in *inflammatory and other affections*, in which it had been previously esteemed inapplicable. Upwards of twenty years ago, it was highly recommended in *rheumatic affections*, by Dr. William Balfour,[2] of Edinburgh; and numerous cases were brought forward by him, and by others, to attest its efficacy. Since then, it has been advised by Guérin,[3] in the cases of *phlegmonous erysipelas* of the extremities; by Velpeau,[4] in *severe burns*, and *phlebitis*, and in *inflammation of the synovial apparatus*;[5] and Mr. James Allan[6] has related three cases of *phlegmasia* benefited by a similar treatment—two were of *erysipelas* of the lower extremities, and one of the face. In these, compression was of speedy and permanent benefit—the pain caused by it being very transient. He states, moreover, that he has found the bandage of very great service in removing the pain and swelling of joints affected with *acute rheumatism*, after the more active degree of inflammation had passed away.

In cases of external inflammation, compression acts probably in two ways,—first, by diminishing the circulation in the intermediate system of vessels concerned in the pathological condition; and, secondly, by restoring tone to the over-dilated vessels; for it is in erysipelatous affections, in which this form of hyperæmia more especially exists, that it has been found of greatest advantage. Numerous cases of *erysipelas* of the extremities have been treated by the author by compression, and with great benefit. He is constantly, also, in the habit of employing compression, under the circumstances mentioned by Mr. Allan, in *arthritic affections* attended with great effusion, and with the most satisfactory results.

From an observation of the good effects resulting from compression in analogous cases, it occurred to Dr. Fricke,[7] of Hamburg, that it might be employed with advantage in cases of *orchitis* or swelled testicle (*hernia humoralis;*) which is frequently very tedious, and requires means that are by no means easy of application. He, accordingly, had recourse to it, and the result was satisfactory: he found, that "the disease could be removed by it in a simple, easy, and surprisingly rapid way." Dr. Fricke was not,

[1] Clinique Médicale de l'Hôpital Neckar, p. 247, Paris, 1835; or the author's translation in American Medical Library, first year. See, also, the author's General Therapeutics, p. 228, Philad. 1836; or his General Therap. and Mat. Med. 4th edit. ii. 285, Philad. 1850; likewise, Morelli, Annali Universali di Medicin. Marzo, 1840, cited in Brit. and For. Med. Rev. Jan. 1841, p. 237.

[2] A new mode of curing Rheumatism and Sprains without Debilitating. Edinb. 1817.

[3] Journ. Analyt. i. 90.

[4] Ibid. and Bulletin Général de Thérapeutique, No. 16, Août 30, 1836.

[5] Nouv. Bib. Méd. Août, 1826; and Mérat and De Lens, Dict. de Mat. Méd., art. Compression.

[6] British Annals of Medicine, Jan. 27, 1837.

[7] Zeitschrift für die gesammt. Medicin. B. i. H. 1, Hamburg, 1836. See, also, Brit. and For. Med. Rev. for July, 1836, p. 253.

however, the first to employ compression in this disease. It would seem, that as long ago as the year 1803, it was used at the Pennsylvania Hospital, by Dr. Physick, and by Dr. Hartshorne.[1] Dr. Fricke is of opinion, that, generally speaking, compression may be employed in *every kind of inflammatory engorgement of the testicle*, whatever may have been its cause, and at all stages of the disease. In many cases, the pain was, at first, in some degree, increased; and in some, especially when applied too tightly, it induced great suffering; but this never continued long—the patient, in a short time, finding himself so much relieved as to be able to leave his bed and walk about the room. In many cases of recent origin, a single application of the compression was sufficient; but when the disease was of longer duration, say from three to eight days, it was found necessary to repeat it two or three times. Swelling of the spermatic cord, if not very considerable, did not contra-indicate its use; nor did other coexistent local affections, as buboes, ulcers, &c. When a general febrile state accompanied the orchitis, compression was found to be the best means for removing it, where the vascular action was not too considerable; although, in extremely rare cases, such a state was the effect of the compression itself. When the pain was very severe, it was generally owing to the compression having been too strong, and the same was the case with certain signs of gastric derangement, that occasionally supervened. In these cases, it was necessary to suspend the remedy until the derangement was removed by the use of an emetic, or the application of a poultice to the stomach. Such cases were, however, extremely unfrequent. The good effects exhibited themselves very soon after its employment, and the speedy abatement of the pain was always the surest sign of its efficacy. If it continued for some hours in any considerable degree, a general disorder of the system might be looked for to explain the failure of success.

In the summer of 1835, Dr. Fricke treated, in this manner, seventeen cases. Of these were cured, in one day, one; in three days, four; in four days, two; in five days, three; in nine days, one; and in ten days, two. The last three were severe and unfavourable cases. For the purpose of compression, he employed sticking plaster, made very adhesive, but not of too irritating materials, and spread on strips of linen, of the breadth of the thumb. No preparatory measures, as leeches, cataplasms, &c., are required. In slighter cases, the patient may stand before the surgeon, leaning against the wall, or he may sit on the edge of a bed or sofa, so that the scrotum may hang freely down. If the scrotum and neighbouring parts are much covered with hair, it must be removed; but, generally speaking, this is unnecessary.

[1] American Journal of the Med. Sciences, Jan. 1842, p. 258.

The following is the method adopted by Dr. Fricke for applying the compression:—The surgeon takes the scrotum in one hand, and separates the diseased from the sound testicle; whilst, with the other, he gently stretches the skin of the scrotum over the former. The spermatic cord is isolated in the same manner. If the swelling of the testicle be considerable, it must be held by an assistant. The surgeon now applies the first strip over the isolated spermatic cord, about a finger's breadth above the testicle, holding the end of the strip with his thumb, and passing it round the cord. He proceeds in the same manner with the second strip, which must cover the former either in part or altogether. The first part of the process must be carefully done; the strips must compress the cord closely; for this purpose, the cord must be kept approximated to the skin, which must be tightly stretched over it; otherwise, when the other extremity of the testicle is compressed, the upper end will be apt to slip upwards through the loose rings of adhesive plaster, which will not only occasion pain, but render the whole operation abortive. In this manner, the surgeon proceeds, applying strip after strip, the last always lying over its precursor by a third of its width, until the thickest part of the testicle, where it begins rapidly to decrease in diameter, is reached. The mode of procedure is now changed—the surgeon lays hold of the part of the testicle already covered, and passes his strips longitudinally from above downwards over the lower portion of the testicle. In this way, the rest of the testicle is closely enveloped and compressed. The proper degree of compression will be indicated, in most cases, by the speedy disappearance of the pain which had previously existed. When both testicles are affected, they must both be included in the circular strapping—the testicle already covered serving as a point of support for the other, as there is not room enough for the application of the circular strips over the second, in the same way as over the first. In some cases, where the skin is irritable, ulcerations take place: small slits may then be cut in the plaster, and a Goulard lotion be applied. Generally speaking, the patient may leave his bed immediately after the strapping has been attached, and walk about the room; and, where the inflammation has not been great, he may even attend to light labour out of doors. When the strapping becomes loose, it may have to be reapplied, but often one application is sufficient.

In orchitis, caused by blows or pressure, compression is regarded by Dr. Fricke as the best agent. If the inflammation runs very high, he usually applies leeches, in the first instance, and keeps on poultices for a day or two; but, in slighter cases, he has recourse immediately to compression. The principal advantages which he considers this mode of treating orchitis has over others, are: *First*. The speedy removal of the pain; *Secondly*.

The quick removal of the disease itself; *Thirdly*. The simplicity of the plan, and the slight trouble given thereby to the patient; *Fourthly*. Its small expense: and, *Fifthly*. The comparatively slight care and attendance required on the part of the surgeon. The last two points, as he properly remarks, are of considerable importance in hospital practice.

Since this plan of treating orchitis was suggested by Fricke, it has been successfully employed by our hospital and other surgeons, although it has been by no means extensively adopted. Several cases, too, have been mentioned by M. Dèchange,[1] of Liége, formerly *chef de clinique chirurgicale* at the Hôpital de Bavière. Of twelve cases of acute orchitis, thus treated, three were cured in three days; and the remainder before the seventh day. Mr. Langston Parker[2] has also extolled this remedy, not only in ordinary swelled testicle, but in *chronic* or *subacute inflammation of the testes*, whether dependent on syphilitic causes or not; and a more recent writer[3] affirms, that he has adopted the practice in many cases, and can speak most unequivocally in its praise. It may be employed, he remarks, in very acute forms; and he has seen several instances, where the patients had not lain in bed an hour, "whilst under the ordinary antiphlogistic treatment they would have been confined from ten days to a fortnight."

Methodical compression has been employed with advantage in *mammary abscess*, by MM. Trousseau and Contour.[4] They found it frequently produce a cure when used at the commencement of the inflammation; relieve the pain when suppuration was established; and of great service after the abscess was emptied. The compression was made by means of strips of diachylon plaster, an inch broad, and several feet long, carried round the body, so as to produce regular compression of the whole breast.[5]

M. Brachet, of Lyons,[6] has reported four cases of *spermatorrhœa* treated by compression of the prostate gland. He states, that pressure cannot be employed indiscriminately in every case; often, by removing the cause we can cure the disease; but he thinks it will succeed in all cases of *atony* produced by *venereal excesses*, *onanism* or *blennorrhagia*. The effects produced by compression are, in his opinion, of two kinds. In the first place it keeps the seminal fluid in its reservoirs, which are thus accustomed to its contact and enabled to retain it longer; and in the second place, it modifies the condition of the urethra, prostate, and seminal excretory ducts. The bandage is composed of a waist-band

[1] Bulletin Médical Belge, Août, 1838, p. 218.
[2] London Lancet, July 25, 1840, p. 640. See also, J. Dixon, Lond. Lancet, Dec. 5, 1840.
[3] Brit. and For. Med. Rev., Oct. 1840, p. 393.
[4] Journal des Connaissances Méd. Chirurg., Février, 1841. See, also, J. Bell, Lond. Med. Gaz., or Med. Intelligencer, Dec. 1841, p. 121.
[5] See, also, Littrè, Journal des Connaiss. Med. Chirurg., Janvier, 1841.
[6] Medical Times, May 24, 1845.

of leather, the extremities of which unite on the abdomen: from its centre behind a strap descends, which, on reaching the genital organs, bifurcates, and is finally buckled in front to the cincture. On the descending strap a small cushion is placed opposite the part on which pressure has to be made. Dr. Batchelder,[1] of Utica, affirms, that he has been in the habit of using compression of the perinæum as a remedy in this affection for upwards of twenty years.

Compression of the arteries, as an antiphlogistic agent, has been revived by Goyrand, Malapert, and others; the object being to prevent the afflux of blood to a part labouring under hyperæmia. The origin of this idea has been a matter of controversy;[2] but, as Dezeiméris[3] has remarked, it certainly is not due to the gentlemen who have engaged in it. Blaud compressed the carotid in *brain fever;* Autenrieth did the same, before Blaud, in cases of *convulsions.* Earl, in *epilepsy;* Livingston and Kellie, in *rheumatism;* Ludlow, in *gout;* and Parry, of Bath, half a century earlier, employed compression of the vessels in different diseases, with the clearest appreciation of its *modus operandi.*

Compression of the carotids has been used by M. Ströhlin[4] in *hysteric convulsions,* and has almost always succeeded in modifying the form of the attack. He used it in two cases of *epilepsy* with similar success. Compression of the carotids at the commencement of the paroxysm always caused them to cease in a minute afterwards.

M. Allier[5] has published a case of *intermittent neuralgia* of the lobe of the right ear, cured by compression of the primitive carotid of the same side: half an hour before the paroxysm, the compression was exerted, with interruptions of five minutes every quarter of an hour. He has, also, reported a case of *neuralgia of the orbito-frontal nerve;* and, subsequently, of the *nervus pudendus superior,* respectively cured by compression of the carotid, and abdominal aorta. The compression of the carotid of the affected side was continued the whole forenoon, with pauses of five minutes every quarter of an hour. For the pudic neuralgia, the abdominal aorta was compressed for the space of three quarters of an hour: the neuralgia, in both instances, gradually ceased. M. Dufrèsne[6] has published a case of *hemicrania* and *facial neuralgia* of the right side, cured by the same means. Compression of the right primitive carotid for ten seconds occasioned instantaneous disappearance of the pain, which returned in one minute after the removal of the pressure. Compression of the

[1] New York Medical and Surgical Reporter, cited in St. Louis Med. and Surg. Journ., June, 1846, p. 43.

[2] Gazette Médicale de Paris, No. 46, 18 Nov., 1837, and No. 47.

[3] Ibid.

[4] Archives Général. de Medecine, Mars, 1841.

[5] L'Experience, No. 16, 20 Jan., 1838.

[6] Ibid. No. cxxviii. Dec. 1839.

same vessel for twelve seconds also caused immediate cessation of the pain, but it shifted to the posterior part of the head. This pain ceased with the removal of the pressure, and in two minutes afterwards the original pain reappeared on the right side. When graduated compression was made on the same vessel for thirty seconds, the pain, as before, moved to the posterior and left part of the skull. M. Dufrèsne then pressed on the left carotid, and, increasing the force as he diminished that on the right side, the posterior pain disappeared, and no return of either had taken place ten minutes afterwards. The patient slept well and made no complaint of pain in the morning.

The employment of compression of the epigastrium to arrest *hiccup* was recommended by Bordeu, but it had fallen into oblivion. It has been revived, however, and was suggested to M. Rostan[1] by an old physician of Paris, whose wife was subject to attacks of hysteria, during which she suffered from incessant hiccup, and in which he had observed, that she experienced remarkable relief from strong compression on the epigastrium with the hand. Since then, M. Rostan has employed it in many cases of the same kind, and constantly with good effect, whatever might have been the cause of the hiccup. To render the pressure constant, he has employed a pad with a truss-spring as a substitute for the hand; and M. Boyer[2] has recorded three cases of painful and obstinate hiccup instantly relieved by the same means.

Compression of the abdominal aorta has been revived by M. Baudelocque, and many others, with the view of arresting *uterine hemorrhage* occurring in labour, as well as the hemorrhage which follows *wounds of the arteries of the inferior half of the body*.[3] In a case of *uterine hemorrhage*, detailed by Dr. Ehrenreich,[4] external compression by the hand on the abdomen, which is the only way of acting on the aorta when any obstacle exists to the introduction of the hand into the uterus, was tried without success, owing to the thickness of the abdominal parietes. The hemorrhage was, however, completely controlled by introducing the entire right hand into the uterus, and making forcible pressure with the fingers in a conical shape on the aorta immediately above its bifurcation. Many similar cases have been published and referred to by M. Piédagnel, in a memoir communicated to the *Société Médicale d'Emulation*, of Paris, on which an excellent report was read by MM. Velpeau and Brière de Boismont, giving a history of the process. It is necessary at times that the compression should be continued for a considerable period, even for an

[1] La Lancette Française, 20 Févr. 1847.
[2] Revue Médico-Chirurg. Juillet, 1847.
[3] See an account of Baudelocque's views, by J. C. Christophers, in Lancet, July 20, 1839, p. 599.
[4] Medicinische Zeitung, No. xxxvii. 1839, cited in British and Foreign Medical Review, July, 1840, p. 274.

hour or two, should the case seem to require it. The gentlemen last cited advise that it should be associated with ergot.[1]

The mode adopted by M. Seutin[2] for compressing the aorta in such cases is as follows. The woman is to be placed on a horizontal plane, with the head and shoulders raised, and the thighs flexed upon the pelvis, in order to relax the abdominal muscles as much as possible, and to avoid mechanical engorgement of the uterine vessels. The surgeon, placed on the right side of the patient, uses the left hand to compress the vessel, keeping the right disengaged for any other purpose which the case may demand. The intestines being pushed on one side by gentle manipulation, the three fingers of the left hand are pressed firmly and deeply behind and to the left of the uterus, nearly on a level with the umbilicus. By this plan, the aortic pulsations will be evident, and farther pressure is then to be made in a direction downwards and backwards. In order that the operator may not be too much fatigued by continued exertion, his hand may be compressed by those of an assistant.

Lastly: M. Allier[3] employed compression of both carotids in a case of *hydrophobia* at the commencement of an attack; immediately, the convulsion ceased, and the patient became apparently exanimate. The family were alarmed, and would not permit a repetition of the experiment. The case ended fatally.

In paroxysmal diseases, the ratio medendi of compression is not the same as in inflammatory diseases. In the latter, the flow of blood towards the inflamed part is prevented by the compression of the arterial vessels proceeding to it; but when compression is exerted on the vessels in neuralgia and congenerous diseases, the new impression caused by the resulting irregularity in the circulation, and the modification in the nervous functions induced thereby, break in upon the morbid catenation like the different agents that are classed under the head of antispasmodics, of which class we have elsewhere endeavoured to show—what, by the way, is not now contested by any eminent therapeutist—that we have none that can be regarded in any other light than as indirect agents.[4]

[1] La Lancette Française, 12 Mai, 1840.

[2] Bullet. de l'Acad. Méd. Belge, cited in Ranking's Abstract, pt. 1, p. 180, Amer. edit. New York, 1845. [3] L'Expérience, No. xvi., 20 Janv., 1838.

[4] See the author's General Therapeutics, p. 380; or his General Therapeutics and Mat. Med. 4th edit. i. 395. Philad. 1850.

LXVI. CONTRA-IRRITA'TIO.

Synonymes. Counter-irritation, Counter-action.
French. Contre-irritation.
German. Gegenreizung.

It is not the object of the author to enter into an explanation of the therapeutical application of counter-irritants, or revellents in general: this he has done at considerable length elsewhere;[1] but to refer to some agents not mentioned in the body of this work, to which attention has been revived, or first directed, of late years more especially.

AMMONIATED COUNTER-IRRITANTS.

Gondret's ammoniacal ointment; Granville's counter-irritants—Antidynous[2] counter-irritants—Raspail's counter-irritant.

Ammonia has long been used in different formulæ for exciting rubefaction and vesication of the cutaneous surface. When two parts of *liquid ammonia* are united with one part of *suet*, and one of *oil of sweet almonds*, the mixture forms the *Pommade ammoniacale* of Gondret, which has been used for a long time to excite a speedy revulsion in cases of *chronic affections of the brain, incipient cataract, amaurosis*,[3] &c., as well as to cauterize the integuments deeply.[4] To the advantages of this preparation, as well as of derivation in various diseases, M. Gondret has called the attention of practitioners in an *ex professo* treatise.[5]

The formula, given above, is that of the French Codex; but, according to M. Trousseau,[6] it is much too hard for use, unless the weather is warm. He proposes two different formulæ,—one for summer, and the other for winter. In the former, he directs three parts of *lard*, one of *suet*, and four of *liquor ammoniæ;* in the latter, equal parts of *lard*, and *liquor ammoniæ*.

M. Gondret has communicated to M. Miquel a formula for his *Pommade*, which differs from that of the Codex, and according to him, succeeds much better. It is as follows:—Take of *lard*, 32 parts: *oil of sweet almonds*, 2 parts. Melt by a gentle

[1] General Therapeutics, p. 333; or General Therapeutics and Mat. Med. ii. 217.

[2] A term coined by Dr. Granville. It ought to be "Antodynous," from ἀντι, "against," and ὀδυνη, "pain."

[3] Bouchardat, Annuaire de Thérapeutique pour 1844, p. 215, Paris, 1844, and Lisfranc, Ibid. 845, p. 1255, Paris, 1845.

[4] Considerations sur l'emploi du feu en médecine, suivies de l'exposé d'un moyen épispastique propre a suppléer la cautérisation, et à remplacer l'usage des cantharides. Paris, 1819; and Nouv. Biblioth. Méd. iii. 441, Paris, 1828.

[5] Traité théorique et pratique de la Derivation contre les affections les plus communes, en général, telle que la Pléthore, l'Inflammation, l'Hémorrhagie, &c. Paris, 1837.

[6] Journ. des Connaiss. Méd., cited in Medico-Chirurgical Review, July, 1840, and Trousseau and Pidoux, Traité de Thérapeutique, &c., 3ème édit. i. 366. Paris, 1847.

heat; and add *liquid ammonia* at 25°, 17 parts, stirring until it becomes cold.[1]

Since the appearance of M. Gondret's treatise, Dr. Granville[2] has published one on counter irritation, which gave rise to much attention on both sides of the Atlantic,—partly in consequence of the strong encomiums he passed on certain counter-irritant applications employed by him; and still more in consequence of the mystery which he threw around them, by keeping their preparation a secret, until the united voice of the profession had expressed the mingled feelings of surprise, indignation, and regret, which such conduct on the part of an individual, holding an elevated position in the ranks of the profession, naturally engendered. It is due, however, to Dr. Granville to remark, that on subsequently publishing his formulæ, he stated, that he addressed his work to the public to impress all with the value of the agency, but that it would have been unwise in him to give precise formulæ to those who could not estimate the proper proportions of the ingredients; that every physician can apportion them; and that he had never concealed the formulæ from his friends, and always intended to give them to the world.[3]

Dr. Granville describes two sorts of ammoniated lotions, of different degrees of power, which are prepared in the following manner: Each kind of lotion consists of three ingredients:—1st. *The strongest liquor of ammonia*, A. 2d. *Distilled spirit of rosemary*, B. 3d. *Spirit of camphor*, C. These are made as follows:—

A. The strongest Liquor of Ammonia.—Saturate a given quantity of distilled water, contained in a glass receiver surrounded by ice, with ammoniacal gas obtained in the usual way from a mixture of equal parts of *muriate of ammonia* and recently *slacked lime*, both reduced to a fine powder. The water may be made to take up nearly 800 times its bulk of ammoniated gas under the circumstances described; its specific gravity will then be about .872, and 100 parts of it will contain thirty-three parts of real ammonia, according to Sir H. Davy's tables. This solution of ammonia will, therefore, be more than three times the strength of the *liquor ammoniæ* of the Pharmacopœia of London, 100 parts of which, at a specific gravity of .960, contain only ten parts of real ammonia. Dr. Granville, therefore, called this "liquor ammoniæ fortissimus." The liquor ammoniæ fortior of the last United States' Pharmacopœia (1842,) which is of the specific gravity .882, is of sufficient strength.

[1] Bouchardat. Op. cit. 1845, p. 254.

[2] Counter-irritation, its Principles and Practice, illustrated by one hundred Cases of the most painful and important Diseases effectually cured by External Applications. London, 1838; or Amer. Med. Lib. edition. Philad. 1838.

[3] Lond. Lancet, Oct. 27, 1838.

B. Distilled Spirit of Rosemary.—Take two pounds of the *tips or small leaves of fresh rosemary*, and eight pints of *alcohol;* leave the whole in infusion for twenty-four hours in a well covered vessel, and after adding as much water as will just prevent the empyreumatic smell, distil over seven pints. The Pharmacopœias of London and the United States direct the essential oil of rosemary to be distilled with alcohol to form the spirit of rosemary. Such a preparation Dr. Granville found unsuited for his purpose.

C. Spirit of Camphor.—To four ounces of pure *camphor* add two pints of *alcohol*, so as to dissolve the camphor, and filter.

The three ingredients, thus prepared, should be kept always ready at hand, in well-stoppered glass bottles, so as to be able to make, extemporaneously, a counter-irritating lotion of any requisite strength, according to the nature of the case. But, for ordinary purposes, Dr. Granville advises that both a milder and a stronger ammoniated lotion should be kept prepared for use.

Lotio ammoniata mitior.

Milder ammoniated lotion.

Assuming the quantity of lotion desired to be divided into *eight* parts, the proportion of the ingredients will stand thus:—

A—four-eighths. B—three-eighths. C—one-eighth, or as follows:—

℞. Liq. ammon. fort. f ℥j.
Spirit. rosmarin. f ℥vj.
Tinct. camphor. f ℥ij. M.

Lotio ammoniata fortior.

Stronger ammoniated lotion.

If the quantity desired be also divided into eight parts, then the proportion of the ingredients will run as follows:—

A—five-eighths. B—two-eighths. C—one-eighth, or as follows:—

℞. Liq. ammon. fort. f ℥x.
Spirit. rosmar. f ℥ss.
Tinct. camph. f ℥ij. M.

Although the changes of proportion may be deemed trifling, yet the strength of this lotion is such, that Dr. Granville never employs it, except in cases of apoplexy, and for the purpose of cauterization.

Directions for Mixing the Ingredients—A and B are gradually mixed together. The mixture becomes opalescent and somewhat turbid, and a peculiar, highly agreeable, ethereal smell is given out, different from the individual odour of either ingredient, although the extreme pungency of the ammonia is still discerni-

ble. "I have strong reasons to believe," says Dr. Granville, "that, at this point of the operation, some particular change takes place, which imparts to the mixture of the two ingredients some of its valuable peculiarities as a counter-irritant described in my work; but what that change is, it is not my business to enter upon in this place: suffice it to say, that in a great number of experiments made with the ingredients separately (for each of them acts as a counter-irritant on the skin,) and with them combined, the effects were uniformly different; those in the former case being found unequal to the production of those complete results which I trust I have justly promised to the profession. Ammonia alone (however strong) will not give rise to the effects I have described, though it has often stopped internal pain, and produced small blisters; but never has it succeeded in almost immediately producing a full vesication, as I have seldom failed to produce with the two ingredients mixed together, particularly after the third ingredient had been added." Before, however, the third ingredient is so added, it is desirable to clear the previous mixture, by the addition of a small quantity of alcohol, and to set the whole in a cool place. All the various precautions here mentioned may, upon an emergency, be dispensed with, when an immediate action is required, either to arrest pain or relieve deep-seated inflammation. But for the more delicate uses, particularly for instantaneous vesication, Dr. Granville recommends, that the preparations should be obtained in the manner specified. The lotion must always be kept in bottles with a glass stopper.

M. Raspail[1] has recommended the following lotion, the effects of which, he says, are often instantaneous in relieving intolerable *headach:*

℞ Liquor. ammon. p. 100.
Aquæ destillat. p. 900.
Sodii chlorid. purif. p. 20.
Camphor. p. 2.
Essent. rosar. q. s.

The whole to be mixed cold.

A piece of linen is to be steeped in this solution, and applied over the part of the head which is the seat of pain, care being taken that none of the fluid passes into the eyes.

EFFECTS ON THE ECONOMY IN HEALTH.

The various counter-irritants, described above, act essentially in the same manner; differing only in the intensity of the counter-irritation which they induce. In all, liquor ammoniæ is the main effective ingredient. The stronger of Granville's lotions is a powerful agent. It gives rise, in a few minutes, to vesication over the whole surface to which it is applied; almost as rapidly, indeed, as if boiling water were placed upon the part.

[1] L'Expérience, 24 Juillet, 1840.

It need scarcely be said, that the strength of these lotions may be regulated so as to produce either full vesication, or simply rubefaction, by varying the quantity of liquor ammoniæ.

The mode of applying these liquid counter-irritants is, as in the case of *Oleum Sinapis*—first to impregnate with them a piece of cotton or linen, folded six or seven times, or a piece of thick or coarse flannel; and then lay either of these on the spot, pressing with the hand, at the same time, very steadily and firmly on the compress, over which there should be placed a thick towel, doubled several times, so that not only the evaporation of the lotion may be impeded, but the hand employed in pressing the application to the part may not suffer from direct or indirect contact with the liquid. Care must be taken that the ammonia does not reach the eyes or nose.[1] As a general rule, the application should seldom be kept on longer than from one to six or eight minutes; and, Dr. Granville affirms, it has often happened to him to find, that less than a minute was sufficient to produce the desired alleviation of pain and spasm. But, in order to excite the higher degrees of counter-irritation, vesication and cauterization, as many as ten or twelve minutes may be necessary.

EFFECTS ON THE ECONOMY IN DISEASE.

There can be no doubt that the ammoniated counter-irritants are valuable agents in all those diseases which are capable of being benefited by a sudden and powerful revulsion. It is chiefly, as elsewhere stated,[2] when the diseased action has been prolonged for a considerable period, and in affections which belong to the *neuralgic class*, that rapid revulsions are productive of the most marked advantage. When the disease is of an acute character—as in the different phlegmasiæ—revellents which are more prolonged in their action, are—as a general rule—preferable. It is in the first class of affections, chiefly, that his lotions are extolled by Dr. Granville; he urges the importance of the sudden vesication effected by them in the treatment of many serious disorders; and affirms that they arrest "*nervous* and *muscular pain* almost immediately, provided it does not depend on structural disease."[3] There is perhaps no agent—he remarks—except boiling water, which can, in the space of between three and ten minutes, give rise to as ample a vesication. But, as powerful and effective a revulsion can be accomplished by the actual cautery in various forms, and especially in that of the moxa. This we say from observation; and it is a result to which just theory would lead us. The ammoniated lotions are, however, devoid of

[1] Granville, Op. cit., Amer. edit. p. 39.

[2] General Therapeutics, p. 341; and General Therapeutics and Materia Medica, 4th edit., ii. 221. Philad. 1850.

[3] Lancet, Oct. 27, 1838.

the painful mental impression, which the dread of actual fire occasions; although we doubt not that, in many of the cases above referred to, such mental impression may exert an important agency in the cure.

Dr. Granville gives the following, not very classically arranged, list of diseases, which, in the course of nine years, have appeared to him to be benefited by his counter-irritants.

DISEASES.

A. Principally affecting the Nervous System.

1. *Acute neuralgia* { periodical / permanent } Tic douloureux.
2. *Spasms*
3. *Convulsions* } including { Epilepsy. / St. Vitus's Dance. / Hysterics.
4. *Cramp.*
5. *Brow-ague.*
6. *Tetanus or Lock-jaw.*
7. *Highly acute toothach.*
8. *Nervous headach.*

B. Principally affecting the Muscles and Tendinous Tissues.

9. *Rheumatism.*
10. *Lumbago.*
11. *Swelled and highly painful articulations.*

C. Principally affecting the Circulation.

12. *Headach from fulness of blood in the head.*
13. *Congestions and sudden attacks of blood in the head.*
14. *Sore-throat.*
15. *Early inflammation* { *a.* of the trachea and bronchia, / *b.* of the lungs and their membranes, / *c.* of the heart and pericardium. } Tending to consumption.

D. Diseases of a mixed character.

16. *Suppressed gout* { *a.* affecting the heart. / *b.* affecting the stomach.
17. *Genuine gout.*
18. *Paralitic debility.*

E. Accidental, Mechanical and Cutaneous Derangements.

19. *Violent sprains.*
20. *Pimples.*
21. *Biles.*
22. *Ringworm.*

Dr. Granville does not affirm that all these disorders, and their modifications, have yielded to the ammoniated counter-irritants; or that the counter-irritants were always the sole agents employed. On the contrary, a few of them, he says, on particular occasions, resisted that agency; others were only momentarily benefited; and a few more required the simultaneous employment of ordinary internal remedies to assist in, and complete the cure. Among the exceptions to the general rule of success, he enumerates

chronic tic douloureux; chronic rheumatism of long standing; epilepsy dependent on organic mischief in the encephalon, or any part of the spinal apparatus; and rheumatic gout, in persons whose constitutions had been completely shaken by that disorder, or by any other previous disease, although, even in this case, some good was obtained from using the ammoniated counter-irritants. The second and fourth of these disorders are of the number that require, in addition to the ammoniated applications, an appropriate internal treatment. The other two Dr. Granville has found to be only partially relieved, but never cured, by counter-irritating lotions.[1]

In many of the disorders, referred to by Dr. Granville in the table given above, the ammoniated counter-irritants have been employed, both in public and private in this country. They have been largely used by the author, and their effect in *nervous* and *spasmodic diseases*, in *neuralgic* and *deep-seated rheumatic pains*, has, at times, been very striking. Severe pains have yielded rapidly, as described by Dr. Granville; *hyperæmiæ* of particular organs have been diverted elsewhere, especially after blood-letting and sedatives had been premised; and, in short, whenever revellents, sudden and rapid in their action, have been demanded, ammoniated counter-irritants have effected every thing that similar powerful revellents were capable of accomplishing,—but no more. The author has been in the habit of having recourse to the moxa in congenerous affections, and with equally satisfactory results. There is one objection, too, that applies to the use of these strong lotions:—the sloughs and sores induced by them are often considerable, and remarkably difficult to heal. This, it is true, may be partly prevented, by being careful that the application is not too long continued; but, with the greatest caution, these results will, at times, supervene. When such is the case, simple dressings, with emollient poultices, will be found the best applications.

Not long ago, Dr. Corrigan,[2] of Dublin, strongly recommended a mode of producing counter-irritation as an admirable remedy in *lumbago* and analogous affections in other parts of the body. It consists in a species of "FIRING" performed by an iron instrument which is very portable, and consists of a thick iron wire shank, about two inches long, inserted in a small wooden handle, having on its extremity, which is slightly curved, a disc or button of iron, a quarter of an inch thick, and half an inch in diameter, the whole instrument being only six inches in length. The face of the disc for application is quite flat. The only other portion of apparatus required is a small glass spirit lamp, so small that it can be carried in the waistcoat pocket. To use the instrument, the

[1] Op. cit., p. 29.

[2] Dublin Hospital Gazette, March, 1846.

lamp must be lighted, and the button held over the flame, keeping the forefinger of the hand holding the instrument at the distance of about half an inch from the button. As soon as the finger feels uncomfortably hot, the instrument is ready for use, and the time required for heating it to this degree is only about a quarter of a minute. It is applied as quickly as possible, the skin being tapped successively at intervals of half an inch over the affected part as lightly and as rapidly as possible; care being taken to bring the flat surface of the disc in contact with the skin. In this way, the process of firing a whole limb, or the loins, making about one hundred applications, does not occupy a minute, and once heating the lamp suffices. The iron is never rendered red hot; it is very little hotter than boiling water, and an eschar is never made by it, and rarely a blister. The pain produced by its application is so slight, that, according to Dr. Corrigan, some of the resident clinical clerks in the hospital preferred it, in their own cases, when suffering under *local muscular rheumatism*, to any other method of counter-irritation,—it being, in their opinion, the least troublesome, most rapid, least painful and most effectual. In *sprains of the muscles* of the back and other parts, and in *sciatica*, he has seen it render valuable service, as well as in *neuralgia* of the fifth pair, and in *paralysis of the portio dura*. Even delicate females, he says, will not object to its frequent repetition, when required.

The method of Dr. Corrigan has been extensively tried by Dr. M'Cormack,[1] who has reported very favourably in regard to its powers, and by others.

LXVII. CORTEX ADSTRIN'GENS BRASILIEN'SIS.

Synonymes. Cortex adstringens Brasiliensis verus, Cortex adstringens verus, Astringent Bark of Brazil.
German. Adstringirende Brasilianische Rinde.

This bark was introduced into Germany, in the year 1818, by Schimmelbusch, a merchant, who carried it from Brazil, where it had long been used internally, as well as externally, as an excellent astringent.[2] According to Von Martius,[3] it is the bark of Acacia jurema, but this is not certainly determined.[4] Oesterlen[5] assigns it to *mimosa* (acacia) *cochliacarpa* seu *virginalis*. Merrem[6] affirms, that the genuine bark is in more or less flat pieces; at times, in half, or complete rolls, from four to twelve

[1] Lancet, Jan. 5, 1847.
[2] Von Schlechtendal, in Encyclop. Wörterb. der Medicin. Wissenschaft. B. viii. S. 538. Berlin, 1822.
[3] Reise, ii. 788.
[4] Riecke, Die neuern Arzneimittel, S. 146.
[5] Handbuch der Heilmittellehre, S. 484. Tübing. 1845.
[6] Ueber den Cortex adstringens Brasiliensis. Köln, 1828.

inches long; from an inch to two inches and a half broad, and from one to four lines thick; these are more frequently straight than crooked. The bark may be separated into two parts; an outer, which is rough, and an inner rind, of a smooth, fibrous character: the two are but loosely connected together. The outer bark is of a grayish-brown colour, traversed by longitudinal and transverse furrows, having, here and there, white and grayish-white crusty growths, covered with a foliated lichen. The inner bark is of a dark-red brown, on its outer surface, and, after the outer bark has been separated, is somewhat smooth: on the inner side, it is of a bright reddish-brown, and, probably owing to the laceration of the woody splinters, somewhat fibrous. The younger bark is smooth in the fracture, and of a dull splendour. The older bark, which is thicker, is unequal, and may often be separated into fibrous layers, which are readily lacerable. When chewed, it has a tolerably strong, astringent, somewhat bitter and disagreeable taste, but it does not excite nausea, nor leave any *arrière-gout*. It has scarcely any smell. In its chemical relations, it resembles rhatany.[1]

Merrem, who made numerous experiments with the bark, affirms, that, whilst it possesses the properties of astringents in general, and to a high degree, it is rather sedative than exciting; agrees with the digestive organs, and aids the peristaltic action. He employed it, first, with more or less success, in *hemorrhage*—in *epistaxis*, *hæmoptysis*, and *metrorrhagia;* and Günther[2] found it very efficacious in *profuse menstruation* arising from atony of the uterus. Secondly; in *mucous discharges*, as *leucorrhœa*, *blennorrhœa*, &c. Thirdly; in *inflammatory* and *exanthematous affections*—as *cynanche*, *urticaria*, and in *periodical erysipelas of the face*. Fourthly; in *nervous diseases*, especially when associated with disturbance of the menstrual function, and *leucorrhœa:* and, fifthly, in *weakness* and *catarrhs of the genital organs, bladder* and *rectum*. The Indians consider, that the bark affects especially the generative apparatus, and, from the experiments of Merrem, it would seem, that its agency is more particularly exerted in cases of *leucorrhœa;* and in many, after cinchona had been administered without effect.[3]

MODE OF ADMINISTRATION.

Merrem prescribed it in various forms. He gave the powder in doses of from ℈j. to ʒss., three or four times a day, mixed with water. It appeared to him to act most beneficially in cases of *mucous discharges unaccompanied by disorder of the digestive*

[1] See the analysis by Hofrath Trommsdorff, in Brandes, Archiv., B. xxxiii. S. 260; and Dierbach, in Heidelberg. Annalen, B. x. H. 3, S. 357. Heidelb. 1834.

[2] In Harless Rein-Westphal. Jahrbüch, B. viii. St. 1, S. 72; and Brandes, Archiv. Band, xi. S. 200.

[3] Osann, in Encyc. Wörterbuch der Medicin. Wissensch. viii. 541.

functions; and he found that the powder was better borne by some than the decoction, which is singular, as the woody matter is more apt, in such cases, to disagree. He rarely gave it combined with aromatics, and never found the combination of use. To form the DECOCTION, an ounce of the *coarsely powdered bark* was boiled with sixteen ounces of *water*, down to f ℥viij.; and to this an ounce of *syrup* was added. The dose was from one to two spoonfuls every two hours. Merrem also prepared an EXTRACT, and a TINCTURE, in the same manner as these preparations are made of cinchona; of the former, he took from one to two drams, dissolved it in six ounces of an *aromatic water*, and added ℥ss. of *syrup*. Of the mixture, a spoonful was given every hour.

Externally, the decoction was injected three times a day in *leucorrhœa* and *blennorrhœa;* or, in the former disease, a sponge imbued with the decoction was introduced, and kept there for some time. It has been applied, also, as an astringent to *ulcers*.

Mistura corticis Brasiliensis adstringentis.

Mixture of the astringent bark of Brazil.

℞. Decoct. cort. adstring. Brasil. f ℥vij.
Copaib. cum vitelli ovi q. s. subact.
Tinct. ferri pomati, āā f ʒij.
Syrup. balsam. f ℥j. M.

Dose.—A spoonful every two hours, in obstinate *gonorrhœa* and *leucorrhœa*. *Merrem.*

℞. Cort. adstring. Brasil. ℥ss.
Coque cum aquæ fontan. q. s.
Sub fin. coction. adde
Sabin. ℥ss.
Colaturæ f ℥viij. adde
Syrup. aurant. cort. f ℥j.

Dose.—A spoonful every hour in *cancer of the uterus*, and in the *hemorrhage* thence arising. *Merrem.*

LXVIII. CORYLUS ROSTRATA.

SYNONYME. Beaked Hazel.

Beaked hazel is a shrub two or three feet high; NATURAL ORDER, Amentaceæ; Suborder, Cupuliferæ; SEXUAL SYSTEM, Monœcia Polyandria; which grows in the mountainous regions of North America. The nut which it produces is of an ovate shape, surrounded by a coriaceous and scaly involucre or cupula, terminating in a tube an inch and a half long, covered with short and thick bristles, very similar to those of mucuna or cowhage.[1]

[1] Duhamel, Amer. Journal of Pharmacy, Jan. 1843.

EFFECTS ON THE ECONOMY.

The short, stiff bristles have been found to possess similar anthelmintic virtues with mucuna, and to be equal to it in all respects: Mr. Duhamel states, that Dr. Heubener, of Bethlehem, Pennsylvania, from whom he obtained the specimen described by him, had employed it in cases of *worms*, and was much pleased with it.

MODE OF ADMINISTRATION.

It may be given, like mucuna, in syrup, molasses or other consistent vehicle, and in the same doses.

LXIX. CREASO'TUM.

SYNONYMES. Creasoton, Creosoton, Creosotum, Kreosoton, Kreosotum, Oxyhydro-carburetum ex oleo pyroxilico paratum, Creosote, Creasote, Kreosote, Kreasote.
French. Créosote.
German. Kreosot.

This substance was first discovered, several years ago, by Reichenbach, of Blansko, and is extensively employed as a therapeutical agent. Its marked chemical properties suggested, that it might be possessed of a decided influence on the economy, and numerous experiments were immediately instituted to test the accuracy of the notion. These were of the most opposite character; and it is not surprising, as in every similar case, that there should have been great discrepancy in the results, and in the opinions deduced therefrom. There can be no doubt, however, that creasote forms a valuable addition to the list of our remedial agents.

METHOD OF PREPARING.

The process given by Koene,[1] is esteemed one of the best for preparing it on a large scale,—almost the only way in which it is formed: we, consequently, meet with it only in commerce. Hence it is in the Materia Medica list of the Pharmacopœia of the United States (1842,)—not amongst the preparations. Tar, derived from pit-coal, is distilled in a retort provided with a long tube having a large mouth. Under this is placed a receiver. The oil, which comes over first, swims on water; and it is necessary to remove, from time to time, the products of the distillation, until an oil is obtained, which sinks in water. When this is the case, the product is collected. The heavy oil, obtained during the distillation, condenses not only in the receiver, but in the tube of

[1] Annales de Chimie et de Physique, Juillet, 1835. See Cormack on Creasote, p. 36, Lond. 1836; or the Amer. edit. in American Medical Library; also, Turner's Chemistry, 5th edit. p. 872, and Christison, Dispensatory, p. 374, Edinb. 1842.

the retort, where it unites with the naphthalin, forming a butyraceous substance. By applying a gentle heat, the mass drops into the receiver. The product is now allowed to remain in a cool place for some hours, after which it is pressed. The expressed naphthalin still contains oil, which is separated by heating it with its own weight of acetic acid, until it melts. After allowing it to cool, the crystallized naphtha is pressed, and the acid adhering to the creasote is saturated with carbonate of potassa. The creasote is now to be shaken for a quarter of an hour with phosphoric acid, —the proportions being half an ounce of the acid to twenty ounces of the oil. The mixture ought then to be agitated with its bulk of water, and afterwards be distilled with a graduated heat, care being taken to separate the oil which floats on the surface. The rectified oil is now to be dissolved in its own volume of a hot solution of caustic potassa, s. g. 1.120. When it has been allowed to cool for half an hour, the supernatant oil is removed, and the heavy oil again treated with caustic potassa, only a fourth part of the solution being, however, employed this time. On uniting the solutions of potassa, a slight excess of diluted phosphoric acid is added, and the free creasote, which floats on the surface, is separated. It is again rectified; and the first product, which is chiefly water, being rejected, the creasote comes over pure. M. Koene recommends the substance, thus prepared, to be preserved in bottles covered with black paper.

A protracted and complex process, like the above, necessarily makes the drug expensive, especially as the quantity obtained is but small. M. Koene procured by it ten drams from thirty-two ounces of tar. M. Lémère, one of the first Parisian pharmaciens who made pure creasote, obtained from eight hundred pounds of tar about six pounds of creasote.

Reichenbach generally prepared it from the tar of the beech by six distillations; dissolving it afterwards in a solution of caustic potassa three times, and setting it free successively by sulphuric acid.[1]

Giordano[2] has recommended the following simplified mode for obtaining it. Distil *wood tar* from the willow, at an elevated temperature, from a tinned copper retort, until the residue has the consistence of soft pitch. Re-distil the liquor passed over till its residue resembles the former. The liquor, neutralized by *carbonate of potassa*, or *lime-water*, is re-distilled till all the oil of creasote has passed over. The oil is dissolved in *caustic potassa*, from

[1] For an account of this and other products of the destructive distillation of vegetable matter, see Cormack, Op. cit. Reichenbach's observations and experiments are contained in a work entitled "Das Kreosot in chemischer, physischer und medicinischer Beziehung. von Dr. K. Reichenbach, u. s. w. zweite mit Nachträgen und Zusätzen von Schweigger-Seidel verm. Ausgabe. Leipz. 1835;" see, also, Annales de Chimie, liii. 325. Paris, 1833.

[2] Annali di Medicina, Aprile, 1835, cited in Brit. and For. Med. Rev. July, 1836, p. 283. For the process of Calderini, see Edinb. Med. and Surg. Journ. for Oct. 1834.

which, after simmering a little in a porcelain vessel, and cooling, the eupione, which floats, is easily separated. The same operation is repeated with the eupione, to remove all the oil that is united with it. The saponaceous liquor, treated with *dilute sulphuric acid*, is distilled into water, from which the creasote is separated, and the water saturated with creasote is kept for external use, or re-distilled for a concentrated acetic acid of a pungent and most agreeable odour. Gozzi[1] has given the following simple method of procedure: Distil *tar* into a cylindrical vessel, half full of water. Pour off the watery liquid at the top; add to the heavier liquid at the bottom sulphuric acid diluted with half its weight of water; heat the mixture till it boils; expose the supernatant creasote for three days to the air, stirring it frequently; and distil the product thrice for thorough purification.

Creasote is a colourless, transparent fluid. Its refractive power is very great, and in angular glass vessels it is beautifully iridescent. Its odour is penetrating, and disagreeable, but not offensive: many compare it to that of castor. It adheres to every thing, and is somewhat permanent. Its taste at first is very burning and caustic to the tongue; but on admixture with the saliva, it becomes somewhat sweetish. It has an oleaginous feel, and is of about the consistence of oil of almonds. Its specific gravity, at 68° Fahr., is stated by Reichenbach to be 1.037; but Dr. Christison[2] affirms that he has never found it lower than 1.065, or higher than 1.067. The fact is, of course, of interest in relation to its adulterations. It boils at 397°, and at —17° does not congeal. When placed on paper, it forms a greasy spot, which, however, disappears after a while, and can be removed by the application of a heated body without any residue. It is a non-conductor of electricity. With water at 68°, it unites in two different proportions—one of the combinations consisting of 1¼ of creasote and 100 of water; the other of 10 parts of water and 100 parts of creasote. The taste of the first mixture—*creasote water*—is very burning at first, and afterwards sweetish, like that of pure creasote, but of course weaker. A drop of creasote in 10,000 parts of water produces a marked impression on the tongue, and has a smoky smell. Litmus and turmeric paper are not in the least changed by it; so that it has neither an acid nor an alkaline reaction. At both poles of the galvanic battery, it furnishes numerous and striking combinations. It does not possess the property of the ordinary empyreumatic oils, of becoming yellow and inspissated. It dissolves iodine, phosphorus, and sulphur. Acetic acid at 1.070, and alcohol, dissolve it in all proportions, and with the latter it is often adulterated.[3] Ether and petroleum likewise combine with it in all

[1] Journal de Chimie Médicale, cited in American Journal of Pharmacy, Jan. 1839, p. 339.
[2] Dispensatory, p. 374, Edinb. 1842.
[3] Journal de Chim. Méd. and Amer. Journal of Pharmacy, July, 1841, p. 112.

proportions. With potassa, it forms two or three combinations, one of which crystallizes. Resins and resinous bodies either decompose creasote, or it decomposes them. With balsams, fixed and volatile oils, camphor, and the vegetable alkaloids, it unites readily. It coagulates albumen, and its antiseptic property is most remarkable, whence its name, from κρεας, 'flesh,' and σωζω, 'I preserve'—σωτηρ, 'preserver.' Fresh meat, placed in creasote water for half an hour or an hour, and then taken out and dried, may be exposed to the heat of the sun without undergoing putrefaction. Nay, when flesh has begun to be putrid, the process ceases after it has been washed with creasote water, and if suffered to remain immersed in it for an hour, it does not subsequently putrefy. There can be but little doubt, consequently, that creasote is the main antiseptic and conservative principle of pyroligneous acid and tar water. From the experiments made by Reichenbach to determine the exact components of the flesh on which the creasote acts, he arrived at the following results. It unites with the albumen of the blood in the flesh, which it coagulates, and with the red particles without acting on the fleshy fibre, which serves merely as the frame-work for the coagulated matters; and it is well known that dried albumen does not putrefy, but becomes hard, brittle, and transparent.

EFFECTS ON THE ECONOMY IN HEALTH.

Reichenbach has properly remarked, that the excessive burning pain in the tongue, which creasote causes, must have at once suggested it to be a poisonous substance. It was soon found that plants, sprinkled with creasote water, died; that fish placed in it were convulsed; and that small animals, as wasps and flies, died when touched with the pure article. If a small quantity of it be spread upon the hand, and washed off a minute afterwards, the place is found to present a white appearance, but without pain or inflammation. In the course of a few days, the place becomes dry, and the cuticle desquamates. When creasote is applied to a part where the epidermis is deficient, or to a wound, instantaneously an extremely violent burning pain is experienced, which continues for eight or ten minutes; but if the part be carefully washed, it gradually ceases. The cause of this is conceived to be the property which creasote possesses of coagulating albumen; and, where blood is flowing, of arresting it. If the rapid disturbance which it excites, affects important organs, death results sooner or later, according to their importance in the economy: relief, however, may be afforded by those substances that dissolve coagulated albumen, as caustic alkalies, acetic acid, &c. It is probable, however, that the poisonous properties result from its acrid character.

To appreciate the physiological effects of creasote, experiments have been undertaken by many individuals. Miguet gave a

young dog, for eight days, an ounce a day of distilled water containing four drops of creasote, without any effect. When, however, he doubled the dose, nausea, languor, subsultus tendinum, and tremors occurred, followed, in the course of a few days, by marked emaciation. On discontinuing the creasote, the functions gradually resumed their pristine condition, and the animal recovered its flesh. To another dog, he gave at once two drams in half an ounce of water, and immediately thereafter great prostration of the muscular system ensued—vertigo, fixed eyes, stupor, dyspnœa, accumulation of mucus in the air passages, spasmodic cough, discharge of large quantities of foamy saliva, with vomiting of a milky matter, although the animal had taken nothing of the kind. After two hours' suffering, it died of convulsions. The body was immediately opened: all the tissues, except the liver, exhaled a strong smell of creasote; and the whole of the mucous membrane of the intestinal canal was inflamed. The matters contained in the stomach coagulated when placed in contact with albumen. When heated, they yielded a thick smoke, and a marked smell of creasote. In the heart and large vessels, the blood was more firmly coagulated than usual: the lungs were gorged with blood; in the brain there was no evidence either of congestion or hemorrhage. In another dog, into whose carotid equal portions of water and creasote were injected, death resulted with similar phenomena, but more rapidly. The precise quantity of creasote used in this experiment is not stated.

Simon, in his experiments, found that when ten drops of creasote, diluted, were injected into a vein, scarcely any effect resulted. Reiter and Müller, who likewise made experiments on animals, agree with Simon as to the result of injections of creasote into the veins; no special symptoms were induced by it, but this appeared to be owing to the blood being instantaneously coagulated by it, which not only prevented the farther progress of the creasote, but also of the blood; hence, no evil consequences resulted; and, it is probable, as Riecke has suggested,[1] that the weaker the solution of creasote, within certain limits, the greater may be its effect on the mass of blood.

Corneliani,[2] an Italian physician, has also instituted a series of experiments with creasote on lambs, rabbits, &c. All these animals bore small doses of creasote—however unwillingly it might be taken—without any remarkable results, and without loss of appetite. Large doses, however, immediately occasioned general torpor, sudden inclination to pass the urine, paralysis—especially of the lower extremities—with or without convulsions, and frequently the ejection of a bloody foam. When the doses were

[1] Die neuern Arzneimittel, u. s. w. S. 153.

[2] Giornale delle Scienze Medico-Chirurgiche, No. 8, Febrajo, 1835; cited in Brit. and For. Med. Review, p. 265, Jan. 1836.

large, and it was but little diluted, death took place in a few minutes, and on examination, the inner lining of the stomach was generally found corroded, yet not so constantly as to allow of death being ascribed to that circumstance. It followed, farther, from his experiments, that pure creasote applied to a denuded nerve, or injected only in small quantities into a vein, may occasion death suddenly; and that the application of the creasote to extensive wounded surfaces in the same animals may be ultimately followed by fatal consequences. Where a very large dose of creasote was administered, immediate death was produced without organic lesion.

In the trials made with it by Dr. Elliotson[1] he found no action produced upon the bowels; but it sometimes augmented the quantity of urine. He once saw it, in the dose of a minim three times a day, cause micturition nine times in an hour. In another case, in doses of three minims, it produced severe strangury.

According to Simon, when applied to the muscles, it destroys the surface like caustic. Müller and Reiter, in their experiments, found, that it speedily rendered the muscular fibres of a dirty-whitish appearance, and readily lacerable. When applied to the fresh blood of the hog, it converted the colour in an instant to an ashy-gray; after which it became black and quickly coagulated. Mixed either pure or diluted with blood, it thickens it; the mixture assumes a brown-red colour, and is found studded with small white points, which are nothing more than coagulated albumen. On exposing the coagulum to the air, it assumes a yellowish-red colour. Reich, on the other hand, who appears to have made many experiments with creasote, both in internal and external diseases, affirms, that he has never observed any caustic effect from it: from which assertion, as Riecke has remarked,[2] the only inference to be deduced is, that he must always have applied it largely diluted. Frémanger likewise asserts, that when pure creasote is applied to the epidermis, it does not destroy it; but merely occasions more or less redness of the skin. When applied to a suppurating surface, it caused, instantaneously, the formation of a white pellicle, owing to its coagulating the albumen contained in the secretions from the wound. Adventitious tissues, with which it is brought in contact, are destroyed by it. When placed between the lips of a wound, it prevents healing by the first intention, by coagulating the albumen; and, consequently, it may be employed in all cases where it is desirable to prevent the growing together of parts. Frémanger is, indeed, disposed to refer all its efficacy to the action which it exerts on albumen.

Its long continued use often occasions an inflammatory condition which, as Dr. J. L. Da Luz[3] observes, has nothing in com-

[1] Medico-Chirurg. Transac. vol. xix. Lond. 1835. [2] Op. cit. S. 154.

[3] Journal da Sociedade das Sciencas Medicas de Lisboa, tom. v. Lisboa, 1837; reviewed in Zeitschrift für die gesammte Medicin. Oct. 1838, S. 224.

mon with the disease for the cure of which it may have been prescribed. In a case of porrigo favosa, treated with it by the author, febrile irritation supervened, and the head was covered by an artificial eruption, which induced, however, a new action in the system of nutrition of the scalp, and, after its subsidence, the porrigo was cured.

Dr. Cormack, of Edinburgh, instituted various experiments on the lower animals to test its physiological effects.[1] In three experiments, about twenty-five drops of pure creasote were injected into the venous system of dogs. All the animals died. In every case of poisoning by it, which he has observed, Dr. Cormack found the following to be the symptoms.—Its first deleterious action was a powerful one of sedation on the heart; the vital energies of that organ seeming to be instantaneously paralyzed. In some instances, hurried and sonorous respiration went on for more than a minute after the heart had ceased to beat. In general, one or two convulsions, resembling the tetanic, preceded death; and, almost invariably before expiring, the animal uttered one or more shrill cries. In every instance the atony of the heart immediately after death was very striking.

From other experiments it appears, that when it is injected into the arteries the deleterious effects are of a much milder character, and if the dose be not large, the animal may experience but little inconvenience,—a circumstance which proves the importance of a thorough admixture with the blood before the poisonous article reaches the heart; such admixture not taking place to the necessary extent, when the poison is injected into the veins, but being readily effected when injected into the arteries, and consequently distributed through the system of nutrition.

When taken for any length of time, the urine acquires a blackish hue, and in some cases creasote may be recognised in it.[2]

EFFECTS ON THE ECONOMY IN DISEASE.

Creasote has been administered in various diseases; the following may be esteemed a summary of the chief therapeutical experiments made with it.

Hemorrhage.—The discovery of creasote happened at a time when the Acqua Binelli enjoyed more confidence as a styptic than it does now; and the fancied probability, that the nostrum was indebted to creasote for its properties, gave rise to many experiments with the latter in cases of hemorrhage. One of the first, who instituted experiments with it on rabbits, was G. Simon. Not being able to obtain any striking results from the Acqua Binelli, he tried creasote, pure, as well as in the form of creasote water, and of an emulsion prepared with gum Arabic; and from the results

[1] Op. cit. p. 66. [2] Macleod, in Med. Gaz. xvi. 599, and xvii. 653.

of these he was led to affirm, that although creasote occasioned the coagulation of the albumen of the blood, it acted no better as a styptic than cold water. With the Acqua Binelli he was not able to coagulate albumen. The rapid separation of the albumen in the form of a reddish-gray coagulum under the influence of creasote, he found to be of no advantage, as the mass remained soft and pulpy; and the wound in the vessel would not close, but was immediately opened by the stream of blood. Neither did he esteem it adapted for arresting trifling hemorrhages; for, when very much diluted, it was still too exciting to the injured parts, and greatly delayed their union. This, indeed, might, he thinks, be expected from the fact, that pure creasote, when placed on the skin for ten or twenty minutes, induces superficial inflammation. The experiments of other physicians have been decidedly more favourable. Müller and Reiter,[1] for example, in theirs, found that creasote was far more efficacious than the Acqua Binelli; for, when the latter was prescribed, it was always necessary to have recourse to other agents, before the hemorrhage was arrested. In their experiments on dogs, they found the hemorrhage from a divided crural vein quickly cease, when a compress of cotton wetted with creasote was placed on the vessel with a moderate degree of pressure. Three days afterwards, the crural artery was exposed on the same dog, and divided; but it was afterwards necessary to tie it, as the creasote, in consequence of the excessive hemorrhage, could not be brought into immediate contact with the vessel, but merely acted on the superficial layer of blood, and therefore did not arrest the hemorrhage. The crural artery of a young and tolerably strong dog was cut a short distance above its division, compression being at the same time exerted upon the trunk. The artery did not bleed. Nine minutes afterwards, a compress of cotton soaked in creasote was applied immediately to the divided extremity of the artery, with some degree of pressure. When the compress was removed, the bleeding was entirely arrested, and the wounded surface was dry, and had an ashy-gray hue. In an old dog, hemorrhage from a divided crural artery was arrested by the same means, but not so speedily. When the artery was examined, it was found to be wholly closed, having a navel-like depression at the extremity, which disappeared when the vessel was pressed upon, and ultimately became conical. Within the vessel there was a conical coagulum, which could be readily detached; and for the space of a line, the artery appeared inflamed through its coats. In arteries that had been divided for a longer time, the union was likewise complete; but there was this difference, that the inflammation at the end of the vessel had disappeared,

[1] Schmidt's Jahrbuch. cited in Encyclographie des Sciences Médicales, Mars, 1837. See, also, Burdach, Medicin. Zeitung. Jahrgang, 1840, No. 31, cited in Lond. and Edinb. Monthly Journal of Med. Science, May, 1842.

and a pointed fibrous caruncle was observed in the vessel, which was doubtless the fibrinous portion of the previous coagulum.

From their experiments, Müller and Reiter were led to confirm the hæmastatic properties of creasote, both when the hemorrhage occurs from veins and from arteries. The arteries divided were of considerable size, larger than the radial artery of an adult male. They consider pressure indispensable to occasion the creasote to act immediately on the artery; and the arrest of the hemorrhage, they ascribe, not alone to the coagulation of the blood, but to the contraction of the arteries. In parenchymatous hemorrhage, creasote water was generally sufficient; as well as in tolerably extensive wounds of the surface. Höring, also, obtained satisfactory results from his experiments on animals. He exposed, on an old cat, the crural artery and vein of the right side; made a small incision into the latter, and pressed upon it to stop the copious flow which ensued: he then applied over the wound, for two minutes, a small compress of lint, wetted with a solution of creasote—two drops to one hundred of water—and the bleeding ceased. The artery was now opened, and a similar compress placed upon it with the same result. Two days afterwards, a second experiment was made of the same kind, except that, owing to the struggles of the animal, a larger opening was made into the crural artery. In this case, it was necessary to apply the compress for four minutes before the hemorrhage ceased. In another cat, a large transverse incision was made into the inner surface of the right thigh, above the middle, by which muscles, arteries, veins, and nerves were divided. Two large compresses of lint, wetted with a solution of creasote, were then pressed on the parts for five minutes, and the bleeding entirely ceased. The like result was obtained in the case of an old horse, whose jugular vein was opened. But the creasote solution did not succeed in wholly arresting the hemorrhage in the same horse, when an opening was made into the crural vein and artery.

To these experiments on animals may be added some that were instituted on the human subject, which testify, more or less, to the efficacy of creasote as a hæmastatic. Hahn applied it in some insignificant cases, but saw no better effect from it than from cold water. Most found it speedily arrest slight hemorrhage from small vessels. Höring applied it successfully in cases of *epistaxis*, which had obstinately resisted other agents,—two plugs of lint, dipped in a solution of creasote, being inserted in the nostrils, after which the hemorrhage soon ceased. Fichtdauer employed it with equally advantageous results in *violent bleeding from leech bites*, after several hæmastatics had been used in vain; and Heyfelder extols it for arresting *hemorrhage from large wounded surfaces*. Berthelot differs with Frémanger and Simon, who affirm that union by the first intention is prevented by it. The results

of his observation were opposite. Miguet applied it successfully as a hæmastatic in fresh wounds on man and animals. Both pure creasote and a solution of it were, however, unsuccessfully used by Bardili in *hemorrhage from the arteria tibialis postica*, which he ascribed to the blood having lost its albumen, owing to the excessive discharge. Reich and Hauff found injections with creasote water useful in *hæmorrhagia uteri*. Schneider had a case of *hemorrhage* that had continued for seven hours in a man eighty years old, which proceeded *from the gums of the upper jaw;* the blood oozing as from the pores of a sponge. He directed the man to take as much creasote water into his mouth as he was able; and after three repetitions the hemorrhage ceased, and did not recur. Köhler[1] endeavoured to test the hæmastatic operation upon himself. He made an incision in his forearm an inch long, and three or four lines deep, to which he applied creasote water. A lancinating pain was felt in the wound, but no other sensible effect. A drop of pure creasote was now let fall between the lips of the wound: this was followed by a sensation of burning and drawing; for a moment coagulated flakes of a whitish-gray colour covered the wound, and there was a temporary cessation to the flow: it soon, however, recurred. After a time, the hemorrhage ceased; but not sooner—Köhler thinks—than if cold water had been applied. The feeling of burning and drawing continued, however, for some time; the edges of the wound were somewhat swollen, and œdematous, and, in about four hours, were covered with a yellowish-brown lymph; but there seemed to be no delay in the cicatrization.

In a case of *lithotomy*, it was found impossible to arrest the hemorrhage by any of the usual means, and no particular vessel could be discovered from which the blood flowed. The patient was at last reduced to the lowest ebb, from the continued loss of blood, and had already lost consciousness, when a sponge, dipped in pure creasote, was introduced into the wound, and pressed against the bleeding parts for an instant or two. The hemorrhage was immediately arrested. No particular pain was experienced; no unpleasant symptoms occurred; thin eschars were thrown off, and the patient recovered.[2] J. L. da Luz[3] found it an excellent styptic in *capillary hemorrhage;* but in *hemorrhage from great vessels* it did not prevent a recurrence of the bleeding. In *hæmoptysis*, its internal use has been found beneficial. Santini[4] prescribed it in a desperate case with complete success, and with Schmalz it was equally effective; on the other hand, it was of little avail in Guitti's hands. In *hæma-*

[1] Neue Wissenschaftlich. Annalen, u. s. w. B. i. H. 3, S. 285. Berlin, 1835.
[2] Daser, Edinb. Medical and Surgical Journal, Oct. 1841. [3] Op. cit.
[4] Gazetta Terapeutica di Verona, Mars, 1834; cited in American Journal of the Medical Sciences, Feb. 1836, p. 502.

temesis, it succeeded with Dr. Isaac Parrish of Philadelphia,[1] after the remedies generally employed in such cases had failed to produce any effect. Dr. Wm. T. Wragg,[2] employed it internally with advantage in a variety of hemorrhages—as *flooding after abortion; flooding where there was no pregnancy: hemorrhage from the stomach and bowels; hemorrhage from the bladder*, and *hæmoptysis;* and the result of his observations induces him to conclude, that, on the whole, they "entitle the remedy to a place amongst the means upon which reliance may be placed in the treatment of a class of diseases, in the management of which we are often embarrassed." He extols it also as a hæmastatic in *traumatic hemorrhage;* and a case is given by Drs. J. L. Lawrence Smith and S. D. Sinkler,[3] in which a mixture of creasote, "a watery emulsion of creasote," (the formula for which is given hereafter,) with proper pressure by means of a dossil of lint, arrested the hemorrhage produced by an oblique slit in the carotid of a sheep. They express their belief, however, that when the emulsion of creasote is applied to the divided artery of the sheep, it depends greatly, if not altogether, upon the manner in which the lint is applied to the wound in the artery, whether the hemorrhage is arrested or not. If it be placed immediately on the orifice of the cut vessel, success is certain; "if, however, the vessel shrink from contact with the lint, the animal is almost certain to bleed to death."

Its effects as a hæmastatic suggested it to Dr. E. W. Faulcon,[4] of North Carolina, as a remedy in a case of *mercurial salivation*, in the form of gargle made by half a dram of *creasote* to a pint of *sage tea*, which was used every hour during the first day. The effects were excellent.

Burns.—Most used creasote with decided relief in burns of the second and third degree, applied by means of rags wetted with creasote water. Berthelot also cured two cases quickly with it; the slightly burnt places becoming desiccated; the more severe healing by the formation of a crust. Guitti applied both creasote water and creasote ointment with advantage in burns which had proceeded to profuse suppuration; and Dr. Sutro[5] strongly recommends an ointment of creasote, the formula for which is given hereafter; and advises it to be kept ready prepared under the name of 'burn ointment.'

In profuse suppuration, it has been advised, on the authority of Levrat and Berthelot; but, according to J. L. da Luz,[6] it has no marked influence on the secretion of pus, and is therefore useless in suppurating abscesses. In *otorrhœa* it has been especially beneficial.

[1] Medical Examiner, Aug. 10, 1839, p. 501.
[2] Southern Journal of Medicine and Pharmacy, March, 1846, p. 128.
[3] Ibid., July, 1846, p. 403.
[4] Medical Examiner, Nov. 1848, p. 656.
[5] Medical Times, Jan. 4, 1845, p. 314.
[6] Op. cit.

Lesions of the integuments.—According to Reichenbach, creasote is of essential service in the *intertrigo* of children, as well as in *excoriations induced by lying—bed sores.* In the latter case, Guitti used it with success. Hahn also frequently employed it. In cases where ulceration had not taken place, he washed the parts several times a day with creasote water, and was of opinion that he had prevented, in some cases, the occurrence of ulceration. Where ulceration had already taken place, he covered the parts with linen rags, folded two or three times, which he soaked in creasote water, and fixed them on by means of adhesive straps. The superficial ulcers soon healed; and the deeper were transformed into hollow surfaces, secreting a homogeneous serous fluid, but no pus.

Höring employed creasote water with advantage in *sore nipples;* and creasote ointment has been recommended by Dr. Fife,[1] in *sprains* and *contusions.*

In *chilblains*, whether ulcerated or not, Hahn[2] used creasote washes successfully;—the affection yielding in a few days; and Dr. Herndon[3] regards creasote ointment as the best remedy in that affection with which he is acquainted. M. Devergie also extols an ointment of creasote, subacetate of lead and opium in the proportions given hereafter.

Ulcers.—Fissures of the skin and *superficial ulcers*, according to Hahn, were changed, under the application of creasote water, into a blackish-brown scab, which adhered for a long time, and, when it fell off, left the parts healed, or, by occasioning too much shrinking, gave rise to fresh inflammation and suppuration. Deeper ulcers were affected in the same manner as those caused by long lying. Its efficacy in *atonic* and *varicose ulcers*, especially of the leg, has been attested by Levrat, Berthelot, Rossi, Hechenberger, and others; but Guitti, Heyfelder, and Schmalz were less satisfied with it. A case of *indolent ulcer* between the knee and ankle, accompanied with a good deal of inflammation, was cured by Dr. Crary, in five weeks, by the application of a solution of creasote (ten drops to the ounce of water,) with methodical compression of the limb, by means of a bandage.[4] Bresciani de Borsa[5] considers it a 'sovereign remedy' for *indolent* and *obstinate ulcers.* He applies it in the form of a lotion, consisting of six drops of creasote to four ounces of water, gradually increasing the strength to 10 or 20 drops. Meister found the application of creasote water, in cases of *carious*, *scrofulous*, *syphilitic*, *fistulous*, and *sanious* ulcers, to be strikingly and almost uniformly advanta-

[1] Lond. Med. Gaz., April 7, 1838, p. 66. [2] Gazette Médicale de Paris, Dec. 1834.
[3] American Med. Intelligencer, March 15, 1838, p. 425.
[4] Boston Medical and Surgical Journal, July 3, 1839, p. 332.
[5] Gazette des Hôpitaux, Sept. 19, 1846; in Ranking's Half-yearly Abstract, January to July, 1847, p. 199.

geous. Heyfelder, likewise, found it extraordinarily useful in *scrofulous ulcers*, and Dr. Cormack[1] states, that he had an opportunity of seeing a case of the kind treated by Dr. Shortt, in the Royal Infirmary of Edinburgh, where an *extensive scrofulous ulcer of the hip*, after resisting a variety of treatment, at last yielded to creasote, and was ultimately completely cicatrized. On the other hand, Otto tried both pure creasote and the watery solution in ulcers of various kinds, especially the scrofulous: the ulcers very generally put on, in the course of twenty-four hours, a cleaner appearance; still they did not cicatrize; on which account Otto prefers, in old ulcerations at least, the use of a solution of chlorinated lime; for notwithstanding creasote diminished and improved the character of the suppuration from scrofulous ulcers, and rendered them cleaner, it did not ameliorate the general condition;—after the diminution of the suppuration, local pains, loss of sleep, and slight febrile movements generally supervening. On these accounts, Otto does not think creasote applicable to scrofulous ulcers in general.

Many observers depose to the good effects of creasote in *scrofulous caries*. Among these may be mentioned Hahn, Coster, Ritgen, Frémanger and Hauff. In *fistulous ulcers*—also of syphilitic origin—several physicians have employed it beneficially. Dr. Fife,[2] of Newcastle-upon-Tyne, found it useful not merely in obstinate but in *malignant ulcers*. In no case of ulceration, he affirms, in which he tried it, did it disappoint his expectations. In a *sloughing carbuncle*, the alcoholic solution, (thirty drops to the ounce,) mixed with carrot poultices, was applied with advantage by Dr. Herndon,[3] of Culpeper C. H., Virginia. In *scurvy* and in *scorbutic ulcers*, M. Coen[4] found its use followed by excellent results, and he refers to cases in which it has been administered internally with very great advantage. J. L. da Luz[5] considers it an excellent cleansing remedy in *atonic ulcers*, but its prolonged use, he thinks, retards cicatrization. In *hospital gangrene*, he esteems it the best antiseptic, and the most powerful means for checking its terrific progress. In *gangrenous or sloughing ulcers*, Hahn used it. Several times a day he pencilled the slough with pure creasote, and, in the intervals, fomented it with creasote water. According to Reichenbach, two *offensive affections of the labia pudendi*—the consequences of infiltration of blood—were cured by it; and Reich and Sir Francis Smith[6] treated with success cases of *cancrum oris*; and the former, one of *scorbutic ulceration of the gums*. In *herpetic ulcers*, Höring and Ber-

[1] Op. cit. p. 106.
[2] Lond. Med. Gaz., April 7, 1838, p. 65.
[3] Amer. Med. Intelligencer, March 15, 1838, p. 425.
[4] Giornale per servire, &c., di Venezia, 1836.
[5] Jornal da Sociedade das Sciencas de Lisboa, T. v. Lisboa, 1837; noticed in Zeitschrift für die gesammte Medicin. Oct. 1838, S. 224.
[6] Dublin Journal of Med. Science, for May, 1837.

thelot observed favourable effects from creasote water; and it has been found especially useful in *carcinomatous* and *syphilitic ulcers*, in which it has been often employed. In *cancer of the uterus*, Wolff injected it, in two cases, into the vagina. In one, the pain was so great, that, on the ninth day, after six pints of creasote water had been used, it was obliged to be discontinued. In the other case, the treatment was continued twenty-six days, and sixteen pints were used: in it, also, the pain was sensibly aggravated. The secretion was not improved in either case, nor was hemorrhage prevented by it; for one of the patients died immediately after an attack of this kind: the other lingered a long time. Heyfelder found injections of creasote water, in conjunction with the extractum calendulæ, of no use in cancer uteri. On the other hand, in a case of superficial ulceration of the os uteri, with copious discharge of a puriform mucus, which had been treated unsuccessfully by other agents, for several months, Hahn found an injection of creasote water effectual in fourteen days. Téalier[1] has likewise reported a case of *superficial ulcerations around the os uteri*, to which nitrate of silver had been applied at least twenty times without inducing a cure. By touching the ulcers with lint fixed upon the end of a probe, and dipped in a mixture of one part of creasote and three parts of water, excessive pain was induced; but this gradually passed away, and in six days the signs of ulceration had disappeared. It is more than doubtful, however, whether either of the last two cases was carcinomatous. In a case of *cancer of the breast*, a solution of creasote was applied by the same gentleman. This excited, instantaneously, violent pain, but after a time the pain ceased, and relief was obtained. Rossi saw a *cancerous ulcer of the face* healed by creasote ointment, but it soon broke out again. The same gentleman cured a *fungous tumour* on the alveolar margin of the right os maxillare—which had occasioned the loss of all the teeth of that side except one, and which even the actual cautery had not prevented from returning—by a collutory of six drops of creasote in six ounces of water. Heyfelder saw creasote used without effect in a case of *cancer of the skin*, and Cormack[2] in one of *lupus of the nose*. Guitti cured an *ulcer, in appearance cancerous*, by the application of pure creasote, for which, at a later period, the solution was substituted, and Marchal has published a case of *cancer of the lip*, the cure of which he believes he accomplished by means of creasote.[3] Garbiglietti cured a *fungous ulcer with caries of the fibula* by creasote, but it is questionable whether the ulcer was carcinomatous; and Meisinger saw *cancer of the face* improved by the use of creasote ointment. It has been before re-

[1] Revue Médicale, Février, 1834. For similar cases, see Friese, in Berlin. Medicin. Zeitung, Nro. 13, 1837.

[2] Op. cit. p. 115.

[3] Gazette Médicale de Paris, Fév. 1835.

marked, that Meisinger used creasote with advantage in *syphilitic ulcers*. Hahn also applied creasote water in *primary syphilitic sores;* the small, superficial ulcers healed soon; the larger and deeper remained stationary. In a *phagedenic ulcerated bubo*, the spreading was arrested, but this was all. According to Heyfelder, creasote—probably pure—excited, in a case of *primary syphilitic ulcer*, in a plethoric individual, violent inflammation, and so much sensibility, that it was obliged to be discontinued. Berthelot cured a *chancre*, which had resisted caustics and other cicatrizing agencies, in a few days, by creasote water. Rehfeld, also, treated *secondary syphilitic ulcers* successfully with it, giving however, at the same time, the corrosive chloride of mercury inwardly. *Chronic venereal ulcers* have in some cases yielded to it, after they had resisted every other kind of treatment.[1] Dr. Bürkner, of Breslau,[2] reports a case, which, after having proved rebellious to every kind of general and local management that could be devised, at length yielded to the application of pure creasote by means of a camel's hair brush. The character of the secreted pus immediately improved; the wound began to heal by granulations from the base; and, at the end of four weeks, Dr. Bürkner found his patient quite well. In *condylomata*, it has been equally successful. By the application of creasote water, Hahn found them contract and disappear; but the more obstinate required to be pencilled with pure creasote. Heyfelder, Reich,[3] Fricke, and Coen,[4] also found creasote efficacious in these cases. The last gentleman but one had the most frequent opportunities for observation; by him creasote, in a dilute state, was applied to the top of the condylomata by means of a pencil. In cases of small condylomata, touching them once or twice was sufficient for their removal; of larger, it had to be more frequently repeated. In some obstinate cases, it required two or three weeks before they disappeared; but when once they fell off, they did not return.

Gonorrhœa and *Leucorrhœa.*—Most extols creasote water as a remedy in *gleet*. He applies it either in the way of injection, or by small tents wetted with it and introduced into the urethra. In *leucorrhœa*, he strongly recommends both its internal and external use. Reich injected creasote water in a case of *gonorrhœa*, and in one of *malignant leucorrhœa;* yet its agency in these cases was doubtful, as copaiba was given at the same time. Hahn[5] also used injections of creasote water in the second stage of *gonorrhœa* and in *gleet;* but he did not think that the discharge ceased sooner under its agency than under the ordinary

[1] Cormack, Op. citat. p. 107; and in Lond. and Edinb. Monthly Journ. of Med. Science, Oct. 1842. See, also, Künchel, in Bulletin Génér. de Thérapeutique, p. 313, Paris, 1833. [2] Casper's Wochenschrift, Sepr. 9, 1837, S. 583.
[3] Hufeland's Journal, Jan. 1834, and Revue Médicale, Mai, 1834.
[4] Giornale per Servire, &c., di Venezia, An. 1836.
[5] Gazette Médicale de Paris, Dec. 1834.

means; whilst, in some cases, the inflammation was even augmented. In two cases of *benign fluor albus*, after many other remedies had been employed in vain, Schmalz saw good effects from the use of a solution of creasote; but, in a third case it afforded no relief. Dr. Elliotson[1] gave it internally to a female labouring under *gonorrhœa*,—at first, in the dose of two minims, to an ounce of water, and, afterwards, in the dose of four, six, and even eight minims, but no good resulted from it. Dr. R. H. Allnatt[2] has used creasote injections in *gonorrhœa* and in *leucorrhœa* with very satisfactory results. He proposes the remedy also for cases of *gleet* occurring in flabby leucophlegmatic males. The formula for an injection used by him is given hereafter.

The author has administered it not unfrequently in *leucorrhœa* and *other mucous discharges*, and, when persevered in, it has at times appeared to be of decided service.[3] Dr. Robert Dick,[4] of Glasgow, has called the attention of the profession to its use in the *chronic stage of gonorrhœa*, and in *gleet*. He thinks its beneficial effects are more obvious than those of copaiba. He administered it in doses of two drops with loaf sugar beaten into a syrup with water; and M. Em. Rousseau[5] has used it successfully in the *acute stage of gonorrhœa* in the proportion of gr. xvss. of *creasote* to half an ounce of *water*. The dose of this was three or four drops, from four to six times a day, in a wineglassful of sugared water; injecting, five or six times a day, three drops in a glassful of decoction of marshmallow.

Cutaneous affections.—Dr. Fahnestock,[6] of Pittsburgh, uses creasote in *erysipelas*, as a local remedy, and so successfully, that, in a practice of many years, he has not seen a case that did not yield to it. In every case of *local erysipelas* of the face or elsewhere, he applies pure creasote, with a camel's hair brush, over the whole of the affected surface, and to some distance beyond the seat of inflammation; and, at the same time, prescribes calomel, followed by jalap in sufficient quantity to induce free catharsis. In the majority of cases, this is all that is needed. In the phlegmonous form, it is necessary to repeat the application more frequently than in the simple, with the addition of a bread and water cataplasm, applied nearly cold, and well sprinkled with water strongly impregnated with creasote; or a cloth may be kept constantly wet with the solution, especially when the face is the seat of the affection. The creasote should cause the parts to become white immediately: and it is worthy of observation, that the skin

[1] Lancet, for Dec., 1835, p. 435.
[2] London Lancet, Dec. 31, 1842, p. 504.
[3] See, also, Coen, in Giornale per Servire, &c., di Venezia, 1836; and Dr. Wm. T. Wragg, Southern Journal of Medicine and Pharmacy, March, 1846, p. 128.
[4] Edinb. Med. and Surg. Journal, April, 1838, p. 602.
[5] L'Abeille Médicale, Avril, 1847, p. 96.
[6] American Journal of the Medical Sciences, July, 1848, p. 152.

does not remain in the least marked by the application, no matter how often it is applied. Reich treated a case of *crusta lactea* externally by creasote, and internally, by the mild chloride and the black sulphuret of mercury. The result was favourable. In *itch*, it was recommended by its discoverer. Wolff, too, saw three cases of not very recent itch cured in eight days by lotions of creasote water. Reich and Coen[1] extol the water and the ointment in inveterate itch. J. L. Da Luz[2] considers it as valuable as sulphur, but Otto did not find the water particularly efficacious. He gives strong testimony, however, in its favour, in *herpetic eruptions:* in a very short time it induced evident improvement, and often removed the affection in from eight to fourteen days. When the cases were more chronic, a longer time was, of course, required for the cure. He never administered it, however, without attaining his object. His rule was, to bathe the affected parts twice a day with creasote water, and in particular cases he directed, in addition, general baths of warm water. The eruption commonly disappeared very rapidly under this management, but it speedily recurred, unless general bathing was used at the same time. It again yielded, however, very readily to creasote water. Grandjean, Reich, and Köhler, also applied the water successfully in *herpes;* and Guitti found both the water and the ointment most serviceable in *herpetic affections* when combined with appropriate internal treatment. Heyfelder recommends that alterative drinks, as the decoctum sarsaparillæ, should be combined with them. Even in *herpes exedens*, the external application of creasote was found effectual by Ritgen, Grandjean, and Rossi. Wolff[3] cured a case of *ancient impetigo* in about eight weeks, by a solution of creasote (*Creasot.* f ʒss.; *Aq. destillat.* f ʒv.) At first, the application caused so much heat and inflammation, that in eight days it was obliged to be discontinued, and afterwards it was alternated with fomentations of warm water from day to day until the cure was completed. Dr. Herndon, of Culpeper C. H., Va., derived much benefit from the ointment in *psoriasis*. In a case of *acne rosacea* of seven years' standing, accompanied with headach, nervousness, thirst in the morning and acid eructations, for which the patient—a female—was put under treatment for a month, without success, Dr. Elliotson[4] determined on trying creasote. The advantage was soon manifest, as in three days the eruption was evidently diminished. At first, she took two minims three times a day; this was gradually augmented to twenty minims,—the farther increase of the dose being prevented by the supervention of giddiness and tremors. At the end of seven months, she was

[1] Op. cit.

[2] Jornal da Sociedade das Sciencas Medicas de Lisboa, tom. v. Lisboa, 1837, noticed in Zeitschrift für die gesammte Medicin. Oct. 1838, S. 224.

[3] Medicin. Zeitung, u. s. w. No. 30, 1834. [4] Lancet, July 4, 1834, p. 459.

discharged; the eruption being scarcely perceptible, and the dyspeptic symptoms entirely removed. In a *chronic pustular disease*, not curable by antiphlogistics, the same gentleman observed better effects from it than from any remedy previously prescribed.[1] Dr. Copland found a saturated solution in water answer well as a lotion in *porrigo favosa*.[2] The author has often used it in *porrigo*, both creasote water and creasote ointment, (see the formulæ at the end of the article;) they have always appeared to him sufficiently strong, and when the quantity of creasote was increased, so much inflammatory irritation was induced, that they had to be discontinued for a time.

In cases of *chronic inflammation of the free edge of the eyelids*, cures were effected by Coster, and G. T. Black[3]; by the former, from the use, twice a day, of a dilute solution of creasote (*Creasot.* gtt. xij.; *Aq. destillat.* f ℥ij.) applied by means of a camel's hair pencil. The cure was complete in ten days. The formula for the lotion used by Mr. Black is given afterwards. An ointment of it has also been found of essential service in various forms of *strumous ophthalmia*, by Dr. C. C. Hildreth, of Zanesville, Ohio.[4] In different kinds of *ophthalmia*, M. Sanson used creasote, but never observed the disease to be modified by the treatment.[5]

In cases of *prolapsus vaginæ*, Schlesier tried the external use of a solution of creasote. After astringent injections, and the application of decoctum krameriæ by means of a sponge, had been used in vain, he injected diluted creasote for seven weeks, omitting it only at the time of menstruation. It excited a burning sensation of a few minutes' duration. At the expiration of the time mentioned, the prolapsus had strikingly diminished, and the great sensibility of the prolapsed parts had disappeared. Owing, however, to the supervention of irritation in the urinary bladder, it had to be discontinued, when there was every prospect of ultimate success.

Dr. Buttmann[6] has given the case of an old lady, upwards of seventy years of age, who had laboured for several years under *œdema* of both legs to such an extent as to interfere materially with progression. She experienced lancinating pains in both feet, and irregular paroxysms of fever. Many external and internal remedies had been used in vain, when, by way of experiment, he applied cataplasms of creasote, soon after which the swelling, very

[1] Medico-Chirurg. Transact. xix. 237. Lond. 1835.
[2] Gully's edition of Magendie's Formulary, p. 204. Lond. 1835. See, also, Sir F. Smith, in Dublin Med. Jour. for May, 1837, and J. L. Da Luz, Op. cit.
[3] London Lancet, Aug. 7, 1841.
[4] Amer. Journ of the Med. Sciences, Oct. 1842, p. 364.
[5] Compte rendu des Séances de la Société de Médecine, Séance du 7 Mars, 1834.
[6] Beitragen zum Sanitats Berichte das Frankfurter Regierungs-Bezirks: cited in Medicin. Zeitung, Dec. 7, 1836, S. 252.

much to his astonishment, gradually disappeared, and with it the febrile attacks.

In *toothach from carious teeth*, creasote has often been used, being applied to the hollow of the tooth by means of a pencil, or of cotton imbued with it. The testimony in its favour has been very great. It has been extolled by Coster, Reich, Hahn, Kneisel, Heyfelder, Fitchbauer, Hauff, Otto, Guitti, Köhler, Meisinger,[1] and numerous others. Some have advised a collutory of creasote, but this is more disagreeable, whilst it is less efficacious than creasote applied immediately to the carious tooth. It excites instantaneously acute pain and a considerable secretion of saliva. The pain of toothach is often relieved by it, but it generally recurs; and perhaps the advantage derived from this agent is not greater than from any of the stronger essential oils. As a palliative, it is very useful. In *rheumatic toothach*, the insertion of a little cotton, imbued with creasote, in the ear of the same side, has been found serviceable.[2] Although, however, it alleviates the pain of toothach, it has been considered to hasten the destruction of the tooth.[3]

In *deafness, apparently owing to deficient secretion from the ceruminous follicles*, advantage has been found from its use, after the ear had been syringed. Perhaps as good a form as any is that recommended by Mr. Curtis,[4] which consists of one dram of creasote to four drams of lard. A little of this oil is inserted into the meatus, night and morning, with a camel's hair pencil. He considers the preparation contra-indicated in cases of *otorrhœa* attended by pain or inflammation. Dr. Partridge,[5] who has seen many excellent effects from creasote in such cases, prefers to commence with half a dram to four drams of oil of almonds, applied by means of a camel's hair brush. After a few days, he usually increases the quantity of creasote as the occasion may require, often using it as strong as one part to three of oil.

In cases of *nævi*, Dr. Thornton[6] found it the most effectual of all applications. He applies it two or three times daily, more or less diluted: excoriation, ulceration, and gradual disappearance of the nævus ensue,—the cicatrix being always smooth and sound.

Thus far, we have spoken mainly of the external use of creasote. Reference has been made to its internal administration in cases of *hæmoptysis*, *hæmatemesis* and *leucorrhœa*. In the following diseases, it has been chiefly given internally:—

Phthisis.—Reichenbach excited considerable expectations from

[1] Medicin. Jahrbüch. des k. k. österreich. Staates, B. xv. S. 553. Wien, 1834.
[2] Riecke, Op. cit. S. 167.
[3] Cormack, Lond. and Edinb. Monthly Journal of Med., Oct., 1842.
[4] London Lancet, vol. i. p. 328, 1838-9; and Mr. Wright, ibid. p. 580.
[5] Medical Examiner, May 30, 1840, p. 348.
[6] Northern Journal of Medicine, Dec. 1844; cited in Braithwaite's Retrospect, xi. 186, Amer. edit., N. Y., 1845.

its use in *phthisis,—pulmonary, laryngeal* and *bronchial;* and as in so intractable a disease every suggestion is immediately and eagerly embraced, numerous trials were instituted with it, the results of which were by no means accordant. Reich[1] affirmed, that he gave it both in laryngeal and tubercular phthisis with distinguished success. In a case, in which the disease appeared to be considerably advanced, the offensive expectoration was changed into one of a tasteless, mucous character, although the fever and the night sweats experienced no modification. Subsequently, hæmoptysis supervened, with violent fever; on which account the dose was diminished. Under the use of the remedy the condition of the patient appeared to improve,—except the cough, which was not mitigated; an anodyne was consequently substituted for the creasote; under which his patient—a female—improved so much, that he was led to believe she might be saved, although the cough still remained severe and frequent. In another case, creasote allayed the hectic fever, and transformed the purulent expectoration into one of a mucous character; yet, although the general condition of the patient seemed to be improved, the cough and uneasiness of the chest continued almost unchanged. Grandjean, also, had a case of phthisis in the third stage, the expectoration of which was soon diminished; the pain in the side removed; the appetite, sleep and strength restored under its administration, but the result of the case was not known. Levrat asserts, that he found it highly useful in *chronic bronchitis*, and in *some kinds of phthisis.* Hechenberger saw good effects from the inhalation of creasote in the form of vapour in a case of "*ulcerated lungs;*" five, ten, or fifteen drops, according to the degree of tolerance of the lungs, being dropped into hot water in an appropriate vessel, and the vapour received through the tube of an inverted funnel. He was of opinion, that this mode of exhibiting it prevented the disagreeable effects apt to be induced by its internal use; and farther experiments have confirmed his view. On the other hand, Elliotson[2] derived no favourable results from his trials with creasote in phthisis; even inhalation of the vapour was generally unattended with any advantage; yet, he is of opinion, that it may be useful where there are only one or two ulcers in the lungs, and there is no tendency to their farther production, as well as where there is much secretion from the bronchial mucous membrane. Either no advantage, or an injurious influence followed its use in phthisis, by Rehfeld, Haupt, Treumann, Günther, Schmalz, Meisinger, Otto, Köhler,[3] and others. The published experiments by Wolff, in the Charité, at Berlin, cannot be esteemed more favourable. It was tried in eleven cases of *tuber-*

[1] Hufeland's Jour., Jan. 1834; and Revue Méd., Mai, 1834.
[2] Medico-Chirurg., Transact. xix. 221. London, 1835.
[3] Hecker's neuern Wissenschaft. Annal. B. i. H. 3.

cular phthisis, of which one was in the first; eight were in the second, and two in the third stage. In two cases, there was scarcely any advantage, after it had been given for fourteen days. In one case, it had to be discontinued on the eleventh day, owing to the supervention of obstinate vomiting. The case ultimately terminated unfavourably. In six cases, the symptoms appeared to be aggravated, and the patients died soon afterwards. In two, in which the disease was in its second stage, death supervened unexpectedly early, on the fourth and the seventh days of the treatment,—in one case, by suffocation; in the other, by sudden hydrothorax. The pulse, according to Wolff, was generally quickened under its use; the hectic augmented; the urinary secretion diminished; the expectoration neither changed in quantity nor quality; the cough was not mitigated; nor the dyspnœa diminished: in four cases, on the other hand, they were manifestly increased: once, epistaxis occurred, and twice hæmoptysis. From the results of all his trials, Wolff is disposed to think, that creasote should be banished from our list of agents employed in phthisis; both as respects the radical and the palliative treatment;[1] but although they may not sanction us in placing much value on it in the treatment of phthisis, it may be improper to ostracise it altogether,[2] as, according to the testimony of others, it would seem to have rendered service. Rampold and Späth assert, that they have derived advantage from it in confirmed phthisis where no inflammatory complication was present; the expectoration and colliquative sweats being diminished under its use; and M. Pétrequin,[3] from his trials with it, considered its effects to be more beneficial —as might be presumed—in incipient than in confirmed phthisis; but in no case did he observe any thing approaching the radical cures described by some. He, indeed, gives the preference to tar water, (see Aqua Picis Liquidæ.)

In *bronchorrhœa*, or that state of the bronchial mucous membrane which consists in a profuse secretion without inflammation, the inhalation of creasote has been found of essential service.[4] In the *chronic mucous affections of the lungs* of old people, it appears to have been especially useful.

Rheumatism and *Gout*.—The success obtained by Reich[5] from tincture of soot in gouty and rheumatic affections, and the probability that its efficacy might depend chiefly on the creasote it contained, induced him to prescribe the latter remedy internally in those diseases. He made the first trial upon himself. After exposure to cold, he was attacked with lancinating pain in the right

[1] See, also, Köhler, in Rust's Magazin, B. xlvi., cited in Amer. Journal of the Med. Sciences, February, 1837, p. 497.
[2] Riecke, Op. cit., S. 170.
[3] Gazette Médicale de Paris, Nov., 1836.
[4] Elliotson, in Med. Chirurg. Transact. xix. 221. Lond. 1835.
[5] Hufeland's Journal, Jan. 1834, and Revue Méd., Mai, 1834.

leg, for the removal of which the ordinary remedies were employed in vain: it yielded to the use of creasote given for nine days. He relates another case of *rheumatism*, and one of *atonic gout*, in which it was equally successful. Marcus, of Hadersleben, recommends it in cases of *rheumatism, unaccompanied by excitement of the vascular system, or tendency to congestion and febrile reaction.* It is proper, however, to observe that he combined other agents with it, so that his experiments are by no means decisive as to its efficacy. Of the three patients to whose cases he refers, one only was cured: the other experienced improvement. Karsten found none of the advantages described by Reich, in *rheumatic* and *gouty* cases, from its use. In a case of *rheumatic headach*, Tschopke found surprising benefit from frictions of creasote, and plugging the ear with cotton dipped in it. It immediately excited acute pain, and some rubefaction of the skin; and as the burning ceased, the pain ceased along with it. In Most's experience, lotions of creasote water greatly alleviated the pain of the joints in *rheumatism* and *atonic gout*.

In *vomiting*, not arising from inflammation or other organic disease of the stomach, Elliotson[1] found creasote very efficacious. In the *vomiting of pregnancy* it has been highly valuable. If the sickness comes on regularly after rising in the morning, Dr. Cormack[2] prescribes two or three drops to be taken five or ten minutes before getting out of bed. This he has generally found effectual; but if it should not be, the patient is directed to repeat the dose in two hours. In more troublesome cases, when the sickness occurs at intervals during the day, one or two drops are given every two, three, or four hours. He has also found it serviceable in the *sickness and vomiting following a drinking debauch*. Even in *Asiatic cholera* and in *sea-sickness*, it appeared to allay the vomiting. In various affections of the stomach, as in *cardialgia* and *gastrodynia*, it may be useful.[3] In *vomiting from nervous excitability*, it has been affirmed to excel all known medicines.[4] After Dr. Elliotson had recommended it, Dr. Shortt tried it in about a dozen cases, and found it equally successful, as did also Dr. A. T. Thomson, of London, Dr. Bodington, of Erdington, in Warwickshire, Dr. Christison,[5] and many others. Dr. John Walker, of Glasgow, in a case published by him,[6] does not appear to have been equally fortunate; and with Dr. Paris it entirely failed.[7] The author's own success has been by no means as great

[1] Medico-Chirurgical Transactions, vol. xix., or Lancet, Aug. 20, 1836.
[2] London and Edinb. Monthly Journal of Med. Science, Oct., 1842.
[3] Riecke, Op. cit. S. 172.
[4] Cormack, on Creasote, p. 133.
[5] Dispensatory, p. 377. Edinb. 1842.
[6] Lancet, Dec. 19, 1835, p. 447. See, also, Taylor, ibid. Aug. 15, 1835, and Macleod, in Lond. Med. Gazette, xvi. 598, and xvii. 653.
[7] Pharmacologia, 8th edit. append. Lond. 1838. See, also, Pereira, Elem. of Mat. Med. and Therap. 2d edit. p. 420, Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.

as that of Dr. Elliotson. In many cases, indeed, it has developed irritability of the stomach, where this did not previously exist.[1] Dr. Elliotson admits, that in large doses it seems to excite vomiting, and that when given in such quantities with a view to check it, no good, but evil, results from a large dose. As a *preventive of sea-sickness*, it has been extolled by Dr. Elliotson, and by Mr. A. B. Maddock.[2] It has been administered, also, as an excitant to relieve *gastrodynia* and *flatulence*, and where hydrocyanic acid and creasote have been separately tried unsuccessfully, Dr. Elliotson recommends that they should be combined. Dr. J. B. Wilmott[3] has extolled its use in injections in *camp dysentery*. One was administered every night composed of a dram to twelve ounces of starch; and more recently it has been suggested in the same form by Dr. Flint[4] in *chronic dysentery*.

Several portions of *tænia* having been observed to be discharged after the administration of creasote, Kraus was induced to prescribe it as a powerful anthelmintic. This he did in numerous cases, and with the best success;—from five to eight drops being given to adults with castor oil; or where the bowels were not freely opened, with half a drop or a drop of croton oil.

In *diabetes mellitus*, it was first given by Berndt,[5] and with striking success. One or two cases of the same kind are related by Gadolin; but Rehfeld used it without advantage. Dr. Elliotson agrees with Berndt in the opinion, that it is sometimes of use in diabetes, and may even be greatly instrumental in accomplishing a cure.[6]

Dr. Elliotson[7] tried it in *nervous disease*. In some cases of *epilepsy*, the paroxysms appeared to be rendered less frequent and more mild; but in the generality of cases, they returned with fresh violence. In some, the remedy had no influence on the disease; in others, it appeared to aggravate it. In *neuralgia*, great advantage was at times derived from it, although here, again, it was frequently of no service.[8] A severe case of *facial neuralgia*, was cured by Mr. Thomas Kelly,[9] by three drops made into a pill with crumb of bread, and given every three hours. Inoculation with a mixture consisting of 10 or 15 grains of acetate of morphia in one dram of creasote, was employed with much advantage in the same disease by Mr. Rynd.[10] Punctures were made over the nerves affected, and the solution was introduced. In a very short space of time the pain was relieved or wholly disappeared. Dr. Elliot-

[1] Cormack, Lond. and Edinb. Monthly Journal of Med. Science, Oct. 1842.
[2] Amer. Journ. of the Med. Sciences, Feb. 1838, p. 496.
[3] London Medical Gazette, May 23, 1845, p. 162.
[4] Buffalo Med. Journal, cited in Med. Examiner, April, 1850, p. 252.
[5] Kleinert's Repertorium, Jan. 1835, and Lancet, July 18, 1835.
[6] Medico-Chirurgical Transactions, xix. 132–135. Lond. 1835.
[7] Op. cit.
[8] Cormack, loc. cit.
[9] Dublin Medical Press, Sept. 13, 1849.
[10] Dublin Medical Press, March 12, 1845.

son also observed good effects from it in *hysteria, where there was no inflammatory complication*, in *spasmodic erethism of the nervous system*, and in *palpitation;* and Dr. Herndon,[1] of Virginia, used it with much benefit as an inhalation in *hysteric croup* (thirty drops to the quart of hot water.) In *asthma, dependent upon morbid excitability of the bronchial mucous membrane*, Dr. Elliotson[2] found its inhalation often useful.

In two cases of *chronic glanders*, the same gentleman[3] accomplished a cure in the course of a few weeks, by the sedulous use of an injection of a dilute solution of creasote (*Creasot.* gtt. j; *Aquæ* f ℥j.) thrown up the affected nostril; combining the treatment, in one of the cases, with the internal use of the remedy; and a similar case of success is given in a more recent number of a British medical periodical.[4]

MODE OF ADMINISTRATION.

The dose for internal use is one or two drops, given several times a day, in gum water.[5] In cases of tape-worm, the dose should be larger. Some give it in emulsion, but this form is objectionable on account of its disagreeable taste. It is best administered in pill. Externally, it is at times applied pure; at others, diluted,—commonly with water, with or without the addition of alcohol,—or in the form of ointment. Carminati[6] affirms that oil and mucilage, when combined with it, render it milder, but that vinegar increases its action. Dr. Cormack,[7] however, doubts the assertion in regard to vinegar. In three comparative experiments, which he made with a view of testing the justice of Carminati's conclusion, there was no apparent difference in the activity of creasote, when given with acetic acid or alone. He was led to believe, however, that the addition of albumen caused it to act more powerfully, which, if true, would be singular.

The inhalation of creasote vapour may be accomplished by diffusing a few drops of creasote through water, or a mucilaginous liquid, in an ordinary inhaling vessel, or in the mode described under the head of Chlorine.[8]

Pilulæ creasoti.

Pills of creasote.

℞. Creasoti ♏ x.
Glycyrrhiz. pulv. ʒj.
Mucilag. acac. q. s. ut fiat massa
in pilulas xx. dividenda.

Dose.—Two pills three times a day. In *neuralgia, atonic*

[1] Amer. Med. Intelligencer, March 15, 1838, p. 425. [2] Op. cit.
[3] Lancet, for June 20, 1833. [4] Ibid. Jan. 20, 1839, p. 145.
[5] It may be well to remark, that the fluidram contains one hundred and fifty drops of creasote. [6] Op. cit. [7] Op. citat. p, 88. [8] See page 186.

rheumatism, and *chronic bronchitis*. The number of pills may be gradually increased to eight or ten at a time. *Joy.*[1]

℞. Creasot. ʒj.
Ext. glycyrrhiz.
Galban. āā. ʒss.
Althææ pulv. ʒij.
Fiat massa in pilulas cxx. dividenda.

Dose.—Six pills, four times a day. In *consumption*. *Reich.*

℞. Creasoti,
Ext. glycyrrhiz. āā. ʒj.
Althææ pulv. ʒij.
Fiat mass. in pil. cxx. dividend.

Dose.—Five pills, morning and evening, in *atonic gout*. *Reich.*

Haustus creasoti.
Creasote draught.

℞. Cræasot. ♏ i.
Aquæ camphoræ,
Infus. gentian. compos. āā. f ʒvj.
M. fiat haustus.

To check *vomiting*.

Mistura creasoti.
Mixture of creasote.

℞. Creasot. gtt. v.
Mucilag. acaciæ f ℥iij.
Syrup. althææ f ℥j. M.

Dose.—A spoonful, every three hours, in *hæmoptysis*. *Santini.*

Tinctura creasoti pro gingivis.
Tincture of creasote for the gums.

℞. Creasot. f ʒj.
Alcohol. f ℥ij. M.

As much of this is to be added to cold water as is necessary to give it a piquant taste. The teeth may be washed with it, and the mouth rinsed. Used in cases of *fœtor of the mouth from carious teeth*, and to limit the *caries*. *Buchner.*

℞. Alcohol. (36° B.) f ℥iss.
Creasot. f ʒj.
Tinct. cocci f ʒvj.
Ol. menthæ gtt. xxxvj.

Used for *toothach:* and, diluted, as a wash for the gums. *Righini.*[2]

℞. Creasot.
Alcohol. āā. ʒss. M.

To be applied to *carious teeth*. *Radius.*

[1] Tweedie's Library of Medicine, v. 282. Lond. 1840; or 2d Amer. edit. vol. iii. Philad. 1842.
[2] Journal de Chimie Méd. Avril, 1841.

℞. Creasot. p. i.
Alcohol. p. viij. M.

This is the ordinary strength of the tincture. Used where fractions of a drop of pure creasote are prescribed.

Lotio creasoti.

Lotion of creasote.

℞. Creasot. ʒss.
Aquæ destillat. f ℥v. M.

Used as a lotion in *impetigo sparsa* and *itch.* *Wolff.*

℞. Creasot. f ʒj.
Acaciæ pulv. ʒj.
Aquæ f ℥viij. M. et fiat emulsio.

This is "*creasote emulsion,*" used as a hæmastatic.
Smith & Sinkler.

The author has occasionally found a lotion composed of f ʒss. to Oj. of water too irritating.

℞. Creasot. gtt. xij.
Aq. destillat. f ℥ij. M.

To be applied by means of a camel's hair pencil twice a day to *inflamed eyelids.* *Coster.*

℞. Creasot. ♏ iij.
Tinct. lavand. compos. ♏ xx.
Aquæ destillat. f ℥ss. M.
G. T. Black.

℞. Creasot. gtt. iv.
Aq. destillat. f ℥ij. M.

In *irritation of the gums.* *Frémanger.*

℞. Creasot. f ʒss.
Acaciæ ℥iss.
Aquæ camphor. f ℥xss. M.

Used every two hours in cases of *aphthous ulceration of the mouth.* *Magendie.*

℞. Creasot. gtt. x.
Aceti f ʒij.
Aquæ f ℥ij. M.

Used in cases of *phagedenic ulceration,* and to *chancres;* applied by means of a camel's hair pencil. *Shortt.*[1]

Unguentum creasoti.

Ointment of creasote.

℞. Cerati,
Ol. amygdal. ãã. ℥j.
Creasot. gtt. xxx. M.

A dressing in *scrofulous caries.* *Frémanger.*

The *Unguentum Creasoti* of the London and United States

[1] Cormack, Op. cit. p. 112.

Pharmacopœias is composed of half a fluidram of *creasote* to an ounce of *lard;*—that of the Dublin Pharmacopœia,(1850,) of one dram to seven.

Unguentum creasoti compositum.

Compound ointment of creasote.

℞. Creasot.
Liq. plumb. subacetat. āā. gtt. x.
Extract. opii gr. iss.
Adipis ℥j. M.

An application to *chilblains.* *Devergie.*

℞. Creasot. ℥ss.
Carbon. animal. præparat. ℥j.
Alcohol. f ℥iss.
Ung. cetacei ℥iss. M.

A "*burn ointment.*" This may be modified according to age as follows:—for children under five years of age, it should be weakened by mixing it with four times its bulk of spermaceti ointment; for children from five to ten with twice its bulk; and so on, gradually increasing the strength according to the age of the patient. In protracted cases, the strength should be gradually increased. *Sutro.*

Linimentum creasoti.

Liniment of creasote.

℞. Creasot. gtt. v.—xx.
Ol. oliv. f ℥ss. M.

To be rubbed two or three times a day on the diseased parts in *chronic herpes.* *Corneliani.*

Injectio creasoti.

Injection of creasote.

℞. Creasot. ♏ xx.
Liq. potass. f ℥ij.
Sacchar. ℥ij.
Tere in mortario, et adde gradatim
Aquæ f ℥viij. M.

The injection to be used three times a day. *R. A. Allnatt.*

LXX. CUBE'BA.

Synonymes. Cubebæ, Piper Cubeba seu Cubebarum seu Caudatum, Cubebs.
French. Poivre à queue, Cubèbe.
German. Cubeben, Cubebenpfeffer, Kubebenpfeffer, Schwanzpfeffer, Schwindelkörner.

Cubebs are the fruit of Piper cubeba, which grows in India, Java,

Guinea, &c. Sexual System, Diandria Trigynia; Natural Order, Piperaceæ. The corns of this plant have been long known in the shops; and in the old Wirtemberg Pharmacopœia they figure as calefacient, inciting, discutient, antinervous, and carminative agents, which seem to have a specific action in *vertigo:* hence they obtained the name "Schwindelkörner" or "grains for vertigo." They had, however, fallen into oblivion, until they were reintroduced in modern times into practice, especially by the English physicians and surgeons.

The shell of the dried berry has a weak taste, but smells agreeably; and the kernel has a bitter aromatic flavour, which is biting at first, but afterwards cooling. The corns were analyzed by Tromsdorff and by Vauquelin;[1] but the most recent analysis is by Monheim.[2] He found in 100 parts,—lignin 65; extractive matter 6; *Cubebin* (Piperin) 4.5; matter like wax, 3; green volatile oil 2.5; yellow volatile oil 1.0; balsamic resin—which, according to Vauquelin, is very analogous to balsam of copaiba—1.5; chloride of sodium 1.0, and 15.5 parts loss. Cubebin appeared to Monheim to be identical with piperin, but to be united with an acrid soft resin. The volatile oil may be obtained separately by distillation with water.

EFFECTS ON THE ECONOMY.

In addition to the general excitant properties of the peppers, the action of cubebs is exhibited on the urinary and genital organs. Under their use, the secretion of urine is augmented; it becomes of a darker colour, and assumes an aromatic odour. Cubebs have been advised, in modern times—*first*, in cases of *gonorrhœa*, in which they have been esteemed a specific by many. Yet the considerations that apply to copaiba are equally applicable to cubebs. Although the revulsive effect induced by both on the kidneys may mitigate the inflammatory condition of the lining membrane of the urethra, which constitutes gonorrhœa; yet, in violent inflammatory cases, and in the early stages of ordinary cases, they may be injurious; and there are many instances on record in which bad consequences appear to have resulted from their improper administration. Still, there are physicians who administer both them and the copaiba in every stage of the disease. Of 50 patients, treated by Mr. Broughton[3] by cubebs, 10 were cured in from 2 to 7 days; 17 in from 8 to 14; 18 in from 15 to 21; 1 on the 55th day; and in 4 only was no success obtained. In the *chronic stage of gonorrhœa*, M. Ricord[4] prescribes cubebs in combination with sesquioxide of iron; and in addition the patient is directed to inject, four times a day, a solution composed of *Aq. destillat.* f ℥viij., *Argent. nitrat.* gr. ij.

[1] Mémoir. du Muséum, vi. 225. [2] Journal de Pharmacie, xx. 403.
[3] Medico-Chirurgical Transactions, xii. 1. Lond. 1822.
[4] La Lancette Française, No. 33. Paris, 1838.

It has been affirmed, that different evils have ensued from the use of cubebs: which ought to suggest care in their administration;—for example,—ardor urinæ; fever; inflammation of the urethra, bladder, and testicles; retention of urine; cutaneous eruptions, &c.[1]

In the *blennorrhœa* of females, cubebs are equally extolled by many practitioners, as well as in *leucorrhœa*.[2]

Spitta found them very efficacious in old and obstinate cases of *coryza*, when given in the form of lozenges: they are said, likewise, to have been administered with advantage in *defective audition, caused by a catarrhal affection of the Eustachian tube*. Rosin found the chewing of cubebs very serviceable in *aphonia*. They have also been prescribed successfully in *chronic rheumatism*. Pül[3] gave them with striking advantage in *intermittent fever;* and in India, they are regarded to be aphrodisiac.[4]

According to Dr. Paris, it is important to keep the bowels open during their use, for when hardened fæces are allowed to accumulate, the spice insinuates itself into the mass, and occasions excoriations of the rectum.[5]

MODE OF ADMINISTRATION.

Cubebs are commonly given in the form of powder, and in doses of from 1 to 2 and even 4 drams, repeated once or oftener in the day. Lozenges, boluses, and electuaries, are likewise prepared of them; and the London, Dublin, and United States Pharmacopœias have a TINCTURA CUBEBÆ (*Cubeb.* ℥iv., *Alcohol. dilut.* Oij. Dose, f ʒj.—f ʒij.) In consequence of the disorder at times induced by them in the digestive function, Velpeau proposed that they should be given in the form of glyster, to the amount of one or two drams of the powder, suspended in five or six ounces of an oily vehicle; and this method has its advantages.[6] To attain the same object, M. Dublanc, Jour., prepared an *oleo-resinous extract*, one sixteenth part of which possessed equal virtues with one part of cubebs; five grains, three times a day, acting like the ordinary dose of powdered cubebs.[7] He prepares it by adding oil of cubebs to the resinous extract, which is prepared by digesting the cake left after the distillation of the oil in alcohol, and distilling off the spirit. The process of Mr. Wm. Procter, Jr., is considered to be

[1] Lond. Med. and Physical Journal, Mar. 1832, and Mérat and De Lens, Dict. Univers. de Matière Médicale, &c., art. Piper Cubeba.

[2] Edinb. Med. and Surg. Journal. xviii. 319. Blundell, Diseases of Women, p. 158, Lond.; or American Medical Library edition, Philad. 1840; also, Lisfranc by Pauly, translated by Lodge, p. 243, Boston, 1839; and Ricord, Practical Treatise on Venereal Diseases, by Drummond. Amer. edit. Philad. 1843.

[3] Recueil de Méd. Chirurg. et Pharm. Militaire, xvi.

[4] Mérat and De Lens, Art. cit.

[5] Brande, Dictionary of Materia Medica, p. 205. Lond. 1839.

[6] Archives Générales de Médecine, xiii. 47.

[7] Journ. de Chimie Médicale, iii. 491, and Journ. de Pharmacie, xiv. 40.

a better one. He exhausts cubebs by ether, in a displacement apparatus, and submits the ethereal tincture to distillation in a water bath. The residual *ethereal extract of cubebs* contains all the volatile oil, cubebin and resin, as well as most of the waxy matter, but none of the extractive. One dram of it is equal to one ounce of cubebs. It may be administered in the form of emulsion, pills, or capsules. Dose, from gr. v. to ʒss.[1]

The volatile oil is sometimes given in the dose of 10 or 12 drops, suspended in water by the aid of sugar, or associated with oil of copaïba. *Gelatinous capsules of cubebs*, containing the oil, are sometimes taken.

M. Piorry[2] has strongly recommended an INFUSION of CUBEBS (*Cubeb.* ℥j., *Aquæ* Oij.) to be used six or eight times a day as an injection in *urethritis* and *vaginitis*.

Pulvis cubebæ compositus.

Compound powder of cubebs.

℞. Cubebæ pulv. ℥j.
Ergotæ pulv. ʒss.
Pulv. aromat. ℈ij.
Sacchari ʒj.
Divide in chartulas viij.

Dose.—One, three or four times a day, in *gonorrhœa, leucorrhœa, gleet, prostatic* and *involuntary seminal discharges*. *Ryan.*[3]

℞. Cubeb. pulv. ℥ij.
Aluminis pulv. ℥ss. M. et divide in chart. ix.

One to be taken three times a day. *Ricord.*[4]

Electuarium cubebæ.

Electuary of cubebs.

℞. Cubeb. pulv. ℥ss.
Mellis despum. q. s.
Fiat electuarium.

Dose.—A tea-spoonful, three or four times a day, in *catarrhus vesicæ, c. urethræ*, &c. *Radius.*

℞. Copaib. ʒivss.
Subige cum
Vitello ovi unius, et
Adde
Cubeb. pulv. ʒivss.
Confect. rosæ ℥ss.
M. et fiat electuarium.

Dose.—A tea-spoonful three or four times a day. *Vogt.*

[1] Pereira, Elements of Mat. Med and Therap. 3d edit., vol. 2, Pt. 1, p. 1265. Lond. 1850.
[2] Gazette des Hôpitaux. Mai, 1842.
[3] Universal Pharmacopœia. or a Practical Formulary of Hospitals, both British and Foreign. by Michael Ryan. M. D., &c. &c., 3d edit. p. 160. Lond. 1839.
[4] Mathieu, Journal des Connaiss. Méd. Chirur. Juin, 1840.

℞. Copaib.
Cubeb. pulv. āā. ʒij.
Aluminis ʒj.
Extract. opii gr. v. M.

Dose.—A dram, night and morning, in the pulp of a prune. The quantity may be rapidly increased to two drams morning and evening.

℞. Copaib. part. i.
Cubeb. pulv. part. xij.
Tinct. vanillæ q. s. M.

Dose.—ʒj. three times a day. *Cazenave.*[1]

Trochisci cubebæ.

Lozenges of cubebs.

℞. Cubeb. pulv. ʒij.
Tolut. gr. vj.
Admisce
Syr. myroxyl.
Ext. glycyrr. āā. ʒj.
Acaciæ q. s. ut fiat massa in trochiscos pond. gr. x. dividenda.

Used in *coryza*. *Spitta.*

Boli cubebæ.

Boluses of cubebs.

℞. Copaib.
Acac. pulv. āā. ʒij.
Aquæ flor. aurant. ℈ij.
Terendo bene mixtis adde
Cubeb. pulv. ʒij.
Misce, et fiant boli No. vj.

Dose.—One, three times a day. *Henschel.*

M. Labelonye[2] has recently proposed the following method for separating all the principles of cubebs from the ligneous matter.—*Cubebs*, reduced to coarse powder, are placed in an apparatus for displacement and exhausted by *ether*, which dissolves the wax, volatile oils and balsamic resin. The residue is submitted to the action of *dilute alcohol* at 20° (.935,) which dissolves the extractive principle, and chloride of sodium. The alcohol and ether are separated by distillation in part, and separately. Evaporation of the hydro-alcoholic solution is then carried on in a water bath until it possesses the consistence of a soft extract, to which the ethereal product is added; the evaporation being continued for a short time, the ether is completely volatilized, and a strongly aromatic extract is obtained, as consistent as honey. This it is improper to subject any longer to the action of heat, on account of the contained volatile oils; the presence of which in all cases interferes with complete desiccation.

[1] Bouchardat, Annuaire de Thérapeutique pour 1842, p. 44. Paris, 1842.
[2] Bulletin Général de Thérapeutique, cited in Amer. Journ. of Pharmacy, 2d series, vol. 2, p. 316. Philad. 1837.

One part of this extract is conceived to be equal to five of the cubebs. It can be readily mixed with water by means of mucilage, and can be administered in potions, injections, &c.

The best form of exhibition, according to M. Labelonye, is in lozenges, or in an emulsive syrup.

Trochisci extracti hydro-alcoholici ætherei cubebæ.

Lozenges of the ethereal hydro-alcoholic extract of cubebs.

℞. Extract. hydro-alcohol. æther. cubeb. ℥viij.
Alcohol. Oij.
Solve et adde
Sacchar. in pulv. ten. lbj.
Ol. menthæ pip. gtt. xviij.

Pour the mixture into flat vessels upon a stove, and allow the alcohol to evaporate at a moderate heat. When the mass is completely desiccated, reduce it to a fine powder, and add a sufficient quantity of mucilage of gum tragacanth to form lozenges—18, 12, 9, or 6 grains each. Most persons, M. Labelonye says, can swallow with facility those weighing eighteen grains, and containing six grains of the extract: ten of these are equivalent to half an ounce of the powder.

Syrupus extracti hydro-alcoholici ætherei cubebæ.

Syrup of the ethereal hydro-alcoholic extract of cubebs.

℞. Ext. hydro-alcohol. æther. cubeb. ℥iij.
Suspende ope mucilaginis in
Aq. menthæ pip. Oj.
Adde
Sacchar. lbij. M.

Four ounces of this syrup contain two drams of extract, equivalent to ten of powdered cubebs.

Dose.—A tea-spoonful.

M. Labelonye also envelops the extract in sugar, as in the ordinary sugar-plum.

An EXTRACT of CUBEBS has been recommended to be prepared as follows:—*Cubebs* are exhausted by repeated digestion in *alcohol*, which readily takes up all the active principles of the pepper; viz., a resin resembling that of copaiba, and a coloured resin, with an almost concrete essential volatile oil. The alcohol is distilled from those tinctures at a temperature so moderate as not to volatilize the essential oil. When the operation can be carried no further in this manner, the evaporation must be continued in an open vessel by the aid of a water bath, at a still lower degree of heat; a little finely pulverized Spanish soap must now be added to prevent the separation of the resin, and preserve the extract of a uniform consistence.

The ordinary dose of this in *blennorrhœa* is about fifteen grains three times a day.[1]

Dr. Puche[2] employs a liquid *aqueous extract* of cubebs; a *liquid alcoholic extract;* a *syrup of the alcoholic extract;* a *bolus* of cubebs; and one of cubebs, copaiba and turpentine. The last he covers with a gelatinous mixture to obviate the unpleasant taste.

LXXI. DELPHI'NIA.

Synonymes. Delphinina, Delphininum, Delphininium, Delphium, Delphina, Delphia, Delphinine, Delphine.
German. Delphinin, Delphin.

This alkaloid was discovered in 1819, by MM. Feneulle and Lassaigne,[3] and, almost at the same time, by Brandes,[4] in the seeds of delphinium staphisagria, in which it is united with acetic acid. As a therapeutical agent, it has been chiefly recommended by Turnbull; but he did not employ it in its pure state.

METHOD OF PREPARING.

The plan recommended by Magendie[5] is to boil a portion of the *seeds of delphinium*, cleared of their coverings, and reduced to a fine paste, in a little *distilled water;* to pass the decoction through linen cloth, and filter. *Pure magnesia* is now added, and the mixture is boiled for some minutes; the filtration is repeated; and the residues are washed carefully and digested in *alcohol.* On evaporating the alcoholic tincture, delphinia is obtained in the form of a white powder, having some crystallized points.

This is esteemed the most simple mode; but if a large quantity be required, the following plan is advised—on account of the time and patience necessary to decorticate the seeds. Submit the *unclean seeds*, when well bruised, to the action of *weak sulphuric acid.* Precipitate the liquor by *ammonia*, and redissolve in *alcohol* the delphinia, which is still slightly coloured. To purify it, draw off the alcohol by distillation, dissolve the residuum in *muriatic acid*, and boil with *magnesia.*

The plan recommended by Couerbe, and adopted by Turnbull,[6] is to evaporate a *saturated tincture of the seeds* to the consistence of a thin extract, and then to treat it with *water acidulated with sulphuric acid.* This solution, when filtered, is to be pre-

[1] Judd, Medico-Botanical Transactions, vol. i. p. 4. Lond. 1839.
[2] Journ. de Connaiss. Médical. Août, 1840; and Bouchardat, Nouveau Formulaire Magistral. 3ème. édit. p. 129. Paris, 1845.
[3] Annales de Chimie, tom. xi. xii., or Journal de Pharmacie, vi. 47 and 366.
[4] Schweigger's Journal der Chimie, xxv. 369. [5] Formulaire, &c.
[6] On the Medical Properties of the Natural Order Ranunculaceæ, chapter 11. Lond. 1835.

cipitated by *ammonia*. The precipitate—after being freed from its water—is to be taken up by *alcohol*, and again reduced to the consistence of an extract, which is likewise to be dissolved in *acidulated water;* to this solution, filtered, a small quantity of *nitric acid* is added, as long as any precipitate is thrown down. The liquid, freed from this precipitate, is again to be subjected to precipitation by *ammonia*, and the powder is dried. This is the *delphinia of commerce;* but, like veratria, it is a compound substance, and consists of *resinous matter*, *staphysagrin* and *delphinia;* the delphinia is obtained by treating the powder with *ether*, which takes up the delphinia, and leaves the staphysagrin.

When in a state of purity, delphinia is white, pulverulent, and devoid of smell; but, like veratria, when applied to the mucous membrane of the nose, it occasions sneezing, along with an abundant secretion of mucus. Its taste is at first bitter, and afterwards acrid, and it acts upon animals in the same manner as—but more energetically than—the seeds whence it is prepared. It is very sparingly soluble in water, but yet in sufficient quantity to communicate a bitter taste to the fluid. In alcohol and ether it dissolves readily; and these solutions have the property of rendering syrup of violets green, and of restoring the blue colour of litmus, when reddened by acids. It combines readily with acids, and forms neutral salts, which are possessed of much bitterness and acridity; and it may be precipitated from solutions of these in the form of a jelly by the addition of an alkali.

EFFECTS ON THE ECONOMY.

From the experiments of Orfila,[1] delphinia appears to belong to the class of acro-narcotic poisons. In the dose of about five grains, it proves fatal to dogs; and the fatal result is more speedily induced when the delphinia is dissolved in weak acetic acid; the animal, in the latter case, dies in the space of from forty to fifty minutes. When diffused through water introduced into the stomach of a dog, and retained there by a ligature placed around the gullet, efforts to vomit supervened, with restlessness, giddiness, immobility, slight convulsions, and death in two or three hours. In this case, the mucous membrane of the stomach was generally found injected.

From his administration of delphinia and its salts, Turnbull concludes, that the pure alkaloid has little effect on the mucous membrane of the stomach and bowels. It may be given, he says, in some cases, to the extent of three or four grains a day, in doses of half a grain each, without exciting vomiting; in this quantity, however, it sometimes operates upon the bowels, but causes very little irritation. In most instances, it acts as a diuretic, and occasions a considerable flow of pale urine. When taken to the ex-

[1] Nouveau Journal de Méd. x.; and Toxicologie Gén. i. 739.

tent of a few grains, it induces heat and tingling in various parts of the body, similar to those produced by rubbing it upon the skin; and its other effects are very nearly the same as those of the salts of veratria.

The preparations of delphinia have been used in the same diseases as those of veratria, and they appear to exert a similar action: the test laid down by Turnbull, in the case of veratria, applies equally to delphinia;—namely, unless a solution of delphinia in alcohol, in the proportion of four grains to a dram, occasions a distinct sensation of heat and pricking, when rubbed for three or four minutes on the forehead, the specimen ought not to be used, as no beneficial effect would arise from its application. When rubbed upon the skin, it gives rise to a sensation of burning, not unlike that which manifests itself a short time after the application of a blister, but not to an unpleasant degree, unless the friction has been carried too far. The effects of delphinia differ from those of veratria in being generally more powerful and durable.

The diseases in which delphinia has been chiefly employed, like veratria, are—*tic douloureux*, *paralysis*, and *rheumatism*. In the first of these, when the affection is seated in the tongue, or at the point where the infra-orbitar nerve escapes from its foramen, the use of delphinia, according to Turnbull, is to be preferred, because it can be applied to the tongue, or rubbed on the gums, without occasioning irritation of the mucous membrane. He thinks it also, upon the whole, better adapted for the treatment of paralytic cases than veratria, but principally on account of the property it has "of exciting the circulation in the diseased part."

MODE OF ADMINISTRATION.

The manner of applying delphinia is the same as that recommended for veratria. It may be used either in the form of OINTMENT or in SOLUTION IN ALCOHOL; and the proportions to be employed, in either case, may vary from ten to thirty or more grains to the ounce, according to the severity of the affection, for the treatment of which it is prescribed. The duration of the friction should be regulated in the same manner, or it should be continued until the pungent sensation produced by the rubbing exhibits itself.

LXXII. DIGITALI'NA.

SYNONYMES. Digitalin, Digitalia, Digitalinum, Digitaline.
French. Digitaline.
German. Digitalin.

The active principle of digitalis was supposed to have been separated by Le Royer, and by Lancelot;[1] yet these substances

[1] Pereira, Elements of Mat. Med. and Therap., 2d Amer. edit. ii. 297, Philad., 1846; and Art. Digitaline, in Mérat and De Lens, Dict. de Mat. Méd.

excited but little attention either from the *pharmacien* or the physician. Subsequently, MM. Homolle and Quevenne separated it, and it has received much notice, especially from M. Bouchardat,[1] who has entered fully into its pharmaceutical and remedial properties.

METHOD OF PREPARING.

The following formula is given by M. Bouchardat.[2] One *kilogramme* (about 2 lbs. 8 oz.) of dried *digitalis leaves* of the year, coarsely powdered and previously moistened, is put into a displacement apparatus, furnished with its plug of carded cotton, and is treated with *cold water* so as to obtain a concentrated solution. The liquid must be immediately précipitated by a slight excess of *subacetate of lead*, and be thrown upon a filter, when it will pass through, limpid and colourless. A solution of *carbonate of soda* is now added until a precipitate is no longer thrown down; and the filtered liquor is deprived of the magnesia, which it still retains, by *phosphate of ammonia*. The filtered solution is again precipitated by *tannic acid* in excess, and the precipitate, collected on a filter, is mixed, whilst still moist, with one-fifth of its weight of powdered *oxide of lead*, (litharge.) The resulting soft paste, placed between unsized paper, dried on a stove and pulverized, is exhausted by concentrated alcohol, in a displacement apparatus. The alcoholic solution, deprived of colour by means of animal charcoal, leaves as a residue of evaporation a granular yellowish mass, which, when washed with a little distilled water, drained and treated by boiling alcohol, suffers the digitalis by evaporation to be deposited on the parietes of the capsule under a granular mammillated form.[3]

When drained and dried, the digitalis ought still to be twice treated with boiling concentrated *ether*, which separates from it, among other substances, a white crystalline matter, traces of green matter, and an odorous principle.[4]

Digitalin is a neutral product, not an alkaloid, as said by some;[5] having the appearance of a white powder; a confused or amorphous crystallization, and is but little soluble in water; insoluble in ether, but very soluble in alcohol; and of an intensely bitter taste, so much so, that the 15th of a grain is sufficient to communicate a decided bitterness to two quarts of water. When diffused in small quantity in the air, it causes violent sneezing. It is not susceptible of any combination with acids or bases.

[1] Annuaire de Thérapeutique et de Mat. Méd. &c., pour 1845, p. 60. Paris, 1845.
[2] Op. cit. p. 69.
[3] See, farther, on the preparation, properties, &c., of this substance, Bouchardat, Annuaire de Thérapeutique, pour 1846, p. 89, Paris, 1846; and, for recent Researches of MM. Homolle and Quevenne, Sandras and Bataille, the Annuaire of M. Bouchardat, for 1850, p. 106.
[4] Oesterlen, Handbuch der Heilmittellehre, S. 769. Tübingen, 1845.
[5] Bouchardat, Op. cit. pour 1845, p. 60.

EFFECTS ON THE ECONOMY IN HEALTH.

MM. Bouchardat and Sandras[1] injected into the subcutaneous veins of the abdomen of a robust dog one tenth of a grain of impure digitalin, dissolved in a few drops of alcohol, and about two fluid-ounces of water. Scarcely was the dog untied, when it made several attempts to vomit; walked in a straggling manner, like an intoxicated individual; evacuated the bowels with much straining, and, in a few minutes, fell down. Whenever it was raised up, it staggered, and renewed its efforts to vomit. During this time, the pulsations of the heart exhibited the greatest irregularity in their rhythm. They were jerking (*brusques*) and strong; several of them succeeding each other rapidly, and then a manifest interval occurring. The number of pulsations, which in the normal state was from 100 to 120 a minute, was reduced to 36 or 40. The dog died at the expiration of four hours. The whole venous system was found gorged with black blood, the clots of which distended the principal veins. There was no other appreciable disorder.

In another dog, pure digitalin furnished by MM. Homolle and Quevenne, was injected in the same quantity and dissolved in the same manner into the external jugular vein. The animal walked for an instant as if giddy; it then stopped and suddenly fell; the pulsations were slow, unequal, and about 40 per minute. The dog died in about a minute and a half after the injection. No appreciable disorder was observed on dissection.

Other experiments were made by administering digitalin by the mouth, and the same phenomena ensued. They injected it also into the venous system of animals, and conclude, from the whole of their experiments, that it is unquestionably an excessively active substance, especially when pure. It modifies in a singular manner the circulation, and is capable of exciting intense irritation of the digestive organs, when taken by the mouth.

EFFECTS ON THE ECONOMY IN DISEASE.

Having satisfied themselves as to the energy and *modus operandi* of digitalin, it became important to obtain its sedative effects on the circulation, without its acrid action on the digestive organs. By means of mucilage and marsh-mallow powder, MM. Bouchardat and Sandras made pills, each of which contained a *demi-centigramme* (the 10th part of a French grain) of digitalin. These pills they gave under their own eyes to patients to whom a retardation of the circulation might be useful, and when there was nothing dangerous to be apprehended from the use of an agent capable of irritating the digestive tube. In all, the pulse was markedly retarded; and irregularity was induced. In only one case were

[1] Bouchardat, Op. cit. p. 60.

they told of any increase in the urinary secretion. When the toxical effects appeared, they were indicated by disorders of the senses, disturbance of the head, distressing dreams, and hallucinations, which were soon followed by diarrhœa, or more or less bilious vomiting. When these phenomena appeared, the digitalin was stopped, but, in spite of every precaution, the vomiting continued at times for two or three days.

The investigations of M. Rayer, as reported by M. Hervieux,[1] have led him to sum up the physiological effects of digitalin as follows. *First*. In doses of the twenty-fourth to the sixteenth of a grain it renders the circulation slower, and increases the secretion of urine. *Secondly*. Doses of one-twelfth to one-eighth of a grain may give rise to serious disturbance of the nervous centres, and the digestive organs; and, *thirdly*. Beyond an eighth of a grain, intolerance always supervenes, and death might ensue if this limit were overstepped, or if the experiment were continued too long.

It would appear from these observations that digitalin represents digitalis in all its active properties, and that it may be administered in every morbid condition in which the plant has been found serviceable.[2] By employing it—as properly remarked by MM. Bouchardat and Sandras—the physician always knows exactly the quantity of the active principle which he administers.

When applied endermically, its action is so irritating that it can scarcely be used in that manner.[3]

MODE OF ADMINISTRATION.

Comparative trials satisfied M. Bouchardat[4] that 4 milligrammes (gr. .0616 Troy) of digitalin, correspond in energy of action with about 40 centigrammes (gr. 6. 176 Troy) of powdered digitalis, prepared with the greatest care. It is a hundred fold stronger than the most active preparation of digitalis.

The following formulæ have been recommended.[5]

Pilulæ digitalinæ.
Pills of Digitalin.

℞. Digitalin. gr. .7720 (5 centigrammes.)
Acaciæ pulv.
Mucilagin. acaciæ, q. s. ut fiant pilulæ xx.

Dose.—1 to 4 daily in hypertrophy of the heart. *Bouchardat.*

Granula digitalinæ.
Granules of digitalin.

℞. Digitalin. gr. 15·44 (1 gramme.)
Sacchar. ℥iss. (50 grammes.)

[1] Bouchardat, Annuaire de Thérapeutique, pour 1849, p. 149.
[2] Strohl, Gazette Med. de Strasbourg, Août et Octobre, 1849, cited in Archiv. Générales de Médecine, Janv. 1850, p. 100.
[3] Bouchardat, Annuaire, &c., pour 1846, p. 92. [4] Op. cit. p. 77.
[5] Bouchardat, Op. cit. p. 76; and Nouveau Formulaire Magistral, 3ème édit. p. 237. Paris, 1845.

Make into one thousand granules like comfits. Each of these contains a milligramme (gr. .0154) of digitalin.

Dose.—Four to six in the 24 hours. *Homolle & Quevenne.*

Syrupus digitalinæ.

Syrup of digitalin.

℞. Digitalin. gr. iss. (10 centigrammes.)
Syrupi O 2¾ (1500 grammes.)

Dissolve the digitalin in alcohol, and add the syrup. In every 15 *grammes* (40 grains) of the syrup there is a *milligramme* (gr. ·0154) of digitalin.

Dose, four to six spoonfuls in the day, or in some appropriate infusion. *Homolle & Quevenne.*

Mistura digitalinæ.

Mixture of digitalin.

℞. Digitalin. gr. ·0770 (5 milligrammes.)
Aquæ lactucæ ℥iii¼ (100 grammes.)
Syrup. flor. aurant. ʒviss. (25 grammes.)

Dissolve the digitalin in a few drops of alcohol; then add the distilled water and the syrup.

To be taken by table spoonfuls in the 24 hours.

Homolle & Quevenne.

Unguentum digitalinæ.

Ointment of digitalin.

℞. Digitalin. gr. ·770 (5 centigrammes.)

Dissolve in a few drops of alcohol at 22° (s. g. ·923;) and incorporate in lard (*axonge balsamique*) 10 *grammes* (ʒiiss.)

LXXIII. DIOS'MA.

Synonymes. Diosma Crenata (folia;) Barosma Crenata (folia;) Agathosma Crenatum (folia;) Bocchoe, Bocho, Boocho, Buckha, Buchu Leaves.
French. Diosmée crénelée.
German. Buccublätter; Duftstrauchblätter.

Diosma crenata is indigenous at the Cape of Good Hope. It belongs to the Natural Family Rutaceæ; Sexual System Pentandria Monogynia. The smell of the leaves is penetrating and peculiar, but resembling that of rue and camphor. By some it has been compared to that of oil of juniper; by others, to rosemary; by others, to cummin, and by others again, to that of the urine of the cat. The name is, therefore, by no means expressive,—διος, "divine," and οσμη, "odour." The taste of the leaves is aromatic; somewhat pungent; and, in the opinion of Buchner, resembles that of peppermint; without any parti-

cular bitterness, yet disagreeable. According to the analysis of Buchner, Brandes, and Cadet, the most important constituents appear to be a volatile oil of a greenish-yellow colour, a peculiar principle—*diosmin*, and a semi-resinous substance. Diosmin is a very tenacious adhesive matter, similar to Peruvian balsam, and can be drawn out in fine threads. It has the same smell as the leaves, only somewhat weaker; the taste is pungent and bitter. The semi-resinous matter has a resinous lustre; is of a dark brown colour, becomes fluid when heated, and burns with a flame. Its odour is not remarkable; taste, somewhat pungent and sourish.[1]

EFFECTS ON THE ECONOMY IN HEALTH.

The Hottentots have long used the leaves of several varieties of diosma both internally and externally; but they give the preference to diosma crenata. Through them its virtues became known to the European settlers. It was first brought to the notice of British practitioners by the notorious Richard Reece, who is more known for the part he took in the farce of Joanna Southcote than for any thing else. In Germany, it was chiefly promulgated by Jobst, who published an extract from Reece's observations in the Repertorium of Buchner.[2] Bardili instituted experiments for testing its action on the healthy organism. It first acts—he says—as an excitant on the stomach, whence arises a feeling of increased heat in that organ, and the appetite becomes augmented: from the stomach, the excitement spreads to the vascular system; the heat of the body is increased; the pulse becomes more frequent, and the transpiration is favoured. It acts, likewise, on the urinary secretion; the urine is separated in larger quantity, contains flocculi, deposits a purulent (?) sediment, and exhales an aromatic odour. On the digestive function, it seems to produce somewhat of a constipating effect. Bardili thinks, that he has also witnessed some narcotic operation in his experiments.

The same results were produced by diosma on animals.

EFFECTS ON THE ECONOMY IN DISEASE.

The inhabitants of the Cape administer this agent as a stomachic, and the Dutch physicians give it with success in *indigestion*. It is said also to have afforded essential service in *chronic cases of rheumatism* and *gout*. Autenrieth extols it in *rheumatic pains*, which have had their foundation in repelled itch (?); and its utility in *chronic rheumatism* has been confirmed by numerous others. It has been extolled, moreover, in *hæmaturia*, *calculous pains*, and in *irritated* and *suppurative conditions of*

[1] Journal de Chimie Médicale, iii. 13, and Journal de Pharmacie, xiii. 106.
[2] Band· xxii. S. 51.

the bladder, *urethra*, and *prostate*. The author has repeatedly administered it, but has observed no other effects than those of a moderate excitant diuretic and tonic. Reece says he found it efficacious in *incontinence of urine*, and in *catarrhus vesicæ;* and he gave it—united with tincture of cubebs—in *spasmodic stricture of the urethra*, *gonorrhœa*, *swelling of the prostate*, and *impotence*.

At the Cape of Good Hope, buchu leaves are often applied externally, in the form of liniment and baths, as well as of fomentations and cataplasms, in *luxations* and *rheumatic pains*,—and in *wounds*, especially the contused.

It may be remarked, that this—like almost every similar remedy—has been given in *cholera;* and, as the Riga physicians assert, frequently with favourable results.

MODE OF ADMINISTRATION.

The dose of the powder is ʒij. in the day: this, at least, is the common dose at the Cape. The *infusion* necessarily contains more of the volatile oil than the *decoction;* but, on the other hand, the latter has more of the diosmin: as respects their action, however, there is not much difference. A *vinegar*, *oxymel*, *liniment*, *extract*, and *tincture* of diosma have been advised.

The London, Edinburgh, Dublin, and United States Pharmacopœias have an Infusum Diosmæ (ℨss. of the leaves to Oss. of water, Pharm. U. S.;) dose, f ℨiss: and the Dublin, a Tinctura Buchu (ℨij. of the leaves to Oj. of proof spirit;) dose, f ʒij. or f ʒiij.

Infusum diosmæ compositum.

Compound infusion of buchu.

℞. Diosm.
Uvæ ursi āā. ℨss.
Aq. bullient. Oss.
Digere leni calore in vase clauso per semihoram. Colaturæ adde
Syrup. seneg. f ℨss.

Dose.—One or two spoonfuls every two hours in *blennorrhœa*, and in *atony* and *paralysis of the bladder*. *Clarus.*

℞. Infus. diosmæ f ℨvij.
Tinct. diosmæ,
—— Cubebæ, āā. f ℨss. M.

Dose.—Two table spoonfuls three times a day. This formula is recommended by Dr. Joy[1] "in *chronic diseases of the prostate*, *bladder*, *kidneys*, *gravel*, &c.," as if the pathological condition to be rectified were, in all these cases, identical!

[1] Tweedie's Library of Medicine, v. 311. London, 1840; or 2d American edit. vol. iii. Philad. 1842.

ELECTRICITAS, see GALVANISMUS.

LXXIV. ELECTRO-MAGNETISMUS.

Synonymes. Electro-magnetism, Magnetic Electricity.

Electro-magnetism has been introduced amongst therapeutical agencies as adapted for the same cases as electricity and galvanism. Various forms of apparatus have been designed; *coil machines*, and *magneto-electric machines:*[1] but, perhaps, as Dr. Pereira has remarked,[2] the most convenient, simple, and powerful is the magneto-electric machine of Mr. E. M. Clarke, of London; which consists of a battery of six curved permanent magnets, and an intensity armature, around whose cylinders 1500 yards of fine insulated copper wire are coiled. The ends of this wire communicate respectively with a pair of directors, each holding a piece of sponge, dipped in vinegar, or a solution of common salt. When the armature is rotated, and a portion of the body is interposed between the directors, a succession of shocks is experienced. As this machine is not affected by the moisture of the atmosphere, and acids are not required to excite it, it is possessed of advantages which the galvanic battery has not.

EFFECTS ON THE ECONOMY IN DISEASE.

Electro-magnetism has been employed in all cases in which voltaic electricity has been deemed advisable. Mr. E. S. Clarke, who applied it in the wards of Dr. Graves at the Meath Hospital, states that he found it act more quickly in *neuralgia*[3] than in any other disease. Some varieties it removed in two or three applications, but others often required a feeble electro-magnetic current for many successive days. Next in order of facility came "*rheumatic* and *sciatic* cases; then cases of *deafness;* after those, some varieties of *catamenial suppression.* It also acted readily on certain curable forms of *amaurosis;* then in *partial paralysis*, and with greater difficulty in *hemiplegia* than in almost any other form." Dr. Golding Bird,[4] and Dr. Neligan[5] found electro-magnetism of immense advantage in many forms of paralysis; whilst in Dr. Bence Jones's[6] trials of it, in the same disease, no benefit was derived in the majority of the cases. Dr. Wm. Davis[7] found it of great value in *rheumatic paralysis*, in a case of *subacute articular rheumatism*, which had produced such changes in the locomotive organs, that

[1] See the author's General Therapeutics and Mat. Med. 4th edit. i. 510. Philad. 1850.
[2] Elements of Mat. Med. and Therap. 3d edit. vol. i. p. 56. Lond. 1849.
[3] Graves, System of Clinical Medicine, p. 434. Dublin, 1843.
[4] London Lancet, June 13, 1846, p. 649.
[5] London and Edinburgh Monthly Journal of Med. Science, April, 1846.
[6] London Journal of Medicine, No. 2, 1849.
[7] Provincial Medical and Surgical Journal, Nov. 15, 1848.

the patient was unable to walk or use her hands; and Professor Kubik[1] bears equally favourable testimony to it in the same affections.

An anomalous case belonging to the *neuroses* was laid before the Sheffield Medical Society; a summary of which is given by Mr. Law.[2] A lady, 51 years of age, had suffered from neuralgia of the right inferior maxillary nerve, when she was suddenly seized with vomiting; fainted, and lost power over the arms when in the upright, but not when in the recumbent posture. Soon afterwards she found it impossible to swallow, and the sickness subsided: after this, she had paralysis of the left side of the face, and of the right arm and leg. Nothing could be introduced into the stomach except through an œsophagus tube. Electro-magnetism was applied to the back of the neck and chest in the course of the œsophagus, to the left side of the face, and from the spine in the course of the nerves to the right arm and leg. This was done for one hour at least, three times a day for a month, and afterwards twice a day. Nutritious and stimulating substances were passed down into the stomach, and quinia and other tonics were administered. Under this management she completely recovered. "With respect to treatment," says Mr. Law, "the writer doubts whether the electro-magnetism is entitled to the credit of having effected the cure; or whether this should be attributed to the quinine, stimulating tonics and great attention which was paid to the digestive organs. Paralysis occasionally terminates favourably quite irrespectively of medical treatment, and the acknowledged obscurity in which the proximate cause, in the case under consideration, was involved, demands especial caution in assigning to each of the various means employed in the treatment its due share of credit. It is by no means impossible, that the electro-magnetism, instead of having carried off the complaint, retarded the cure, and that this was ultimately accomplished by nature assisted by the general treatment. Until a series of cases treated with electro-magnetism, have been contrasted with a parallel series treated without, it would be unphilosophical to pronounce a decided opinion on this principle as a curative agent in paralysis. Although the writer has employed electro-magnetism in a variety of cases during the last twelve months, yet he has hardly been able to verify a single observation of any one of its numerous and zealous advocates. Dr. Shearman used either the negative or positive pole, as chance directed. Now, Retter asserts, that the former diminishes, whilst the latter augments the powers of life; and J. D. Humphreys, medical galvanist, with Chas. Woodward and others, says, that the positive pole exerts a salutary influence, by exhilarating the

[1] Prag. Vierteljahr, v. 4, 1848; cited in Schmidt's Jahrbücher, u. s. w. No. 2, p. 159. Jahrgang, 1849.

[2] Provincial Medical and Surgical Journal, May 15, 1844.

spirits, and infusing feelings of energy and strength; while the negative excites a sense of exhaustion and of irritation. These writers distinctly state, that the only effect of the negative pole, if applied to the seat of a disease, would be to aggravate its worst symptoms. How are these opinions to be reconciled with Dr. Shearman's belief, that he had cured his patient by the indiscriminate use of the oxidating and deoxidating electricities? Dr. Wilkinson, Dr. Hodgkin, Mr. Ware, and Mr. Carpue, ascribed wonderful power to electro-magnetism in diseases affecting respiration, circulation, digestion and secretion. According to these gentlemen, there is hardly a complaint which it will not either cure or relieve, or an indication in therapeutics, which it will not satisfactorily fulfil. The writer can reconcile the discrepancies between the statements of authors and his own experience only by supposing, that the publications on this subject contain many errors. With respect, however, to the case under consideration, it is right to say the society (Sheffield Medical,) generally agreed with Dr. Shearman, in ascribing the cure to electro-magnetism; and that Dr. Abercrombie speaks rather favourably of this agent."

This case was doubtless one of the large class of anomalous nervous maladies, which require new nervous impressions, and a tonic system of medication. To fulfil the former indication, nothing could be more appropriate than electro-magnetism. The same may be said of a case of *hysterical convulsions*, which occurred to Dr. Byrne,[1] in a girl, twelve years of age, who was aroused from each paroxysm by having the poles of an ordinary electro-magnetic battery applied—the one to the occiput, the other to the sacrum.

Mr. Tuson[2] has recorded observations of a very favourable character in regard to the benefit of this agent in *certain local neuralgic affections*, the consequence of injury; and it has been extolled by Dr. William Cumming[3] in *constipation*, and in *certain irregularities of the functions of the bowels*.

Dr. Hays,[4] who, as remarked under GALVANISMUS, found galvanism the most useful remedy in certain cases of *amaurosis* which fell under his care, employed electro-magnetism in several cases in Wills' Hospital, and in a number in private practice, but without its seeming to be productive of the slightest benefit in a single instance; whence he too hastily infers, that for remedial purposes a regular and constant galvanic current would appear to be more useful than the violent shocks produced by interrupted currents, such as are induced by the electro-magnetic apparatus. This is obviously a *non sequitur*, for the shocks may be diminished so as scarcely to be felt; and, moreover, theory would suggest, and ex-

[1] Charleston Medical and Surgical Journal, cited in Ranking's Abstract, January to July, 1849, p. 49.
[2] Medical Times, Feb. 24, 1849. [3] London Med. Gazette, Dec. 7, 1849.
[4] American Journal of the Med. Sciences, Aug. 1840, p. 288.

perience has shown, that there are numerous cases in which the excitant and revulsive effect of properly graduated shocks is more serviceable than the regular and constant current.

Dr. Kramer[1] has employed the magneto-electric or electro-magnetic current as a remedy for *deafness* and *tinnitus aurium*. He found it a decided excitant to the organ of hearing, its action being manifested by convulsive twitchings, pains in the ear, momentary increase in the hearing distance, and aggravation of the tinnitus, either at the time or afterwards; but it did not seem to have any strengthening effect on the nerves, and required to be used with the greatest precaution, and in the mildest manner. The action was strongest when the current was conveyed from the mouth of the Eustachian tube to the external meatus of the affected ear, instead of from one auditory passage to the other.

Dr. Thomas Radford[2] employed galvanism with great success in the treatment of cases of *uterine hemorrhage*, accidental or unavoidable, accompanied by exhaustion, and occurring before, during, or after labour. He considers, from positive trial, that it will be found a most important agent in *tedious labour*, depending upon want of power in the uterus, and where no mechanical obstacles exist.[3] He also suggests the probability of its proving valuable in originating uterine action *de novo* in cases where it may be deemed necessary to induce premature labour; and that it may be worthy of trial in certain cases of *menorrhagia* in the *ungravid* state, where, on examination *per vaginam*, the uterus is found to be atonic, as evidenced by its large, flaccid condition, and the patulous state of the os uteri. His mode of applying it is as follows. Slight shocks are carried through the long axis of the uterus by means of a conductor introduced along the vagina to the os uteri, another being placed externally over the fundus. Shocks may be also passed transversely through the uterus by applying simultaneously the conductor on each side of the abdomen. The application must be made at intervals, so as to approximate, as nearly as possible, its effects to the natural labour pains; and be continued so as to meet the exigencies of the case. Successful cases are related by Messrs. Thomas Dorrington,[4] H. Wilson,[5] Mr. Cleveland,[6] and others.

In a case of *amenorrhœa*, electro-magnetism was used with success by Dr. Collins.[7] He had applied the electro-magnetic ma-

[1] Beiträge zur Ohrenheilkunde, Berlin, 1845; cited in Brit. and For. Med. Review, July, 1847, p. 22.

[2] Provincial Medical and Surgical Journal, Sept. 18, 1844, p. 386; and Dublin Quart. Journal, May, 1847.

[3] See a case by Mr. Clarke, Dublin Hospital Gazette, March 1, 1845, cited in Braithwaite's Retrospect, January—June, 1846, p. 423.

[4] Provincial Med. and Surg. Journal, March 11 and 18, 1846. [5] Ibid. Ap. 29, 1846.

[6] Dr. G. Bird, Lectures on Electricity and Galvanism, in London Medical Gazette, June 11, 1847. [7] London Lancet, Jan. 25, 1845, p. 91.

chine in some other cases with the happiest effects; and was induced to try it in this. He applied one of the buttons on the lumbar region of the spine, and the other in front over the pubic region, using the negative and positive poles alternately to the spine and abdomen: the remedy was continued five days, from five to ten minutes each day, when the catamenia were fully re-established. Dr. Collins adds, that he has used it with good effect in *rheumatism*.

It has likewise been employed with success in *amenorrhœa* and *dysmenorrhœa*, by Dr. Robert L. M'Donnell, of Montreal,[1] and by Dr. Walkly, of Mobile.[2] The former prefers the apparatus sold under the name of the *vibrating magnetic machine*. When this is in operation, one of the buttons at the free extremity of the electrodes is applied by the physician to the lower portion of the spinal column, corresponding to the point of exit of the sacral nerves, and the other is applied by the patient herself, or by a female attendant, immediately over the pubes. In order to protect the patient from the inconvenience of receiving the shock through the hand which holds the button, a thick glove should be worn. Having desired that one button be kept firmly pressed upon the os pubis, the physician commences by passing the other button along the spine from the occiput to the os coccygis. After this has been done slowly four or five times, the button is kept for five or six minutes immediately over the sacrum, and the electricity is thus passed in an uninterrupted current through the uterus. It is not necessary to put the patient to great torture by increasing the strength of the shocks. More benefit, according to Dr. M'Donnell, will be derived from an uninterrupted and steady transmission of a moderate current than by occasional shocks of great intensity. The current may also be sent transversely through the pelvis, by placing a button on each hip, above the great trochanter.

Dr. Walkly[3] thinks electro-magnetism as a parturifacient far preferable to ergot, for the reason, that the pains induced by it are regularly intermittent, as in natural labour, and hence not likely to injure either the mother or the child. The electricity may be applied by placing the negative electrode in a foot-bath with the feet, whilst the positive electrode is placed over the lumbar region, and a succession of shocks passed for from three to five minutes. The application of galvanism to induce and increase parturient contractions of the uterus has often, indeed, been proposed. It was suggested by Herder[4] in 1803, and by Dr. F. Ramsbotham in

[1] British American Journal, cited in Ranking's Half-yearly Abstract, July to December, 1846, p. 170.

[2] New Orleans Med. and Surg. Journal, July, 1846, p. 52.

[3] Op. cit.

[4] Diagnostische Praktische Beiträge zur Erweiterung der Geburtshülfe, Leipz. 1803, cited by Professor Simpson, in Monthly Journal of Medical Science, July, 1846, p. 33.

1834,[1] but does not appear to have been employed by them. Several trials were instituted by Professor Simpson, of Edinburgh, with the view of ascertaining the exact degree of influence which galvanism possesses over the contractile action of the uterus during labour, and consequently the amount of aid which may be expected to be derived from it in any case in which its assistance is had recourse to. His general results were not favourable to it. In one instance the pains were more frequent in their recurrence, but shorter in their duration during the application of galvanism; in five other cases, it neither increased the average frequency of the pains, nor their average duration. In one case, the pains ceased whilst the galvanism was applied, and returned upon its removal. In another, the action ceased whilst the galvanism was applied, and did not return on its withdrawal, nor for 24 hours afterwards. Professor Simpson concludes, that as employed at the present time and in its present mode, it is not a means which can be in any degree relied on to directly excite or increase the contractile action of the uterus; "and is so far practically and entirely useless as a stimulant to the parturient action of the uterus."

There can be no doubt, however, from the mass of testimony, much of which has been collected by Dr. Channing,[2] of Boston, that uterine contractions may be excited by the powerful stimulation which interrupted electro-magnetic currents are capable of inducing.

In the opinion of Dr. Golding Bird,[3] electricity is the only really direct emmenagogue with which experience has furnished us. "I do not think," he remarks, "I have ever known it fail to excite menstruation when the uterus is capable of performing this function." "The rule," he adds, "for ensuring success in the great mass of cases of amenorrhœa is sufficiently simple. Improve the general health by exercise and tonics; remove the accumulations often present in the bowels by appropriate purgatives; and then a few electrical shocks,—often a single one will be sufficient to produce menstruation, and at once to restore the previous deficient function." As the author has elsewhere[4] remarked, however, improvement of the general health is itself an efficient agency in the removal of amenorrhœa. An admirable mode of using it, according to Dr. Channing, is the hip-bath, in which one of the poles of the electro-magnetic or galvanic apparatus is immersed near the organs to be especially acted upon. The other handle is applied in the course of the spine, or in the bath on the opposite

[1] Simpson, Op. cit.
[2] Notes on the Medical Application of Electricity. Boston, 1849.
[3] Lond. Med. Gaz., June 11, 1847.
[4] General Therapeutics and Mat. Med., 4th edit., i. 422. Philad. 1850.

side of the body. Dr. Tracy E. Waller[1] recommends it as a valuable agent in *prolapsus uteri*.

An interesting case of *poisoning by opium* is recorded by Dr. Thomas S. Page,[2] of Valparaiso, in which electro-magnetism was successfully employed to cure the patient. The breathing had become short and hurried; the mouth widely extended, and jaw fallen; nothing seemed capable of rousing him; the exhaustion was extreme; the pulse could be felt feebly at the wrist, and was maintained there, in Dr. Page's opinion, by the agitation which he had undergone. Electro-magnetism was now applied. Whilst an assistant rapidly rotated the wheel, Dr. Page applied the balls at first to each side of the neck, and ran them down behind the clavicles. The arms and body moved convulsively, but the patient lay as unconscious as before. He now passed one ball over the region of the heart, and the other to a corresponding point on the right side. In an instant the eyes opened, and with a ghastly expression of countenance the head and body were thrown convulsively toward Dr. Page, and he groaned. He now sank back into his reclining posture, and was again asleep. The balls were reapplied in the same situation with similar results a third and a fourth time, when he cried out:—"no more!" Reaction was now positively established.

Dr. Page suggests, that electro-magnetism will not only be found a most useful agent in cases like the above; but in highly *congestive forms of disease*, where oppression of the nervous system prevents reaction and speedily destroys life. In all cases of *asphyxia* he considers it will be useful, and believes that in very many instances it might be applied with the happiest effects in *asphyxia neonatorum*.

When employed—as every form of electricity occasionally is—to modify the function of nutrition for the removal of *morbid growths*, or to promote the absorption of *effused fluid*, as in *hydrocele*;[3] magneto-electricity is most commonly administered in the way of electro-puncture; yet excellent effects are not unfrequently induced by the employment of the magneto-electric influence in the shape of shocks passed through the part affected for a longer or shorter period.

[1] Medical Examiner, April, 1848, p. 238.
[2] Amer. Journ. of the Medical Sciences, Aug. 1843, p. 301.
[3] Ogier, in Southern Journal of Medicine and Surgery, No. 3, and Frost, Charleston Med. Journal, July, 1848.

LXXV. ELECTRO-PUNCTU'RA, GALVANO-PUNCTU'RA.

Synonymes. Electro-puncture, Electro-puncturation, Galvano-punctura, Galvano-puncture, Galvano-puncturation.

German. Electropunctur, Galvanopunctur.

Electro-puncture consists in a union of acupuncture with electricity. The idea of the conjunction appears to have originated with Berlioz; but Sarlandière was, doubtless, the first who put it in practice, although J. Cloquet has contested the priority with him—a matter, by the way, as in all such cases, of extremely small moment. The operation consists in employing acupuncturation in the usual way, either with a single needle, or with two or more; and making a communication between them and the prime conductor of an electrical machine in action; or they may be made to form part of the circuit in the discharge of a Leyden jar. In this way, the electrical influence may be graduated from the simple aura to a full shock. Sarlandière appears to have employed electro-puncture with great success; but he restricts its use to *rheumatic* or *neuralgic pains*, uncomplicated with organic mischief or inflammation: when such complications exist, he advises that bloodletting and general antiphlogistics should be premised. Guersent thinks it better, in all these cases, to use simple acupuncturation, and only to employ electro-puncture when the first proves to be inadequate, as in *paralysis*, and in *tremors produced by the immoderate use of mercury;* in all cases, indeed, in which the malady depends on a diminution of the nervous energy. A case of success from its use in paralysis of the right arm, in which voluntary motion and sensibility were destroyed, has been published.[2] The patient was, in the first instance, subjected to the use of blisters and moxas along the course of the radial nerve, from which he obtained some advantage. The remedy which succeeded best, however, was electro-puncture along the nerves from the shoulder to the hand. At first, the punctures were but little felt; but afterwards they were very painful. The sensibility, mobility, and strength of the fingers and hand gradually returned; and, three months after his admission, the patient left the hospital completely cured.

Galvano-puncture has likewise been used by M. Jobert[3] for the treatment of *deafness* dependent upon paralysis of the acoustic nerve. He introduces Itard's sound through the nasal fossæ

[1] E. Gräfe, art. Electro-punctura, in Encyclopäd. Wörterb. der Medicinisch. Wissensch. x. 550. Berlin, 1834.

[2] La Lancette Française, Dec. 20, 1836; cited in Amer. Med. Intel., Oct. 16, 1837, p. 265.

[3] Cited from L'Examinateur Médicale, in Lond. Med. Gaz., June 2, 1843, p. 356.

into the Eustachian tube; and into this sound a long thin acupuncture-needle is passed, so as to fix itself in a point of the parietes of the tube, whilst the other extremity projects from the end of the sound. Another acupuncture-needle is implanted in the membrana tympani. This being done, one of the conducting wires of a galvanic battery, the trough of which is filled with water and chlorohydric acid, is passed through the eye of one of the needles, and the end of the other conducting wire is made to touch the opposite needle. M. Jobert has used in the beginning eight pairs of plates of the battery; afterwards, ten and twelve pairs, and as high as eighteen; and he asserts, that he has patients who have been acted upon by the entire pile, which contains forty pairs. At the moment the poles are placed in contact, there is a very painful shock in the ear and head, with convulsive movements; but the shock and pain usually cease immediately. In one patient, the impression was felt for eight days; but it never exceeded a slight pain, and ceased of itself. When the patient was irritable, only one shock was given; but he has given two and even three shocks to persons whose sensibility was obtuse, and who had been already subjected to electro-puncture. In general, he permitted eight days to elapse between each trial. He relates four cases of well marked deafness, which were completely cured, one after a single shock; another after two shocks; and a third after two sittings, each consisting of three galvanic shocks.

The author has frequently used both electro-puncture and galvano-puncture in *rheumatic* and *neuralgic affections;* but he does not think the advantages were more marked than those of simple acupuncture, whilst the suffering from the operation was certainly greater. Magendie regards electro-puncture as the remedy *par excellence* in the treatment of *obstinate neuralgia.*[1] In *rheumatism of the chronic form*, it has afforded almost instantaneous relief; and M. Raciborski[2] found it of essential advantage in cases of *sprains*.

Magendie affirms, that he has treated many cases of *incomplete amaurosis* with great success by galvano-puncture. He fixed a needle in the frontal nerve, and another in the superior maxillary, making these communicate respectively with the poles of a galvanic pile of twelve pairs of plates, each six inches square. Whenever the contact was made, the patient experienced a painful commotion in the course of the nerves, and at the bottom of the orbit; light became better appreciated, and the pupil contracted. A case has been reported by Dr. Dacamina[3] of *palsy of the*

[1] Medico-Chirurg. Rev. July, 1841, p. 202; see, also, Dr. Shuster, cited in Lond. and Edinb. Monthly Journ. of Med. Science, June, 1844, p. 510; and Dr. Cowan, in Address before the Provincial Med. and Surg. Association, cited in Braithwaite's Retrospects, Amer. edit. xii. 36. N. Y. 1845.

[2] Cited in Southern Medical and Surgical Journal, July, 1846, p. 436.

[3] Psychological Journal, January, 1849.

tongue, which was cured by it. In 1813, an old woman was seized with general paralysis of sensation and motion in consequence of fright. This passed away, except as regarded the arms, head and tongue. She was unable to articulate a word. Twenty-three years afterwards, Dr. Dacamina had recourse to galvano-puncture,—one pole of the apparatus being applied to the occipital nerve by means of a needle introduced into the neck, and the other to the tip of the tongue. After two applications, the patient could raise the organ; and after the third, she could reply to some questions intelligibly, although with difficulty. After this, the points of contact were varied, and the electricity was applied to different parts. The patient gradually recovered her speech, and the other palsied parts were also cured.

In cases of *asphyxia*, galvano-puncture has been proposed to arouse the dormant energies. The effect of electricity, in the different forms in which it is adopted in medicine, on the functions of sensibility and muscular contraction, could not fail to suggest it early to observers as a fit agent for this purpose: but it is rarely at hand, and, therefore, seldom available. J. P. Frank, Thillaye,[1] and others have highly recommended it;—the latter gentleman, on the strength of numerous experiments on animals. As the object, in these cases, is to arouse the respiratory muscles to action, the electric shock may be passed through the shoulders or the chest in any direction. Neither common nor galvanic electricity is possessed of much—if any—power to restore the action of the involuntary muscles. The author has frequently attempted to re-excite the action of the heart, intestines, fibres of the uterus, &c. soon after the cessation of respiration and circulation, by means of the galvanic stimulus, but without the slightest success, although the voluntary muscles responded to it energetically. Besides, were the action of the heart re-excited by it, this could be but momentary. A necessary stimulating agency to that viscus is distention by the proper fluid, and unless the respiratory movements were restored, and conversion of venous to arterial blood effected, so that the latter could reach the left heart, the action of that organ could not be maintained. Every attempt, therefore, is properly made to restore the action of the respiratory muscles, so that hæmatosis may be accomplished.[2]

M. Leroy d'Etiolles[3] has suggested galvano-puncture in a manner which, at the first aspect, appears most formidable; but which is really less so than it seems to be, in consequence of the impunity with which fine needles can be made to penetrate, as has been

[1] Archives Générales de Médecine, tom. xii.

[2] Art. Asphyxia, by the author, in the American Cyclopedia of Practical Medicine, part x. p. 486, Sept. 1836; and in his Practice of Medicine, 3d edit. i. 475. Philad. 1848.

[3] Magendie's Journal de Physiologie, tom. vii. tom. viii. and tom. ix.; also, Recherches Expérimentales sur l'Asphyxie, Paris, 1829; and Bourgeois, Observations sur la possibilité du retour à la vie dans plusieurs cas d'Asphyxie. Paris, 1829.

seen,[1] even the most important organs. He introduced an acupuncture needle on each side, between the eighth and ninth ribs, until it reached the fibres of the diaphragm. He then established a galvanic current between the needles by means of a pile of twenty-five or thirty pairs of plates, an inch in diameter. The diaphragm immediately contracted, and an inspiration was accomplished. He then interrupted the circle, when the diaphragm, urged by the weight of the abdominal viscera, and, aided by gentle pressure made on the abdomen by the hand, returned to its former position, and an expiration was effected. In this way, the two respiratory acts were made to succeed each other, and regular respiration was reinduced. A continuous current was likewise employed in some cases; but the respiratory movements were irregular, and nothing like natural respiration resulted. Leroy tried his method on animals asphyxied by submersion; and when they had not been under water more than five minutes, they were often restored.

These experiments were witnessed by Magendie.[2] On different occasions, M. Leroy asphyxied animals of the same kind, and apparently of the same strength, and while those that were left to themselves perished, those that were treated by galvanism recovered. As an aid, therefore, to pulmonary insufflation, and an important one, galvanism,—combined or not with acupuncturation,—might be advantageously employed in asphyxia, but, as has been already remarked, it can rarely be available. Certainly, no time should be lost in adopting the other energetic and indispensable measures that are demanded.[3] It has been recommended, that as only a very small apparatus is necessary, batteries, consisting of a few plates, might be kept wherever there are station-houses for the reception of persons in a state of asphyxia.[4] The suggestion is good; and they might also with propriety form a part of the cabinet of apparatus of the private practitioner; but whilst an assistant is preparing the apparatus for action, the practitioner should be assiduously engaged in employing other means of resuscitation.[5]

In a paper read before the French Academy of Sciences, in January, 1843, Dr. Shuster[6] reported the following conclusions as the result of his employment of electro-puncture in disease. *First*, Electricity is only useful as a therapeutical agent when introduced into the substance of the affected organs by means of acupuncture. *Secondly*, Galvanic electricity and the electro-magnetic fluid, when employed by acupuncture, constitute the

[1] See art. Acupuncture, p. 51. [2] Journal de Physiologie, ix.
[3] See art. Asphyxia. Op. cit. p. 486.
[4] Kay, in Edinburgh Med. and Surg. Journal, xxix., and in his work on Asphyxia. London, 1834.
[5] See Most, Art. Galvanismus, in Encyklopäd. der gesammten medicin. und chirurgisch. Praxis, u. s. w. 2te Auflage. Leipz. 1836. [6] Op. cit.

most powerful and harmless agents that we possess. *Thirdly*, The affections in which electro-puncture may be employed successfully are:—First, *hydrocele*, *ascites* (idiopathic or symptomatic of curable lesions,) *hydrothorax*, and *articular dropsies*. Its use may be extended to *chronic hydrocephalus*, *dropsy of the pericardium*, and the greater part of *dropsical effusions*. Secondly, *lipomatous*, *steatomatous*, *atheromatous*, *melicerous*, *serous* and *synovial cysts*. Thirdly, *congestions* and *indurations*, chiefly those of the lymphatic glands, of the testicles and epididymis; *indurations of the areolar tissue* in the neighbourhood of certain kinds of ulcers, and in the walls of fistulous passages, and certain *indolent tumefactions;* and there would be nothing irrational, he properly remarks, in attacking *cancerous affections* in the same way. Fourthly, *goitre*. Fifthly, *varicose dilatations*, especially when electro-puncture can be aided by rest and compression; and he does not despair to employ it with advantage in cases of *aneurism* and *erectile tumours*. Sixthly, *chronic rheumatism*, *neuralgia*, and *certain nervous diseases*. Seventhly, *paralytic affections* in general, but especially those of the retina, (*amaurose asthénique*,) and of the muscles of the voice, (*mutisme paralytique*.)

M. Zenobi Pechioli[1] has detailed a case of double *hydrocele* in which he employed electro-puncture. Two needles were inserted, one into the upper, the other into the under, part of the tumour. These were connected to opposite poles of a voltaic pile, and the electric fluid was passed in a continued current for five minutes, when it had to be discontinued in consequence of the right testicle becoming painful. Five minutes after the removal of the needles, both hydroceles disappeared completely. In the evening, redness and heat of the scrotum occurred, and the right side of the scrotum became œdematous. The operation was repeated in ten days, and was followed by a like result. Ten days afterwards, it was again resorted to, after which he had no return of the disease. M. Pechioli is of opinion, that the openings made by the common mode of acupuncturation are too small to allow the fluid to escape, and he thinks, that by passing a current of electricity through the hydrocele, the contained fluid is forced out through the sac into the areolar tissue of the scrotum, whence it is removed by absorption.

M. Pétrequin,[2] of Lyons, has applied electricity to the cure of *aneurism* in three cases. Two of these he had lost sight of before the influence of the treatment could be duly appreciated. In another case, of *aneurism of the temporal artery*, galvano-

[1] Bulletin delle Scienze Medic. di Bologna, Sept., 1841; cited in Dublin Journal of Med. Sciences, November, 1842, p. 311.

[2] Amer. Journal of the Med. Sciences, Jan. 1846, p. 229; cited from Med. Times, Nov. 15, 1845; and Revue Médicale, Nov. 1846, p. 340.

puncture was performed by the introduction into the tumour of two sharp steel pins crossing each other at right angles; the heads of the pins were then placed in communication with the wires of a voltaic pile, and a shock and sharp pain were experienced, the pain increasing with the intensity of the electric action. The operation lasted ten minutes, and fifteen plates were employed. The pulsations gradually diminished in the tumour during the operation, and, at its close, had entirely disappeared. No accident followed the experiment; and in ten days neither tumefaction nor pulsation could be detected in the spot where the aneurism had existed. M. Pétrequin lays down the following precepts, an observance of which, he thinks, will ensure a complete coagulation of the blood contained in an aneurismal tumour. *First*, compression of the artery between the aneurism and the heart during the application of the galvanic agency. *Secondly*, the pins introduced into the tumour should be numerous, cross each other at right angles, and their surface should be protected by a coat of varnish, in order to prevent unprofitable loss of the electric fluid. *Thirdly*, after the operation, ice should be applied to the tumour. Successful cases of its employment in aneurism are given by Drs. Bellingham, O'Shaughnessy,[1] Abeille,[2] Borelli,[3] and others; but it has been unsuccessful in the hands of Liston, Phillips and others, and has been very unfavourably reported on by M. Gimelle,[4] before the Academy of Medicine of Paris, who is so impressed with the numerous dangers and the ill success of it, that he desired the Academy to pass an absolute condemnation of it. This was, however, regarded as too extreme a measure, since cases in which the ligature could not be employed, or had been so usually without success, might sometimes be benefitted by this procedure.

There can be no doubt that electro-puncture is capable of materially modifying the nutrition of the part on which it is practised, and that it will, consequently, be found to exert power over *morbid depositions*, solid as well as fluid.

[1] Ranking's Half-yearly Abstract, January to July, 1847; Amer. edit., p. 196; and Ibid. July to December, 1847, p. 203.

[2] Annales de Thérapeutique, Novembre, 1847; cited in Ranking, Op. cit., January to June, 1848, p. 107.

[3] Schmidt's Jahrbücher, Bd. lxiv., S. 75; cited in Canstatt und Eisenmann, Jahresbericht, u. s. w. im Jahre, 1849, v. 145. Erlangen, 1850.

[4] Bulletin de l'Académ. xv. 572-82; cited in British and Foreign Medical Review, July, 1850, p. 268.

LXXVI. EMETIA.

SYNONYMES. Emetina, Emeta, Emetinum, Emetium, Emetine.
French. Emétine, La Matière Vomitive.
German. Emetin, Brechstoff.

In the year 1817, MM. Pelletier and Magendie,[1] by a series of chemical and physiological experiments, discovered, that the various kinds of ipecacuanha are indebted for their emetic properties to a peculiar substance to which they gave the name *Emétine.* This substance possesses the emetic power in a very concentrated state, and has neither the disagreeable smell, nor the nauseous taste of ipecacuanha. They considered, therefore, that it might be advantageously substituted for ipecacuanha on all occasions.

There are two varieties of the active principle—the *coloured* and the *pure*—which, as Magendie remarks,[2] bear the same relation to each other as moist sugar does to the white and crystallized. Ipecacuanha, derived from cephaëlis ipecacuanha, contains the most emetia.

Emetia has been received into many of the Pharmacopœias, as the Parisian, Batavian, Hanoverian, &c.

METHOD OF PREPARING.

1. *Coloured Emetia.—Powdered ipecacuanha* is digested in *ether* at 60° (.720) to dissolve the fatty matter whence it derives its disagreeable odour, and which possesses no emetic virtue. When the powder yields nothing more to ether, it is exhausted by means of *alcohol:* the alcohol is then evaporated in a water-bath, and the residue is dissolved in *cold water.* It thus loses some of the wax, and a little fatty matter, which still adhered to it; it is then only necessary to mix it with *carbonate of magnesia*, whereby it loses its gallic acid,—to redissolve it in *alcohol*, and to evaporate to dryness.

By a similar process, M. Boullay obtained from the roots, leaves, flowers and seeds of *Viola odorata*, an active, alkaline, bitter and acrid principle, similar to emetia from ipecacuanha, which he denominates *emetine of the violet*, *indigenous emetine* or *violine.* According to Orfila, it possesses highly poisonous qualities.[3]

2. *Pure emetia—Cephaëlinum*, of Bischoff.—This is obtained by substituting *calcined magnesia* for the carbonate used in the process just described, in such quantity, that the acid existing in the liquid may be neutralized, and that which is associated with the emetia be separated from it. The precipitate of magnesia and emetia must now be washed with a little *very cold water*, to remove the colouring matter, which is not combined with magnesia;

[1] Journal de Pharmacie, iii. 145; and Magendie's Formulaire pour la préparation de plusieurs nouveaux médicamens, &c.
[2] Journal De Pharmacie, Janvier, 1824.
[3] Op. cit.

and, after being carefully dried, it must be treated with *alcohol*, which dissolves the emetia. The emetia obtained by the evaporation of the alcohol, must then be dissolved in a *dilute acid*, and treated with pure *animal charcoal*. After this purification, the emetia must be precipitated by a salifiable base. The waters used to wash the magnesian precipitate still contain emetia, which may be separated by a second series of operations.

Coloured emetia appears in the form of reddish brown, transparent scales; is almost inodorous, and of a bitter, but not nauseous taste. It can withstand the heat of boiling water without experiencing change; is very deliquescent, soluble in water, and not crystallizable.

Pure emetia has a white and frequently a somewhat yellowish appearance; is pulverulent, and does not deliquesce, like the former, in the air. In cold water, it is but little soluble; more so in warm. In ether and alcohol, it dissolves readily. Its taste is feebly bitter. It has an alkaline reaction, is dissolved by all the acids—diminishing their acidity, but without wholly neutralizing them. With the acids it forms crystallizable compounds, from which it may be precipitated by galls, which are the best agents for obviating the effects of emetia, when given in too large a dose.

EFFECTS ON THE ECONOMY IN HEALTH.

According to Magendie,[1] from half a grain to two or three grains of coloured emetia given to dogs and cats, excited vomiting, at times followed by long sleep. In larger doses,—ten grains, for example,—it occasioned, in dogs, repeated vomiting, after which the animal fell asleep, and generally died in twenty-four hours. On dissection, violent inflammation was found in the lungs, and in the mucous membrane of the stomach and bowels throughout their whole extent. The effects were the same when the emetia was injected into the jugular vein, or absorbed from any part of the body. In a healthy man, two grains of coloured emetia taken fasting, produced repeated vomiting, to which succeeded a decided disposition to sleep. Even a quarter of a grain, at times, induced nausea and vomiting. It acted also on the bowels.

The effects of pure emetia are analogous, but more powerful: two grains were sufficient to kill a strong dog.

EFFECTS ON THE ECONOMY IN DISEASE.

The same effects are induced on the morbid as on the healthy economy. Magendie recommends the administration of coloured emetia—as the pure is much too dear—in every case where it is desirable to excite vomiting, and especially where ipecacuanha is indicated. It has not, however, been much used, except by Magendie himself. M. Lerminier, who prescribed it, says that one or

[1] Op. citat.

two grains of coloured emetia are equal in strength to from ten to twenty of ipecacuanha; but that he observed no difference in their operation, and Dr. Domeier[1] appears to have arrived at the same conclusion. The obvious advantages it possesses are—the convenient and agreeable form under which it may be administered, and the circumstance that several spurious sorts of ipecacuanha are frequently passed off in commerce, and occasion, in consequence, considerable disappointment in the mind of the practitioner. The employment of the active principle of course precludes these inconveniences.[2]

Prollius has frequently administered pure emetia, which he recommends as a substitute for ipecacuanha, on the grounds above mentioned; and he properly adds, that the price is not a matter of so much moment as it might seem to be, by reason of the very small quantity required to produce the desired effects.

When made into an ointment, with lard, and rubbed on the skin, it produces a great number of small painful pustules, which neither suppurate nor leave pits. It may be used in all cases in which the unguentum antimonii is needed; and where it cannot be applied, as on the face. It has been rubbed on the chest in *diseases of the lungs*, *nervous palpitation*, and *rheumatic pains*.[3]

MODE OF ADMINISTRATION.

To produce vomiting, three grains of coloured emetia may be dissolved in any vehicle, and given in divided doses, at short intervals. In several cases, with Dr. Domeier,[4] one grain was amply sufficient. Of *pure* emetia, Magendie found, in a man eighty-five years of age, one-sixteenth of a grain enough to induce vomiting. He remarks, however, that the man was easily made to vomit. Prollius found the medium dose of pure emetia, for an adult, to be from two-sixteenths to three-sixteenths of a grain; sometimes it was requisite to give another sixteenth. Very rarely had he to give more than four-sixteenths, or one-fourth of a grain. As, on account of its sparing solubility, pure emetia, when given alone, might be restricted in its operation, Prollius adds an equal portion of tartaric acid, and a little sugar.

Mistura emetiæ vomitoria.

Emetic mixture of emetia.

℞. Emet. colorat. gr. iv.
Infus. flor. aurant. f ℥ij.
Syrup. flor. aurant. f ℥ss. M.

Dose.—A dessert-spoonful every half hour,—to excite vomiting. Any simple distilled water and syrup may be substituted for those of orange flowers. *Magendie.*

[1] London Medical Gazette, Sept. 14, 1839, p. 229.
[2] Clinique Médicale, vol. i. Paris, 1823.
[3] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 108. Erlangen, 1848.
[4] Op. citat.

Pastilli emetiæ pectoriales.

Pectoral lozenges of emetia.

℞. Emetiæ colorat. gr. xxxij.
Sacchar. ℥iv.
Mucilag. q. s. ut fiant pastilli, pond. gr. ix. sing.

These lozenges are commonly coloured red, to distinguish them from those of ipecacuanha. A little carmine may be added for this purpose.

Given in cases of *catarrh, hooping-cough, chronic diarrhœa*, &c.

Dose.—One lozenge occasionally. *Magendie.*

Pastilli emetiæ vomitorii.

Emetic lozenges of emetia.

℞. Emetiæ colorat. gr. xxxij.
Sacch. ℥ij.
Mucilag. q. s. ut fiant pastill. pond. gr. xviij. singul.

Dose.— One of these lozenges, taken fasting, is generally enough to make a child vomit: three or four are required for an adult. *Magendie.*

Mistura emetiæ purificatæ vomitoria.

Emetic mixture of purified emetia.

℞. Emetiæ purif.—in pauxil. acid. nitr. solut.—gr. j.
Infus. flor. tiliæ f ℥iij.
Syrup. althææ f ℥j. M.

Dose.—A dessert spoonful to be given every quarter of an hour, until vomiting is induced.

LXXVII. ER'GOTA.

Synonymes. Secale Cornutum seu Luxurians seu Clavatum, Clavus Secalinus, Calcar, Secalis Mater, Semina Monstrosa Secalis Cerealis, Ustilago, Clavus Siliginis, Spurred Rye, Corned Rye, The Spur, Ergot, Hornseed.

French. Seigle ergoté, Ergot de Seigle, Blé cornu, Clou de Seigle, Mère de Seigle, Bled avorté, B. farouche, Faux Seigle, Seigle cornu ou corrompu, S. à éperon, S. ergotisé, S. ivré, S. noir.

German. Mutterkorn, Gebärpulver, Afterkorn, Schwarzkorn, Aetzroggen, Hahnensporn.

The effects which this substance is capable of exerting on the uterus are so well known as not to need any lengthened description. Its employment in parturition having been revived in this country, there are but few who are ignorant of its reputed properties. Certain other effects have, however, been ascribed to it, in very recent times, which require mention.

Spurred rye or ergot—the latter being the common name, from

its "spurred" appearance[1]—is usually considered to be the result of a disease in rye, occurring most frequently when a hot summer succeeds a rainy spring.[2] Decandolle, however, regards it as a parasitic fungus, which he terms *Sclerotium clavus;* whilst Leveillé esteems it to be a fungus giving a coating to the diseased grain—the medical virtues residing in the coating. This fungus he calls *Sphacelia segetum.* Brande refers it to the Natural Order Fungaceæ, and terms it *Spermoëdia clavus;* and in the last edition of the London Pharmacopœia, it is referred to *Acinula clavus* of Fries;[3] but, according to Lindley, Fries has no such plant in any of his works; and the only species of Acinula known, *Acinula candicans*, is found on the rotten leaves of the common alder, and among melting snow; its organization is of another kind from that of the spermoëdia; and Fries, who regards the other as a morbid state of the grain of certain grasses, regards acinula as a true fungus.[4] M. Debourge considers, that ergot is an animal product of the telephorus family. The insect deposits a liquid of its own formation on a grain of rye, and produces the ergot; whence it follows, he conceives, that ergot may be produced at pleasure by expressing this liquid upon all the grains of rye that are within a certain period of their maturity.[5]

Mr. Smith[6] and Mr. Quekett,[7] however, maintain that ergot is not a fungus but a diseased state of the grain occasioned by the growth of a fungus not previously detected: to this fungus the latter gives the name *Ergotætia*[8] *abortans* or *Ergotætia abortifaciens.* By the microscope, they discovered sporules, sporidia, or jointed bodies, which appeared to be the reproductive particles of the fungus.[9]

Mr. Francis Bauer,[10] who has made ergot a subject of particular study, and who, many years ago, undertook, at the suggestion of Sir Joseph Banks, a series of careful microscopical

[1] French, *ergot*, a "spur."

[2] Dr. Wright, Edinb. Med. and Surg. Journ., Jan. 1841. [3] Syst. Mycol.

[4] Brande's Dictionary of the Materia Medica, p. 233, Lond. 1839. See, also, Venus, Grundriss der Medicin. Receptirkunst, u. s. w. S. 347, Weimar, 1838; and the opinions of Schreber, De Geer, Parmentier, Buffon, Von Münchausen, Tessier, Zuckert, Rössig, Hube, Aymen, Robert, Tillet, &c., in Wright, op. cit.

[5] *Sociétés Savantes*, in Encyclographie des Sciences Médicales, Avril, 1838; and A. Richard, Eléments d'Histoire Naturelle Médicale, 4ème édit. ii. 13, Paris, 1849.

[6] Transactions of the Linnean Society of London, xviii. Pt. 3, p. 449. Lond. 1840.

[7] Ibid. p. 453, and London Lancet, June 22, 1839, p. 465. See also an abridgment of a communication read by Mr. Quekett before the Linnean Society, Dec. 4, 1838, with illustrative wood-cuts, in American Journal of Pharmacy, for July, 1839, p. 116. For remarks on an insect met with in the diseased grain, see a paper by Mr. Muller, of Butler county, Pa., with comments by Dr. Carson, in Amer. Journal of Pharmacy for Jan. 1839, p. 269.

[8] From *ergota*, and αιτια, "cause."

[9] See the views of Quekett, Zink, Corda and others on the fungus, to which Dr. Pereira has given the name *Oidium abortifaciens, ergot-mould*, from ωον, "an egg," and ειδος, "resemblance;" in Pereira's Elements of Mat. Med. and Therap. 3d edit. vol. 2, Pt. i., p. 944. Lond. 1850.

[10] Transactions of the Linnean Society of London, xviii. Pt. 3, p. 481. Lond. 1840.

observations with a view to determine the nature and cause of that singular production, does not consider the question as to the cause of the ergot to be finally and satisfactorily settled. He states that he is not convinced that the filamentous fungi with numerous sporidia, pointed out by various recent observers, are the cause or the consequence of the ergot:—because, *first*—every gramineous plant is equally infected with that minute filamentous fungus, yet very few of these plants produce ergots,—amongst agricultural grains, the rye being the only one that is subject to the disease; and *secondly*, in autumn all decaying plants are infected with such filamentous fungi and minute sporidia. M. Bauer's investigations led him, however, to determine the ergot to be a morbid condition of the seed.

Ergot is in grains, from a third of an inch to an inch and a half long, and from a line to three lines in diameter, usually curved like the spur of a cock, having commonly two longitudinal furrows, and often irregularly cracked and fissured. Externally, it is of a dingy-purple hue; internally of a pale grayish-red or grayish-white. Its odour is peculiar, fishy and nauseous; taste obscurely acrid and disagreeable. Unless excluded from the air, it swells and softens, acquiring a deep black colour and heavy smell; and becoming infested by a little acarus, which is about one-fourth the size of the mite of cheese, and destroys the interior of the ergot, leaving the grain as a mere shell. In four months, seven and a half ounces of fecal matter of the acarus were formed from seven pounds of ergot.[1] The powder becomes quickly damp, and full of animalcules. It ought, therefore, to be fresh: certainly not to be kept for a longer period than two years.

To prevent the formation of the parasites, Mr. Rowle[2] keeps a small piece of camphor in the stopper bottle which contains the ergot. This soon annihilates the whole race of insects, and adds greatly to the certainty of the effect of the medicine. The plan had been recommended before by Dr. Bright.[3] It has been advised that the camphor should be mixed with the ergot, in the proportion of a grain to a scruple.[4]

It has been proposed to dip the dried ergot in a concentrated solution of gum Arabic; to dry this on a plate of white iron; and when it is dry, to repeat the process two or three times; keeping it afterwards in a well stopped bottle.[5] A recent writer[6] has advised the following method for preserving it in good condition for several years. *First*. To reduce fresh well dried ergot

[1] Pereira, Elements of Mat. Med. and Therap. ii. 916. Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.
[2] Lond. Lancet, Aug. 10, 1844.
[3] Edinb. Med. and Surg. Journ. No. 141, and Lond. Lancet, Aug. 24, 1844.
[4] Mr. Simpson, Lond. Lancet, Sept. 7, 1844.
[5] M. Martin, Journ. de Chim. Med., Avril, 1841.
[6] V. Legrip, in Journal de Chimie Médicale, cited in Lond. and Edinb. Monthly Journ. of Med. Science, April, 1845.

to powder. *Secondly.* To expose the powder to a temperature of 112° or 120° Fahrenheit, in order to dry it thoroughly and quickly. *Thirdly.* To put it into glass bottles not exceeding a hectogramme, (about three ounces) in size, and seal them hermetically. *Fourthly.* To withdraw it from the action of light by shutting it up either in a dark place, or by covering the bottles with black paper.

Mr. R. M. Nunn, of Wexford, extols the following plan of preservation, of which he speaks from experience.[1] Procure a choice specimen of ergot; reduce it to powder; have in readiness a sufficient number of two dram bottles; into each bottle put one dram of sulphuric ether, (alcohol may do as well) and then press in two drams of the powdered drug: (if the bottles are of the proper size, a slight pressure will be necessary to make them hold this quantity:) then cork well, and either seal with wax or cover with bladder. When required for use, put the contents of one of the bottles into a tumbler; and pour on them a small quantity of boiling water: violent effervescence takes place, which speedily subsides, and during which the ether is evaporated. As much boiling water may then be added as is necessary. It is instantly fit for use.

As it is important to judge between a good and a bad specimen Dr. Wright remarks,[2] that if it be clear and smooth on the surface; not powdery; of a deep purple colour; neither entirely black nor light brown; having a full strong odour; breaking clearly; exhibiting a pink blush interiorly; unpunctured by insects; burning with a clear jetting flame, and of a less specific gravity than water, its activity may be trusted.

It has been affirmed, as the result of actual trials, that ergot picked from growing rye is much more powerful than that which is gathered on the barn floor after the grain had been threshed.[3]

When examined by the microscope, the internal structure of ergot is found to consist of minute roundish cells, many of which contain particles of oil. The bloom seen, at times, on its surface, seems to be composed of the sporidia of the fungus, to which it is believed by many to owe its origin.[4]

Chemical analysis has thrown no light on the cause of its properties. According to the analysis of Vauquelin[5] it contains a colouring matter of a yellowish hue; a white oily substance; a violet-colouring matter insoluble in alcohol; a free acid, which is in part phosphoric; a very abundant vegeto-animal matter, which is greatly disposed to putrefaction, and furnishes much thick oil and ammonia on distillation: and a small quantity of free ammonia,

[1] London Lancet, cited in Med. Examiner, Oct. 19, 1844, p. 251.
[2] Edinb. Med. and Surg. Journ. Oct. 1839, p. 296.
[3] Böttcher and Kluge, cited by Christison, Dispensatory, p. 414. Edinb. 1842.
[4] Christison, Op. cit., p. 411. Edinb. 1842.
[5] Mémoir. du Muséum, iii. 198, Paris, 1817.

which may be obtained at the temperature of boiling water. A more recent analysis has been made by Maas,[1] of Hamburg. He found it contain gluten; ammonia or a peculiar alkali; acetic acid; a violet-colouring matter: resin; fixed oil; an alkaline acetate; but neither starch, hydrocyanic acid, narcotina, nor phosphoric acid, which some had discovered in it.[2] It has likewise been analyzed by Bonvoisin, Pettenkofer, Winkler, Robert, Wiggers,[3] Legrip,[4] and others. The analysis of Wiggers is very elaborate. The results were,—a thick white oil, 35.000; white fatty matter, 1.0456; cerin, 0.7578; fungin, 46.1862; *ergotin*, 1.2466; osmazome, 7.7645; sugar, 1.5530; gum extractive and colouring matter, 2.3250; vegetable albumen, 1.4600; phosphoric acid and phosphate of potassa, 4.4221; phosphate of lime and traces of iron, 0.2922; silica, 0.1394. Dr. Wright's[5] analysis furnished him with the following constituents and their proportions in 100 parts of ergot; thick white oil, 31.00; osmazome, 5.50; mucilage, 9.00; gluten, 7.00; fungin, 11.40; colouring matter, 3.59; fecula, 26.00; salt, 3.10; loss, 3.50. Ergot appears to him to differ from sound rye, chiefly in the presence of oil, osmazome and fungin. He gives the following process for preparing the OIL OF ERGOT.[6] Digest ergot in liquor potassæ, at a temperature of from 120° to 150°, until a perfect saponaceous mixture is formed. The liquid must then be diluted with half its weight of water, be accurately neutralized by sulphuric acid, and submitted to distillation from a salt-water or oil bath. The product is white, adhesive, and fatty-looking, almost free from empyreuma, and nearly tasteless. The readiest and best, but most expensive mode of obtaining it, is to pass ether through ergot in fine powder by the process of displacement. By allowing the ether to evaporate spontaneously, the oil is left in its purest form.[7] This Dr. Wright considers to be the active matter of ergot; and he states—as the result of positive experiment—that it has the same effect in inducing powerful uterine contractions as ergot itself.

EFFECTS ON THE ECONOMY.

The effects produced on the animal economy by ergot, when eaten as food, are extremely injurious: the aggregate of the symptoms has been termed *Ergotism*. At times they are limited to vertigo, spasms, and convulsions, with a peculiar tingling or formication in the arms and legs, which has given the affection the

[1] Bulletin des Sciences Médicales de Ferussac, xix. 332; and Mérat and De Lens, Dict. de Mat. Méd. art. Ergot.

[2] For Mr. Battley's Analysis, see Lond. Med. Gaz., Feb. 1831, and for that of Wiggers, Lancet, Nov. 10, 1832, cited from Allgem. Med. Zeitung.

[3] Wright, Edinb. Med. and Surg. Journal, Oct. 1839, p. 298.

[4] Bouchardat, Annuaire de Thérapeutique, pour 1845, p. 44. Paris, 1845.

[5] Op. cit. [6] Edinb. Med. and Surg. Journal, July, 1840.

[7] Duhamel, Amer. Journal of Pharmacy, July, 1841, p. 95.

name among the Germans of Kriebelkrankheit or "creeping disease." Most commonly, the limbs waste away, lose sensation and the power of motion, and separate from the body by dry gangrene—constituting *gangrenous erethism* or *mildew mortification*.[1] These, however, are the toxical, not the therapeutical, effects of the agent.[2]

The extraordinary property, ascribed to ergot, of assisting the parturient efforts, has long been credited in Germany. Its old German names, Mutterkorn ("womb-grain") and Gebärpulver ("*parturient powder*," *pulvis ad partum*,) are sufficient evidences of this notion; but, for a long time, this was rather a matter of popular than of scientific belief, although the "*pulvis parturientis*" of the Marburg Pharmacopœia consisted principally of ergot.[3]

Upwards of forty years ago, it was recommended in this country by Dr. John Stearns, of Saratoga county, New York, and since that time the weight of testimony adduced in its favour on both sides of the Atlantic has been overwhelming. Still, there are many distinguished individuals, who deny it all power over the uterus both in the unimpregnated and the impregnated state, and who affirm, that it acts only indirectly on that viscus through the general disturbance it occasions; and that, therefore—like every other internal agent administered as an abortive—it ought to be esteemed rather indirect than direct in its action. Such is the decided opinion of Jörg,[4] whose attention has been directed to the effects produced by different medicinal agents on the sound and diseased economy, and who goes so far as to affirm, from his experiments and observation, that there is no "farther connexion between these degenerate grains and the uterus, than the word Mutter ('uterus') which is common to both." From his various and varied experiments, Dr. Jörg infers, that ergot, when given in small doses, produces little or no effect upon the functions; but that when fresh dried in an oven, and administered in large doses, it oppresses the stomach, occasioning nausea, vomiting, colic, liquid evacuations; destroys the appetite, and injures the digestive powers; these effects being accompanied by a sense of weight in the head, vertigo, ce-

[1] See articles, *Convulsio cerealis*, and *Ergotism*, in the author's Medical Lexicon, 7th edit., Philad. 1848; also, his Therapeutics, p. 272, Philad. 1836; or his General Therapeutics and Mat. Med., 4th edit. ii. 197, Philad. 1850; and a case of Kriebelkrankheit, induced by ergot, in Med. Times for July, 1847, recorded by Dr. R. R. Nuttall.

[2] See Christison on Poisons, 3d edit. chap. xl. Wright, op. cit. p. 307, and Jan. 1840, p. 9.

[3] Wright, op. cit. p. 22. See, on the history of Ergot, Ramsbotham, Principles and Practice of Obstetric Medicine and Surgery; appendix, Amer. edit. Philad. 1845.

[4] Dass der Gebrauch inner Reizmittel zur Beförderung der Geburt des Kindes unnöthig, fruchtlos, und gesunden Frauen sogar schädlich sei; u. s. w. S. 40, Zeit. 1833. See, also, Pereira, op. cit. p. 919, and Bonjean, in Rapport de MM. Bussy, Pelletier, Dubail, Fremy père et F. Boudet, in Journ. de Pharmacie, Février, 1842, p. 175.

phalalgia, and by general torpor of the system. Under these circumstances, he thinks, it is not difficult to understand, that the connexion between the fœtus and the uterus may be modified, and abortion take place. The researches of M. Arnal,[1] satisfied him, that the first action of ergot is on the intestinal canal, in the mucous membrane of which it produces an inflammation *sui generis* (?), and anatomical lesions, which remind the observer of those seen in typhoid fever; whilst the greater part of the phenomena seen towards the termination of poisoning by it resemble many of those of the same malady. The composition of the blood he found greatly altered. It was rendered more diffluent; a portion of its fibrin was removed; and, if long continued, it produced softening of the gums, and pathological phenomena, analogous to those of scurvy.

The author caused various experiments to be instituted with ergot in doses of half a dram, and a scruple, of the powder, and in the form of the oily matter referred to below. These were made on both males and females; and the general effects were those described by Dr. Jörg;—when the dose was too large, nausea or vomiting often resulting, with signs of narcosis. They were made, at the author's desire, by Drs. Cottman and M'Kee, at the time resident physicians at the Philadelphia Hospital.[2] A case of narcosis, produced by this drug in the dose of thirty grains —administered for the purpose of restraining a real or supposed tendency to hemorrhage after the expulsion of the placenta—was communicated to the author by Dr. Beckwith, of Raleigh, North Carolina.[3]

Dr. Hooker, of New Haven,[4] found, when a quantity of pulverized ergot was macerated for several days in sulphuric ether, and the liquid evaporated in a glass vessel until it no longer afforded a smell of ether, that there remained at the bottom of the vessel a small quantity of thick heavy oil, resembling in appearance fish oil; above this was a lighter oil, much more abundant than the former, of a light reddish brown colour, and of a sweetish nauseous taste. The light oil was found to be possessed of decidedly narcotic properties. In two experimental cases, the effects of ergot continued apparent for nearly a week; the pupils of the eye were dilated; the pulse, respiration, and capillary action were very slow, and the skin livid,—with loss of appetite, general languor and lassitude, and rigidity and soreness of the muscles;

[1] See a *Resumé*, by M. Piorry, of the *Mémoire* of M. Arnal, in Bouchardat, Annuaire de Thérapeutique pour 1849, p. 124.

[2] Amer. Med. Intelligencer, Sept. 1, 1839, p. 161. See, also, M. Cordier, in Journ. Gén. de Méd. Avril, 1823, and C. T. De Gravina, in Annali Universali di Medicina, Ottobre, 1839, cited in Brit. and For. Med. Rev. Oct. 1840, p. 555.

[3] Amer. Med. Intelligencer, Oct. 15, 1839, p. 213. See, also, Trousseau and Pidoux, Traité de Thérap. i. 546, Paris, 1837.

[4] Boston Med. and Surg. Journal, x. 298, Boston, 1837.

those of the thighs and other parts of the lower extremities being more particularly affected. For three days, the pulse continued below fifty, with a proportionate infrequency of respiration.[1]

In the experiments made with this substance, by Dr. M'Kee,[2] he found that in every case, when given in doses of from ten to forty drops, it at first produced slight exhilaration of the spirits with increase of circulation; but these symptoms were soon followed by sedation, and in the larger doses by nausea, also. The sedative properties were equally exhibited in experiments instituted on the healthy individual, by Dr. Q. Gibbon,[3] of Salem, New Jersey, with the decoction, extract, and oil. The experiments of Dr. De Gravina,[4] led him to infer that ergot is a direct sedative, like digitalis, and hence he considers it a good antiphlogistic remedy, and well calculated to lower the vital powers.

An ethereal solution has been prepared by Dr. Rees, by digesting four ounces of powdered ergot in four fluidounces of ether for seven days. The ether dissolves the fatty matters contained in the drug. It is then poured off, evaaporated to dryness, and the residue again dissolved in two fluidounces of ether. Repeated trials of this preparation have been made by Mr. J. C. W. Lever,[5] who affirms that it acts most powerfully on the parturient powers of the uterus during and after labour. What is singular,—Mr. Lever remarks,—whilst all the other preparations of ergot not unfrequently produce acro-narcosis, he has not once seen these symptoms supervene on the use of the ethereal solution. He thinks they are most probably caused by some constituent of the drug, which ether does not dissolve,—a view which cannot be reconciled with the results of the experiments detailed above. Each ounce of the preparation, Dr. Rees thinks, may be considered equivalent to two ounces of ergot; or fifteen drops to half a dram dose of the powdered drug. Mr. Lever gave it, dropped upon sugar, in doses varying from fifteen drops to thirty, and found that uterine action commenced in twenty minutes or half an hour.

Although ergot is capable of producing the acro-narcotic effects described above,[6] their supervention is not desired by those who regard it to be possessed of peculiar powers by which it causes

[1] See Amer. Med. Intelligencer, Dec. 15, 1837, p. 329. A case has been recently published, by Dr. Myddleton Michel, of sudden death, which he ascribes to ergot taken with the view of producing abortion in one who, owing to her having been previously afflicted, in two attacks, with well-marked opisthotonos and emprosthotonos and nervous depression of the vital energies, was a fit subject for the occurrence of such fatal results. It does not, however, appear to the author as clearly as it does to the narrator of the case, that the sudden—immediate—death, was owing to the toxical influence of the ergot. Charleston Med. Journal and Review for Sept. 1850.

[2] Ibid. Sept. 1, 1839, p. 161.

[3] Amer. Journ. of the Medical Sciences, Jan., 1844, p. 244. [4] Op. cit.

[5] London Medical Gazette, April 10, 1840, p. 108.

[6] Bonjean, cited in Bouchardat, Annuaire de Thérapeutique, pour 1842, p. 85. Paris, 1843.

contraction of the uterine fibres of the parturient female, and who administer it with that view. When given in appropriate and properly repeated doses, the uterine action, they assert, becomes more energetic, and the contractions constant and almost unremitting; but there is no accompanying disorder. Cases are on record[1] in which it has appeared to induce rupture of the uterus, where the obstacles to delivery were invincible. It has been largely administered, and in no country, perhaps, more than in this. Practitioners of eminence—here and elsewhere—have placed the fullest reliance on its powers to excite contraction of the uterine fibres, and although in many of the cases which fell under their observation, the parturient efforts might have recurred without the agency of the ergot, this could scarcely have been the case with the remainder. From the results, therefore, of these cases, we seem compelled to admit, that ergot is possessed of expulsive properties by which it acts upon the parturient uterus; but that it is capable of producing any effect upon the unimpregnated uterus, or upon the impregnated, at any time except when parturition has commenced, is denied by many. It has been affirmed, indeed, that in the neighbourhood of Trois Croix, in France, there was, during the season of 1841, an epizootic abortion amongst the cows, which had produced much consternation amongst the farmers; and that M. Bodin,[2] director of the school of agriculture, had discovered that the grains of rye, and of many other of the gramineæ, contained a considerable quantity of ergot. This, he concluded, was the cause of the epizootic. On the other hand, the experiments of Dr. Wright,[3] and of Dr. De Gravina,[4] seem to exhibit the singular fact, that ergot appears to have the power of *prolonging* gestation in the guinea pig and rabbit, when administered for a considerable period![5] The result of all observations precludes the belief, that the increased parturient efforts resulting from its agency are produced indirectly by violence done to the constitution of the mother, inasmuch as, in most of the recorded cases of benefit accruing from its administration, no such violence would appear to have been perpetrated. Yet, admitting the full power ascribed to ergot, in these cases, it can be rarely necessary to have recourse to it; and it is doubtless often employed, where the propriety of the administration of it, or of any other agent, is extremely questionable. A writer, who places the discovery of its powers in the same rank with that of the vaccine virus, states, that he has administered it in 1500 cases![6]

But the effect produced by ergot upon the mother has not been

[1] Delmas, Journal de Médecine de Montpellier, and Journal de Pharmacie, Juin, 1842, p. 546.

[2] Journal de Méd. et Chirurg. Pratiq. Oct. 1841. [3] Op. cit. [4] Op. cit.

[5] Brit. and For. Med. Review, Oct. 1840, p. 556.

[6] Wardleworth, Essay on the Chemical, Botanical, Physical and Parturient Properties of the Secale Cornutum. London, 1840.

the only topic of interest in regard to its use in parturition. It has been maintained by many, that, since its introduction, the number of the still-born has augmented, and that observation has sufficiently shown, that where it is given to expedite delivery, more or less danger always accrues to the offspring;[1] either by the induction of asphyxia, or of positive death, owing to the violence of the uterine contractions, or to the deleterious agency of the drug on the fœtus in utero.[2] Observations by Dr. Hardy,[3] of Dublin, show, that it exerts a powerful sedative influence on the action of the heart of both mother and fœtus. But even were we to admit its prejudicial effect on the fœtus to be true—and it has been deposed to by many obstetricians—and that the number of the still-born is greater than formerly—which, however, appears to be by no means the case—its influence could be but small, and could not account for the statistical differences that have been noticed.[4]

Mr. Braithwaite[5] affirms, that in order that ergot should act perniciously on the child, it is necessary that its action on the uterus should be uninterrupted. He has seldom or never seen any bad effects on the child when the patient had some rest between the pains. In many cases, it has been largely administered, and yet the child has been born alive. Dr. James Patterson,[6] of Glasgow, details the particulars of a case in which the enormous quantity of four ounces was given, yet the movements of the child continued lively; and he refers to an excellent paper, now before the author, by Professor Von Busch,[7] of Berlin, which contains a reference to one hundred and seventy-five cases, in which it was given on account of deficient labour-pains. One hundred and seventy-seven children were born; of these, one hundred and forty-two were born alive; eighteen in a state of asphyxia, which was removed by appropriate treatment; and seventeen still born. Of the seventeen dead, seven had evidently died before labour, and were more or less putrid; and ten, during labour; of these, two lost their lives from turning; one from presentation of the breech; two from prolapsus of the funis; one from narrow pel-

[1] Chevasse, in Transact. of the Provincial Med. and Surg. Association, iv. 306, London, 1836. Huston, North American Med. and Surg. Journal, 1829; and Chatto, in London Med. Gaz., July 13, 1839, p. 575; also, Reports of Med. Society of London, in Lancet, Oct. 26, 1839, p. 168, and Wright, Edinb. Med. and Surg. Journal, Jan., 1840, p. 25.

[2] Mojon, in Gaz. Méd. de Paris, 19 Janv., 1839; and T. E. Beatty, Dublin Journal of Med. Science, May, 1844, p. 218.

[3] Dublin Journal of Medical Science; cited in Med. Examiner, for Jan., 1848, p. 75.

[4] Avery, in Transact. of the Med. Society of the State of New York, vol. iii. Pt. 2, p. 185, Albany, 1837.

[5] Retrospect of Pract. Med. and Surg., vol. i. No. 1, p. 181, 3d edit. London, 1842.

[6] Lond. Med. Gaz., June 1, 1839, p. 337. See, on this subject, E. Warren, New England Quarterly Journal of Medicine and Surgery, July, 1842, p. 10.

[7] Die gebürtschülfliche Klinik an der königlichen Friedrich-Wilhelms-Universität zu Berlin, in neue Zeitschrift für Geburtskunde, u. s. w. B. v. H. i. S. 107. Berlin, 1837.

vis and detention of the head therein; one from the long duration of the fourth stage of labour; one from a difficult forceps case, which required perforation afterwards; one from a peculiar deformity of the extremities; and one from no assignable cause; so that, of the one hundred and seventy-seven cases, there was but one which could be referred to the agency of ergot, and there was no reasonable ground for such reference.

A recent writer[1] is disposed to think, that ergot, improperly administered, produces puerperal convulsions as a remote effect,—and that it gives rise to hour-glass contraction, and to a predisposition to hydrocephalus in the early stage of infantile life! The chief or only cases in which Dr. Catlett seems to think it admissible are, when there is serious hemorrhage, owing to detachment of the placenta, accompanied by deficient uterine tone; and in the latter stage of labour, in checking hemorrhage from whatever cause.

Dr. Frank Ramsbotham,[2] who regards ergot as capable of exerting specific powers on the uterus at all periods of utero-gestation, and who has referred to several cases of premature labour, induced in his own practice by its use, is disposed to conclude, that although it may bring on labour without having recourse to any operation, yet that it does not present a more likely, or indeed, so probable a means of saving the infant as the older method of puncturing the membranes; and he infers, from his experience, that whatever might have been the quantity administered, unless it exerted a decided influence over the uterus, the child suffered no detriment.[3]

Dr. Paterson[4] and Mr. Heane[5] have directed ergot successfully in large doses with the view of *inducing premature labour*. The former of these gentlemen is disposed to think, that its abortive properties are not exerted upon the impregnated uterus at an early period of utero-gestation, but that, at a certain stage of development, the uterine fibres are capable of being excited by it so as to expel the fœtus. It would be strange were its agency to be thus restricted.

When ergot was found to be possessed of the power of *exciting uterine contractions*, it was philosophical to employ it in *retention of the placenta*, in *after-pains*,[6] and in cases of *uterine hemorrhage*, and of *convulsions*[7] *in the parturient state*, accompanied by atony of the uterus.[8] In such cases, means of more speedy action

[1] Catlett, Edinb. Med. and Surg. Journal, Jan. 1842.
[2] London Med. Gaz., June 15th, 1839, p. 420. See, also, Ibid. June 28, 1834.
[3] See, on this subject, J. J. Kelso, in London Lancet, June 22, 1839, p. 462; and Duparcque, in Revue Médicale, Mars, 1838.
[4] Lond. Med. Gaz., June 1, 1839, p. 332. See, also, Ibid., Sept., 1838.
[5] Ibid., Jan. 26, 1839. For various opinions on this subject, see Dr. Wright, in Edinb. Med. and Surg. Journal, Jan. 1840, p. 27.
[6] Hoffman, in Berl. Med. Zeitung, June 29, 1836; and Beatty, in Op. infra cit.
[7] Duparcque, Revue Méd. Mars, 1838. [8] Von Busch, Op. cit. i. 105.

are needed; but still, cases might arise in which its administration might be serviceable, and several such, attesting the benefit rendered by it, have been published.[1] It has been strongly recommended, likewise, for the *prevention* or *removal of uterine hemorrhage*, by Stearns,[2] Dewees,[3] Bradley,[4] Abraham,[5] Kisch, Trousseau,[6] T. E. Beatty,[7] and others. In a case of copious *hemorrhage from the uterus connected with polypus*, Mr. Moyle[8] administered two drams of the tincture, which was repeated at intervals, with the effect of inducing uterine contraction and the expulsion of the polypus, "which equalled in size two large placentæ." He was equally successful in a similar case. Other cases, in which the effect of the ergot was to force down the *polypus* so that a ligature could be applied to it, have been related by Dr. Somerville and Dr. M'Farlane.[9]

The employment of ergot has been extended to *amenorrhœa*,[10] and *dysmenorrhœa*, and to *uterine hemorrhage in the unimpregnated female*, and many cases have been published in confirmation of its being possessed of decided virtues.[11] It was thought, also, that it might be serviceable,—and was found so by Bazzoni,[12] Negri, Langlet,[13] and others,—in *leucorrhœa*, and in *gonorrhœa*,[14] *dysentery*,[15] &c.; and again, as it proved to be useful in uterine hemorrhage, it was conceived that it might exhibit like powers in *other hemorrhages;* and, accordingly, it was given in cases of *epistaxis*,[16] *hæmoptysis*, *hæmatemesis*, *hæmaturia*, &c. In these last cases, it has not been so often employed.[17] The author has frequently administered it in them, but has never had reason to believe that it exerted any efficacy; and such has been the case with MM. Trousseau and Pidoux,[18] Dr. Pereira,[19] and others.[20]

[1] Camps, London Med. Gaz., Jan. 13, 1843.
[2] Philada. Journ. of Med. and Phys. Science, v. 44.
[3] System of Midwifery.
[4] Lancet, April 15, 1837.
[5] Ibid. April 22, 1837.
[6] Journal des Connoissances, 1839.
[7] Dublin Quarterly Journal of Med. Science, May, 1846, p. 322.
[8] Lond. and Edinb. Monthly Journ. of Med. Science, June, 1841.
[9] Ibid. Aug. 1841.
[10] Enriotti, in Repertorio Med. Chirurg. del Piemonte, cited in Journ. des Connoissances, Mars, 1838. Langlet, Bulletin Médical Belge, Juin, 1839, p. 125. Dewees, Midwifery, chap. Amenorrhœa; Locock, Cyclop. of Practical Medicine, i. 70. Nauche, Nouveau Dict. de Méd. et Chirurg., art. Ergot; and Dr. Wright, in Med. and Surg. Journal, Jan. 1840, p. 34. See, also, Churchill, (with whom it failed,) Diseases of Females, Amer. Med. Library edit. p. 54. Philada. 1839; and G. Fyfe, Med. Gazette, June 18, 1841.
[11] G. Fyfe, Op. cit.; and John Yale, Boston Med. and Surg. Journal, July 8, 1846, p. 459.
[12] Annali Universali di Medicina, Feb. 1831; and Ryan, Medical Formulary, p. 264, 3d edit. London, 1839.
[13] Op. citat.
[14] Müller, in Rust's Magazin, B. xl. H. iii., cited in Amer. Journal of the Medical Sciences, Feb. 1835, p. 527; Ryan, Op. cit. and Desruelles, Gazette des Hôpitaux, 2 Juin, 1842.
[15] Mojon, Op. cit.
[16] John Yale, loc. cit.
[17] Duparcque, Op. cit., and De Gravina, Annali Universali di Medicina, Ottobre, 1839.
[18] Traité de Thérap. i. 546. Paris, 1837.
[19] Elem. of Mat. Med. and Therap. ii. 925. Lond. 1842.
[20] See the author's General Therap. and Mat. Med., 4th edit. ii. 198. Philad. 1850.

The narcotic or sedative property, however, which it exhibits in certain cases and doses, and the sedative action which it exerts in others, may render it, at times, serviceable in these affections, whatever may have been the process of reasoning which led originally to its employment.[1]

Where *hysteria* depends upon simple atony of the generative system; or of the nervous and generative systems combined, Dr. Nardo[2] found the internal administration of ergot followed by the rapid removal of the disease. His practice consists in giving about a scruple of the powder mixed with sugar, in divided doses each day, intermitting the dose every third or fourth day. Many cases are related by him to show the efficacy of the practice,—the hysteria, and the irregularity or absence of the menstrual secretion being removed at the same time. In *spermatorrhœa*, too, dependent upon atony or excessive irritation of the genital organs, it has been useful in the dose of from three to five grains three times a day.[3]

Dr. Wright[4] affirms, that when applied to an abraded surface, it gives rise to profuse sloughing. He tried it on wounds nearly healed, and in less than 24 hours they discharged purulent matter abundantly, which was generally of an offensive character; and the wounds, thus treated, even under the application of proper curative means, were long and tedious in healing. In the form of powder, he found it very serviceable in arresting *hemorrhage;* and not simply in a mechanical manner, as was proved by experiment. Even in the form of infusion, it possessed the power in an extraordinary degree. Müller divided the popliteal artery in the sheep, and completely arrested the bleeding by lint dipped in an infusion of ergot. The caudal artery, and the anterior crural artery of a horse were cut, and the bleeding was similarly subdued. Dr. Wright says, that he has several times divided the external jugular and the saphena major veins, and has never failed to arrest the hemorrhage by an infusion of ergot, although with arteries he has been generally less successful. In the greater number of his experiments, he used a dilute solution of ergot, in the place of warm water, to sponge the bruised parts, and always succeeded in preventing that continued flow of blood, which is often a serious obstacle to the safe direction of the knife. He consequently recommends it as a valuable means of preventing troublesome hemorrhage from small vessels in the course of surgical operations; and, upon the same principle, believes the injection of a similar solution into the uterus, in cases of flooding, will be found to answer every practical end that can be desired. The decoction has

[1] See some remarks on this subject, by the author, in his Amer. Med. Intel. vol. i. p. 219.

[2] Cited in Edinb. Med. and Surg. Journal, Jan., 1843, p. 225, and in Bouchardat, Annuaire de Thérapeutique pour 1843, p. 93. Paris, 1843.

[3] Ibid. pour 1848, p. 80. Paris, 1848.

[4] Op. cit., Jan. 1840, p. 20.

proved to be an equally efficacious hæmastatic in the hands of others.[1]

In a severe case of *epistaxis*, Dr. Wright[2] arrested the hemorrhage by injecting up the nostrils equal parts of very dilute spirit and oil of ergot; and he has little doubt, that in the severe cases of uterine hemorrhage that follow delivery, the injection of the oil diffused through water into the uterus would be productive of the happiest results. It proved also serviceable in arresting hemorrhage after the extraction of a tooth, and from leech-bites. It will be seen, presently, however, that the styptic properties of the ergot have been supposed to reside chiefly, if not exclusively, in the *ergotin*, or extract of ergot.

Snuffed up the nose, powdered ergot was observed, by M. Cowperat,[3] to have the power of removing the *dilatation of the pupil caused by belladonna*. Dr. J. F. M'Evers[4] repeated the experiment, and found that it did not cause any change when employed on the same day with the belladonna; but, in every case, on the subsequent morning, whilst the pupils were still largely dilated, the ergot had a marked effect in a few minutes. In a case of *mydriasis* he prescribed it with success.

Dr. Wright found the oil a valuable external application in cases of *local rheumatism*. In three instances, it was entirely successful. The affected part was well rubbed with it for a quarter of an hour, night and morning until relief was obtained. He states, farther, that it is one of the most valuable remedies with which he is acquainted in *toothach*, and has repeatedly known it subdue the pain when creasote had failed. By M. Lisfranc,[5] the powder was employed in the dose of from two to eight grains, in cases of *hypertrophy of the uterus* of various kinds, whenever reduction of the organ to a less size seemed to be the prominent indication; and Dr. Perrine[6] has published some cases of *periodical disease*, in which it was administered with advantage during the intervals; but no farther results appear to have been elicited.

M. Payan[7] thinks it demonstrated, that ergot is primarily and essentially an excitant of the spinal marrow; and he conceives, that its action on the uterus, bladder, and muscles of the lower extremities is but secondary, from a reflex action transmitted from the spinal marrow to those organs through the nerves distributed to them. He has given the details of some cases of *paraplegia*, which seemed to be relieved by it; an infusion of fifteen grains in

[1] Wright, cited in Liston's Lectures, London Lancet, Aug. 31, 1844, p. 691.
[2] Edinb. Med. and Surg. Journ., July, 1840.
[3] London Medical Gazette, Sept., 1848.
[4] Dublin Quarterly Journal of Med. Science, November, 1848.
[5] Pauly's Lisfranc, translated by Lodge, p. 330. Boston, 1839.
[6] American Journal of the Medical Sciences for Nov., 1833, p. 279.
[7] Revue Médicale, Février et Mars, 1839; and Journal de Pharmacie, Juin, 1842, p. 545.

water being given at first in the course of the day, and the dose being gradually augmented.[1]

M. Allier, fils,[2] from having observed, as he believed, contraction of the fibres of the bladder under the administration of ergot, has recommended it highly in cases of *retention of urine;* and feels himself justified in inferring, from the results of varied observation, that it is capable of restoring to the bladder the contractility it may have lost, owing to immoderate distention of its coats by accumulation of urine;—that its action has been evinced in cases in which this kind of paralysis has resisted all known therapeutical agents; and that, owing to the fugacious character of its operation, it ought to be administered at short intervals, in broken doses, and these be long continued. He recommends, that it should be commenced in the quantity of a scruple in the day, divided into six equal parts; that the dose should be afterwards raised to forty grains, and then gradually diminished to a scruple; and afterwards discontinued by degrees in eight or ten days after the cure, in order to consolidate it. A case of retention in the male, cured by ergot, is recorded by Dr. Kingsley,[3] of Roscrea. Ten grains were given three times a day. Similar testimony is afforded by Dr. J. J. Ross,[4] of Cambusmore, Dr. Houston, of Dublin, Dr. Sainmont,[5] and others.[6]

It has been recommended by Dr. Steinbeck,[7] in *incontinence of urine*, from want of power in the sphincter of the bladder. It was associated, however, with extract of belladonna, nux vomica, and phosphoric acid; so that it is impossible to say what precise influence was exerted by it.

Lastly, in the *Annales de la Société de Médecine de Gand*, M. Guersant[8] has published two cases in which he administered it with the greatest advantage to effect the *expulsion of fragments of calculi* after the operation of lithotrity. Twenty-four grains were first given in three doses during the day; but no effect having been produced, the dose was increased to thirty grains, when the patient experienced frequent desire to pass the urine, followed by pain in the hypogastric region, pricking in the limbs, and slight derangement of vision. After using the medicine for five days, fragments of calculi were passed, and, during twenty-four hours, in three times the quantity that had been discharged during the whole previous period subsequent to the operation.

[1] See, also, Pétrequin, Bulletin de Thérapeutique, Mars, 1840.
[2] Journal des Connoissances Médico-Chirurgicales, Nov. 1838.
[3] Dublin Medical Press, April 26, 1843.
[4] London and Edinburgh Monthly Journal of Med. Science, Jan. 1844, p. 43.
[5] Gazette des Hôpitaux, Juillet, 1848, cited in Schmidt's Jahrbücher, u. s. w. No. 7, S. 17. Jahrgang, 1849.
[6] Provincial Medical and Surgical Journal, April 24, 1844.
[7] Medicin. Zeitung, cited in Lond. Lancet, March 4, 1843.
[8] Journal de Médicine et de Chirurg. Pratiq. Novembre, 1839,

MODE OF ADMINISTRATION.

The great difference which has been observed in the effects of ergot has led to the belief, that there must be much difference in the article, and that every care must be taken to have it good. Dr. Ryan,[1] indeed, affirms that not one druggist or chemist in a hundred has it genuine. According to Dr. Wright, if it be clear and smooth on its surface; not powdery; of a deep purple colour; neither entirely black, nor light brown; have a full strong odour; break clearly, exhibiting a pink blush internally; be unpunctured by insects; burn with a clear jetting flame, and be of less specific gravity than water, its activity may be trusted.

It must be recently pulverized, too, if we are desirous to count upon its action when given in this form.[2]

When prescribed with the view of augmenting parturient energy, it is most commonly perhaps given in *powder*, in the dose of from ten to twenty grains, repeated every twenty minutes until the effect upon the uterus is elicited. By many, as by M. Arnal,[3] it is considered more active than any of its preparations. Professor Von Busch[4] found the best results when it was given in the dose of ten grains at short intervals—from ten to fifteen minutes. In one case it was requisite to repeat it eight times; in four cases, six doses were sufficient; in twelve, five; in thirty-three, four, and in the remainder of the one hundred and seventy-five cases, three and less: the smallest quantity exhibited was a single dose of ten grains; the largest, nine doses of ten grains. Dr. Ryan[5] says the maximum dose is a dram and a half; but it, obviously, cannot be thus limited.

Dr. Samuel Hardy, of Dublin,[6] has observed, that it has always commenced its action within twenty-five minutes at the farthest, when the child has been expelled alive; and that if a longer time than this has elapsed, instruments have been necessary, and the child has been born dead. The beneficial effects of ergot are evidenced by the pains running into one another without any appreciable interval. Professor Beatty, of Dublin, affirms that when delivery was not effected within two hours from its exhibition, the child's life was generally lost; and such is the result of the observations of Dr. Hardy.[7] Several cases are, however, reported by Mr. J. Pratt, which disprove this statement. In one, three hours elapsed between the taking of the medicine and delivery; in another, five hours; in another, three and a half; and in a fourth, six hours; and, in all the cases, fine healthy children were born.[8]

Dr. Hooker, who considers, that the ecbolic and the narcotic

[1] Formulary, p. 264. [2] Allier, op. cit.
[3] Bouchardat, Annuaire de Thérapeutique pour 1849, p. 124. [4] Op. cit. S. 106.
[5] Op. cit. [6] Dublin Journal of Medical Science, May, 1845.
[7] Dublin Journal of Med. Science, cited in Med. Examiner, Jan. 1848, p. 76.
[8] Dublin Hospital Gazette, cited in Amer. Journ. of the Medical Sciences, Jan. 1846, p. 244.

properties of ergot may be separated, recommends, in these cases, the *clear infusion*, which possesses, he conceives, the former property only. The powder of course contains both.

Dr. Bishop, of New Haven,[1] asserts, that he has seen but once any unpleasant effects from ergot, and then he gave it in powder; the labour was protracted and narcotism induced. In New Haven, it is the general practice to administer the infusion, and in that form it is considered safe and effective in parturition. It is not easy, however, to see how the fixed oil can be taken up by hot water.[2] The infusion is termed in France, "*Thé de Seigle noirci des sages-femmes Américaines*"![3] By some, as will be seen hereafter, the sedative and other properties of ergot have been affirmed to exist in the aqueous extract or *ergotin*. It is proper to remark, that the form of infusion, as well as of *decoction*, was found by Dr. Jörg to be highly unpleasant to the stomach, and it could not be repeated in his experiments—which, it must be remembered, were not made on the parturient female—in large doses for any length of time, without irritating the bowels, producing loss of appetite, and general impairment of the digestive function.

Dr. Wright[4] recommends the *oil of ergot* to be given in the dose of twenty to fifty drops in tea, weak spirit and water, some aromatic water, or made into an emulsion with mucilage and syrup. It would seem to be the most advisable form of exhibition, as the oil retains its properties for several years, if kept in well closed bottles excluded from light. As to the form of *tincture*, Mr. Battley affirms, that alcohol will not extract the active property, and Dr. Ryan[5] states, that he has certainly found the tincture to fail in the majority of cases. Mr. Battley prefers the watery extract.

For the purpose of inducing premature labour, it has been necessary to give ergot in larger doses. Dr. Paterson[6] gave it in the form of infusion, until the patient took six drams of the medicine. The infusion was likewise given by Dr. F. Ramsbotham,[7] and the quantity which each of his patients took varied from two to twelve drams.

As a parturifacient, Dr. W. R. Gore[8] has recommended the *ammoniacal solution of ergot*, a formula for which is given hereafter. This, he says, contains all the active principles in a convenient form, and with increased efficacy, the ammonia causing the ergot to act more rapidly, and with greater certainty.

When ergot is given with other views, the usual dose is 10 or

[1] Amer. Med. Intel. Dec. 15, 1837, p. 330.
[2] See the author's General Therapeutics and Mat. Med. 4th edit. i. 429. Philad. 1850.
[3] Journal de Pharmacie, Février, 1842, p. 177.
[4] Edinb. Med. and Surg. Journal, July, 1840.
[5] Op. cit. p. 266.
[6] Lond. Med. Gazette, June 1, 1839, p. 333.
[7] Ibid. June 15, 1839, p. 421.
[8] Medical Times, Nov. 5, 1842.

15 grains of the powder, three or four times a day: the results of the observations of Dr. Cottman[1] have shown, however, that in 30 grain doses its sedative effects are more marked. This, too, was the dose in which it was administered by Dr. Hooker. In such cases, the tincture, and the light oil described by him may also be prescribed;—the latter, in the dose of ten to thirty drops.

Infusum ergotæ.

Infusion of ergot.

℞. Ergot. ʒj.
Aquæ bullientis f ℥iv.
Infunde.

Dose.—One third, to be repeated every 15 or 20 minutes in *deficiency of uterine contractions.*

℞. Ergot. ℥ss.
Aquæ bullientis f ℥xxiv.
Colaturæ adde
Syrup. simpl. f ʒj.

Dose.—Two ounces every three or four hours, to *induce premature labour.* *Paterson.*

℞. Ergot. ʒss.
Infunde per semihoram in
Aquæ bullientis f ℥iss. et cola.

This quantity to be taken for a dose, and repeated every four hours. *F. Ramsbotham.*

℞. Ergot. ʒss.
Infunde in
Aquæ bullient. f ℥iij.
Cola et adde
Ergot. in pulv. gr. x.—gr. xv. M.

This quantity sweetened with sugar to be taken for a dose. To be repeated in twenty minutes; and if the uterus should not contract well, to be given a third time. *S. L. Hardy.*

℞. Ergot. in pulv. crass. ʒij. (avoirdupois.)
Aquæ bullient. ℥ix.
Infuse for an hour in a covered vessel and strain.

The product should measure about eight ounces.

Dublin Pharmacopœia of 1850.

Liquor ergotæ ammoniacalis.

Ammoniacal solution of ergot.

Into half a pint of *spiritus ammoniæ aromaticus* put four ounces of fresh *ergot*, bruised coarsely. Let them stand for a month, frequently stirring with a glass rod, after which squeeze out every drop of the spirit. In a glass stoppered bottle, it may be preserved for any length of time without deterioration.

Dose.—Thirty drops in a wineglassful of cold water, every

[1] American Medical Intelligencer, Sept. 1, 1839, p. 161.

ten minutes, until the action required is sufficient, applying at the same time a gentle pressure with the flat of the hand on the abdomen. When the pains are present, three doses are usually enough. *W. R. Gore.*

Decoctum ergotæ.

Decoction of ergot.

℞. Ergot. ℥j.
Aquæ Oijss.
Coque ad Oij. et cola.

Dose.—A table-spoonful every quarter of an hour.

Tinctura ergotæ.

Tincture of ergot.

℞. Ergotæ in pulv. crass. ℥viij. (avoirdupois.)
Alcohol. dilut. Oij. f ℥xl.
Macerate for fourteen days, and strain; express, and filter.

Five fluidrams contain one dram of ergot.
Dublin Pharmacopœia of 1850.

℞. Ergot. ℥ijss.
Alcohol. dilut. Oj.
Macera per dies quatuordecim et cola.

Dose.—Twenty minims to two fluidrams, two or three times a day, as a sedative agent. *Guy's Hospital.*

Syrupus ergotæ.

Syrup of ergot.

(*Sirop de Calcar.*—Desgranges.)

℞. Ergot. gr. xx.
Extract. opii. gr. ℈.
Syrup. f ℥viij. M.

Dose.—Two table-spoonfuls (one ounce) in cases of *engorgement of the uterus.* *Lisfranc.*

Pulveres ergotæ compositi.

Compound powders of ergot.

(*Antihemorrhagic powders.*—Ryan.)

℞. Ergot. ʒss.
Pulv. aromat. ℈ss.
Sacch. ʒss.
M. et divide in chartulas x.

Dose.—One, every hour or every second or third hour, in *active hemorrhage* from any outlet. In *leucorrhœa* and *gleet*, one may be given three or four times a day, and should they fail the following may be substituted.

℞. Ergot. pulv. ℈ij.
Cubeb. pulv. ℥j.
Pulv. aromat. ʒss.
Sacchar. ʒj.
M. et divide in chartulas. viij.

Dose.—One, three or four times a day. *Ryan.*

Pilulæ ergotæ.

Pills of ergot.

℞. Ergot. pulv. gr. ix., xij. vel xviij.
Ext. hyoscyam. gr. i.
Potass. nitrat. gr. xv.
Camphor. pulv. gr. iij. M. et divide in pil. xl.

Two to four, every two hours, in cases of *urethritis* of the prostatic or membranous portion of the canal. *Desruelles.*

Vinum ergotæ.

Wine of ergot.

℞. Ergot. contus. ℥ij.
Vini Oj.

Macerate for 14 days, shaking occasionally; then express, and filter through paper.

Dose.—f ℥j. to f ℥ij. *Pharm. U. S.* 1842.

Injectio ergotæ.

Injection of ergot.

℞. Ergotæ ℥ss.
Aq. bullient. Oss.

Used in cases of *erythemoid vaginitis* and *urethritis*.
Desruelles.

Extractum ergotæ.

Extract of ergot.—Ergotin.

(*Ergotine ou Extrait hémostatique, of Bonjean.*)

Powdered ergot is exhausted by water, by the process of displacement, and the watery solution is heated in a water bath. At times it coagulates, owing to the presence of a portion of albumen; at others, it does not. In the *former* case, the coagulum is separated by the filter, and the filtered liquor is evaporated in a water-bath, until it has the consistence of a clear syrup. A considerable excess of alcohol is then added, which precipitates all the gummy matters. The mixture is left at rest, until the whole of the gum is precipitated, and the liquid has assumed a state of limpidness. The liquor is then decanted to reduce it in a water-bath to the consistence of a soft extract. In the *latter* case, the watery solution is brought directly to a half syrupy state, and is treated by alcohol as mentioned above, to obtain from it the extract, which, procured by this process, is soft; of a red or brown colour; very homogeneous; of an agreeable odour of roast meat, and of a slightly piquant and bitter taste, more or less analogous to that of damaged wheat. It forms with water a limpid solution of a beautiful red colour. 500 parts of ergot furnish from 70 to 80 parts of extract.

M. Bonjean affirms, contrary, as has been seen, to the opinions of other observers, that whilst *ergotin* contains the medicinal

property of ergot, the oil and the resin contain the poisonous properties. He considers it a real specific [?] in *hemorrhage* in general. "When my ergotin," he remarks, "shall have been tried, observers will be struck with the immediate effect it produces in the most frightful (*foudroyantes*) hemorrhages: the most rebellious cases of *hæmatemesis* yield in a short time under its use; and relapses are generally rare, especially when the precaution is taken to continue its employment some time after the cessation of the symptoms." To be convinced that the ergotin is also the obstetrical principle, we have only to treat powdered ergot with ether, by the process of displacement, until the whole of the matter that is soluble in the liquid is exhausted: in this manner the poison is removed,—that is all the oil of ergot and the resin. A powder remains, which is no longer unctuous, but rough like sand, without any disagreeable taste or poisonous influence, and which in the dose of 6 or 8 grains, powerfully excites uterine contractions, in every case of *inertia of the womb*, in which the employment of ergot would be esteemed proper.[1]

Dr. Sachero,[2] Professor of clinical medicine in the University of Turin, prepared two extracts of ergot, the one *aqueous*, and the other *alcoholic*. The former had the characters described above, whilst the latter was of a deep brown colour, with no particular smell, and was very pungent and slightly bitter to the taste. The watery extract he regards as a hyposthenic remedy, well adapted for cases of hemorrhage; the resinous extract, he thinks, probably acts as an excitant; whilst the oily is the poisonous principle.—"The action of the ergot," he remarks, "when administered in its natural state, appears to be of two kinds; the one, as in labour, affects the sanguineous system, the energy of which it diminishes (*hyposthenises*,) by means of the ergotin: the other affects the nerves of the uterus, which it stimulates by its resinous principle. To this double action must be added a third, equally hyposthenic, that of the oily or poisonous principle."

Dr. Ebers[3] found ergotin of very marked advantage in *uterine hemorrhage*. He employed it "with the most perfect success" in those forms that are attendant upon cancer of the uterus, and which so greatly exhaust the patient's strength, and lead rapidly to death. These he treated exclusively with ergotin, in doses of two grains every two hours. In almost all the cases, twelve doses were sufficient to arrest the hemorrhage. In *uterine hemorrhage* occurring at different periods of life, in youth, and especially at the critical period, he has found it of equal advantage.

[1] Bouchardat, Annuaire de Thérapeutique, pour 1843, p. 88, & pour 1844, p. 21.
[2] Cited in Lond. and Edinb. Monthly Journ. of Med. Science, Aug. 1844, and in the Amer. Journ. of the Med. Sciences, Oct. 1844, p. 463.
[3] London Medical Gazette, Nov. 1845.

It is proper to remark, that Drs. J. Lawrence Smith and S. D. Sinkler infer, from the results of a trial of ergotin on the divided carotid of a sheep, that it depends greatly, if not altogether, upon the manner in which the lint is applied to the wound of the artery, whether the hemorrhage is arrested or not. If it be placed immediately upon the orifice of the cut vessel, "success is certain: if, however, the vessel shrinks from contact with the lint, the animal is almost certain to bleed to death."[1] Such, also, is the opinion of M. Velpeau,[2] and of M. Bouchardat,[3] the latter of whom had done much to disseminate the views of M. Bonjean. He has concluded, that the facts adduced by M. Bonjean, in "support of his discovery, are very far from presenting the characters of demonstration." "As regards the success on animals," he remarks, "it is well known how plastic their tissues are, and with what ease they are repaired after serious injuries; and as respects the effects of ergotin on wounds in individuals of the human species, those that have been hitherto published may be attributed with probability to the circumstances that were associated with the application of the remedy almost as much as to the action of the remedy itself."[4]

Mistura extracti ergotæ.

Mixture of extract of ergot.

(*Potion d'ergotine.*)

℞. Extracti ergotæ gr. xv.
Aquæ f ℥iij.
Syrup. flor. aurant. seu limonis f ℥j. M.

Dose.—A table-spoonful every quarter of an hour, in cases of *hemorrhage*, or of *inertia of the uterus*. In very violent cases of hemorrhage the quantity of ergota must be increased, and the doses be given more frequently. *Bonjean.*

Syrupus extracti ergotæ.

Syrup of extract of ergot.

(*Sirop d'ergotine.*)

℞. Extract. ergot. ℥iiss.
Solve in
Aq. flor. aurant. seu
Aq. rosæ f ℥j.
Syrupi f ℥xvj.
Coque syrupum et adde solutum.

Dose.—Two to four table-spoonfuls a day, more or less, according to the urgency of the case. *Bonjean.*

[1] Southern Journal of Medicine and Pharmacy, July, 1846, p. 406.
[2] Comptes rendus, 6 Juillet, 1846.
[3] Annuaire de Thérapeutique, &c., pour 1847, p. 49. Paris, 1847.
[4] Annuaire, &c., pour 1848, p. 81. Paris, 1848.

Pilulæ extracti ergotæ.

Pills of extract of ergot.

(*Pilules d'Ergotine.*)

℞. Extract. ergotæ ʒj.
Glycyrrhiz. pulv. q. s. ut fiant pil. i.

Dose.—Six to ten in the day. *Bonjean.*

LXXVIII. EUPHOR'BIA LATH'YRIS.

Synonymes. Cataputia Minor, Lathyris, Tithymalus Latifolius, Caper Spurge, Garden Spurge, Mole Plant.
French. Epurge, Catapuce.
German. Kleines Springkraut, Purgirkörner-Euphorbie.

The oil of *spurge*—Oleum Euphorbiæ Lathyridis—has been recently recommended in medicine. Although the euphorbia is not a native of this country, it is sometimes met with in situations where it has the appearance of growing wild. It is easily cultivated, and in some parts of New Jersey, where it has been introduced, is found in abundance.[1]

The oil obtained from the seeds resembles in colour oleum ricini, but is less dense. It has no odour when newly prepared, and no perceptible taste. It is soluble in sulphuric ether, insoluble in alcohol, and forms a soap with the alkalies. Its s. g. is .920.

EFFECTS ON THE ECONOMY IN DISEASE.

Dr. Charles Calderini found, that, in the dose of from four to eight drops, it acted as a cathartic on the adult, without occasioning colic or tenesmus. In half the quantity, it proved cathartic to children. He gave it in sugared water, or in the form of an emulsion; and was of opinion that it might be advantageously substituted for castor oil, especially for children. After him, it was employed by M. Grimaud, and subsequently by M. Bally,[2] who carried the dose as far as ten drops, and by M. Martin Solon,[3] at the Hôtel-Dieu of Paris, who uses it with excellent effects as a hydragogue cathartic in various diseases, in the dose of from 23 to 46 grains—or one and a half to three *grammes*. Louis Frank[4] has suggested its employment in cases of *tænia*, *hysteralgia*, *ascites*, &c.

It would appear, from the remarks of Mr. Scattergood, that the oil obtained from the beans grown in this country, does not possess the mild qualities ascribed to the European article. Six, eight,

[1] Scattergood, in Philad. Journ. of Pharmacy, iv. 124, Philad. 1833. See, also, Journ. de Chimie Méd. ii. 178. [2] Journal Universel des Sciences Médicales, xli. 264.
[3] Bullet. Général de Thérapeutique, Août, 1848.
[4] Journ. de Pharm. xi. 273: and Mérat and De Lens, Dict. de Mat. Méd. iii. 183. Paris, 1831.

ten, and twelve drops were given to several individuals as a cathartic; and although administered in conjunction with aromatic oils, and in one or two cases with an alkali in the form of soap, it invariably produced nausea, and even vomiting. Mr. Scattergood adds, that he has been informed by the manufacturer, Mr. Thomas Bellangee, of Crosswicks, New Jersey, that when administered in small quantities, and repeated at intervals of half an hour or an hour, it operates on the bowels freely as a cathartic, without producing much nausea.

Pichonnier[1] has proposed the following formula for a cathartic mixture.

Mistura olei euphorbiæ.

Mixture of oil of euphorbia.

℞. Olei euphorb. lathyr. gtt. viij.
Acac. pulv. ʒj.
Sacchar. ʒij.
Aquæ destillat. f ʒiij. M.

LXXIX. FERRI PRÆPARA'TA.

Synonymes. Preparations of Iron.
French. Les Préparations de Fer.
German. Eisenpräparate.

Metallic Iron has long been employed in the cases in which chalybeates in general are indicated. The French Codex directs it to be formed into an impalpable powder prepared by porphyrizing bright and clear iron filings without water. Of late years, it has been proposed by M. Quevenne to reduce the sesquioxide by means of hydrogen, which is done by passing a stream of the gas over the oxide, contained in an iron or porcelain tube heated to low redness. The iron, thus prepared, Ferri pulvis[2]—*Le fer réduit par l'hydrogene*—must be kept in a dry, well stopped, bottle, on account of its great liability to oxidation. Mr. Wm. Procter prepares it by placing precipitated carbonate of iron on layers of iron-gauze in a tube of wrought iron; passing a stream of hydrogen through it heated to a dull red; maintaining this for some hours, and keeping up a small current of gas till cool.[3]

MM. Miquelard and Quevenne combine it with sugar and chocolate, and form it into granules and pills.[4] M. Raciborski[5] has strongly recommended it in *anæmic* and, especially, in *chlorotic*

[1] Journ. de Chimie Médicale. Paris, 1827.
[2] A formula for this is introduced into the last edition (1850) of the Dublin Pharmacopœia.
[3] R. E. Griffith, Universal Formulary, &c., p. 199. Philad. 1850.
[4] Trousseau and Pidoux, Traité de Thérapeutique et de Matière Médicale, i. 2. Paris, 1847.
[5] De la Paberté, &c. Paris, 1844.

cases: and it is a favourite chalybeate with the author's colleague, Professor Meigs.[1] The ordinary dose is about two grains three times a day in the form of pill made with sugar and gum. It has not appeared to the author to possess any marked advantage over the carbonate or sesquioxide.

LXXX. FERRI ARSE'NIAS.

Synonymes. Ferrum Arseniatum seu Arsenicicum Oxydulatum, Arseniate of Iron, Arseniate of Protoxide of Iron.
French. Arséniate de Fer.
German. Arsensaures Eisenoxydul, Arseniksaures Eisenoxydul.

This preparation has been recommended by Mr. Carmichael,[2] who often applied it externally in cases of *cancerous ulcers*. Naturally, it presents itself in small, clear, bluish-green crystals, of a regular octahedral shape, and is called *scorodite*. Artificially, it is formed by double decomposition.

METHOD OF PREPARING.

Glaser gives the following formula for its preparation:—Eight ounces of semivitrified *white arsenic*, sprinkled with a little *spirit of wine*, and reduced to fine powder, are mixed with as much *purified saltpetre*. The mixture is then placed in an uncovered Hessian crucible, which should only be half filled with it, and then be placed in a wind furnace. At first, a slight degree of heat is applied, under which the mass soon melts, giving off copious red fumes, the inhalation of which should be carefully avoided. The process had better, therefore, be carried on in the open air, or in a laboratory that has a chimney with a good draft. When the mass no longer gives off red fumes, and flows tranquilly, the crucible must be carefully removed from the fire, the contents be suffered to cool somewhat, and *boiling distilled water* be poured upon them: under active boiling they will dissolve altogether. *Hot water*, sufficient to fill the crucible, is now added, and the whole is allowed to remain at rest for twenty-four hours; at the expiration of which time a considerable quantity of beautiful crystals of acid arseniate of potassa is found on the sides of the crucible. The fluid, holding the salt in solution, is now filtered into a clean porcelain or glass vessel; the crystals are collected, dried carefully in the shade, and put away amongst the poisons as the *Arsenias potassæ acidus*.

The fluid, poured from the crystals and filtered, is now diluted with *distilled water*, and a solution of *pure sulphate of iron*

[1] Females and their Diseases, p. 371. Philad. 1848.
[2] An Essay on the Effects of the Carbonate and other Preparations of Iron upon Cancer, 2d edit. Dublin, 1809.

added thereto so long as any precipitate is thrown down. The bluish-green precipitate, insoluble in water, is the *ferri arsenias*, which must be collected on a filter, washed and dried in the shade. The process must be conducted with the greatest care, and the vessels used be cautiously cleansed or broken, for fear that mischief may arise. In these chemical operations, the acid of the saltpetre is decomposed by being heated with the arsenious acid or white arsenic, a part of its oxygen is taken by the latter, and arsenic acid is thereby formed, which unites with the potassa of the saltpetre and forms acid arseniate of potassa: the nitric acid being converted into nitrous acid is given off in the form of red fumes: by admixture of a solution of sulphate of iron with the solution of the acid arseniate of potassa, a double decomposition ensues, the result of which is the formation of sulphate of potassa and arseniate of iron, which last, being insoluble, falls to the bottom of the vessel.

EFFECTS ON THE ECONOMY.

According to Carmichael, this preparation acts more powerfully on the vitality of *cancerous formations* than any other agent, and the dead slough caused by it is much deeper than that caused by the application—which was at one time so much celebrated—called "*Plunket's caustic.*" He allows, however, that the greatest caution should be observed in its use. Of late, he has employed a compound of arseniate of iron with phosphate of iron; half a dram of the former to two drams of the latter. This mixture must be applied very thin by means of a camel's hair pencil, and not over the whole surface of the ulcer when it is extensive. It has also been administered internally in *cancerous affections* and *lepra*, by Cazenave; and Biett[1] recommends it in *lupus*, *elephantiasis*, *psoriasis*, *chronic eczema* and *lichen.*

MODE OF ADMINISTRATION.

Arseniate of iron may be applied externally in the form of ointment, composed of from ℈j. to ʒss. to from ℥ss. to ℥j. of lard; or the compound, just mentioned, may be applied in the following manner:—

Unguentum ferri arseniatis compositum.
Compound ointment of arseniate of iron.

℞. Ferri arseniat. ʒss.
—— phosphat. ʒij.
Cerat. cetacei ʒvi. M.

This ointment must be spread on lint and applied to the ulcer.
Carmichael & Werneck.

Werneck gives it the preference over all the usual arsenical preparations. The dose is from $\frac{1}{16}$th to $\frac{1}{12}$th of a grain, made into a pill.

[1] Aschenbrenner, Die neueren Arzneimittel, S. 131. Erlangen, 1848.

The following formula may be used in cancerous and other affections.

Pilulæ ferri arseniatis compositæ.

Compound pills of arseniate of iron.

℞. Ferri arseniat. gr. iij.
Extract. gentian. ʒj.
Glycyrrhiz. pulv. ʒij.
Syrup. cujusvis q. s. ut fiat
massa, in pilulas xlviii. dividenda.

Dose.—One, three times a day.

LXXXI. FERRI BRO'MIDUM.

Synonymes. Ferrum Bromatum seu Perbromatum, Brometum Ferricum, Bromated Iron, Bromide of Iron;—in solution, Hydrobromate of Iron, Ferri Hydrobromas, Ferrum Hydrobromicum Oxydatum.

French. Bromure de Fer.

German. Bromeisen, Eisenbromid, Bromwasserstoffsaures Eisenoxyd.

METHOD OF PREPARING.

This preparation is made by heating equal parts of *bromine* and *iron filings* under water. As soon as the fluid becomes of a greenish colour it is filtered and evaporated to dryness: the reddish residue—again dissolved in water and evaporated—is bromide of iron. It has a brick-red colour; dissolves readily in water, is deliquescent in the air, and has a very styptic taste.[1]

EFFECTS ON THE ECONOMY, AND MODE OF ADMINISTRATION.

Magendie has prescribed it successfully, in cases in which the preparations of bromine have been indicated. (See *Brominum*, p. 142.) He recommends the following formula.

Pilulæ ferri bromidi.

Pills of bromide of iron.

℞. Ferri bromid. pulv. gr. xij.
Confect. rosæ gr. xviij.
Acaciæ pulv. gr. xij.
Fiat massa in pilulas xx. dividenda.

Dose.—Two, morning and evening. *Magendie.*

℞. Ferri bromid. ʒj.
Extract. glycyrrhiz. q. s.
ut fiat massa in pilulas lx. dividenda.

Dose.—One or two, morning and evening, in cases of *scrofula*, and *hypertrophy—of the uterus* especially. *Werneck.*

[1] Magendie, Formulaire pour la préparation, &c., de plusieurs nouveaux médicamens, dernière édit.

LXXXII. FERRI CARBURE'TUM.

Synonymes. Ferrum Carburetum seu Carbonatum seu Supercarburetum; Carburetum Ferri Nativum, Graphites, Plumbago, Plumbum Nigrum, Carbo Mineralis, Cerussa Nigra, Black Lead, Carburet of Iron.
French. Carbure de Fer, Graphite, Crayon noir, Plombagine.
German. Kohlenstoffeisen, Graphit, Reissblei, Mineralische Kohle.

This well known substance was formerly considered to be slightly astringent and desiccative. By Weinhold,[1] it has been advised strongly in certain *cutaneous affections*, but although it has been received into various pharmacopœias of continental Europe, as the Antwerp, Bavarian, Brunswick, Spanish, Parisian, Finnish, Prussian, Saxon, and Swedish, it has never been recognised as a therapeutical agent in this country or in Great Britain.

METHOD OF PREPARING.

As crude graphite is frequently very impure from the attached matrix, the Prussian Pharmacopœia has a formula for its purification, the product of which bears the name *graphites depuratus*. With this view, the graphite must be very finely pulverized: a pound of it is boiled in a proper quantity of *common water* for an hour; the water is then decanted, and two ounces of *nitric acid* and of *muriatic acid*, and eight ounces of *common water* are poured upon the graphite. This mixture is digested for twenty-four hours, frequently shaking it; the acid fluid is then poured off, and, after the residuum has been washed by an appropriate quantity of *common water*, it is dried.

EFFECTS ON THE ECONOMY.

The internal use of graphite produces no perceptible change on the organic functions, except that, according to Weinhold, under its protracted use, the urinary secretion is augmented, and a disposition to micturition excited. He found, however, that in *herpetic* and *other cutaneous affections*, it occasioned a very favourable modification in the eruption, and wholly removed it. In consequence of the results of his observations, he published a monograph in which he recommended it to physicians in those diseases. He employed it as well internally as externally. The urine, he asserts, after its administration, commonly began to make a deposit, and this continued until some change in the cutaneous affection announced its approaching cure. In cases of *complication of herpes with other affections*, Weinhold combined it with other remedies;—in *syphilitic eruptions*, adding corrosive sublimate, &c.

The efficacy of graphite in herpetic and other cutaneous affections has also been attested by many other respectable physicians,

[1] Der Graphit als ein neu entdecktes Mittel gegen Flechten. Leipz. 1809.

as Horn, Heim, Ruggieri, Brera, Bernstein, Hildenbrand, Richter, Hufeland, Marc,[1] &c. This circumstance gave occasion to its admission into the Prussian Pharmacopœia; yet it has not the confidence of physicians, even in those countries into the pharmacopœias of which it has been received, and is consequently but little prescribed. Its use in chronic cutaneous diseases is said to have been suggested by the circumstance, that in Venice the makers of crayons are speedily cured of any such affections under which they may labour.[2]

MODE OF ADMINISTRATION.

Internally, graphite is given in doses of from five to fifteen grains, from two to four times daily; and the dose may be augmented, according to circumstances, to a dram in the day. It is given in powder or in the pilular form. Externally, it is applied in the form of ointment or plaster—from ʒij. to ʒvj. of the graphite to an ounce of the constituent.

Pulvis ferri carbureti.

Powder of carburet of iron.

℞. Ferri carburet.
Sacch. āā. ʒss. M.
Divide in partes æqual. vi.

Dose.—One, every two hours, in *lichen leproïdes.*
Von Hildenbrand.

Electuarium ferri carbureti.

Electuary of carburet of iron.

℞. Ferri carburet. ʒss.
Mellis despumat. ℥ij. M.
Fiat electuarium.

Dose.—A coffee-spoonful, morning and evening.—*Weinhold.*

Pilulæ ferri carbureti.

Pills of carburet of iron.

℞. Ferri carburet.
Extract. dulcamar. āā. ʒj.
M. fiant pilulæ pond. gr. ij. sing.

Dose.—Six, three times a day. *Märker.*

℞. Ferri carburet. ʒij.
Zinci oxid. ʒss.
Adipis ℥j. M.

Mayer.

[1] Riecke, Die neuern Arzneimittel, u. s. w. Stuttgart, 1837, S. 214; see, also, Weinhold, in Hufeland's Journal, B. xxxiv. St. 1, S. 118: Heim in Horn's Archiv. 1810, xii. 326, and Ibid. 1811, B. 1, S. 91; Huber, in Med. Chir. Zeitung, 1811, No. 68, S. 282; Hufeland, Journ. der prakt. Heilkunde, B. xxxviii. St. 6; Bernstein, Ibid. B. xli. St. 5; Mayer, Ibid. B. lx. St. 2, and Osann, in Encyclop. Wörterb. der Med. Wissensch. x. 434. Berlin, 1834.

[2] Mérat and De Lens, in Dict. de Mat. Méd., art. Carbone.

Unguentum ferri carbureti.

Ointment of carburet of iron.

℞. Ferri carburet.
Sulphur. āā. ʒij.
Adipis q. s. ut fiat unguentum.

Brera.

Emplastrum ferri carbureti.

Plaster of carburet of iron.

℞. Ferri carburet. ʒij.
Emplast. sapon. ʒiv.
Misce intimè.

Weinhold.

LXXXIII. FERRI CITRAS.

Synonymes. Ferrum citricum, Citras ferricus, Citrate of Iron.
French. Citrate de Fer.
German. Citronsaures Eisenoxydul, Citronensaures Eisenoxyd.

Two citrates of iron have been proposed, of late years, by M. Béral[1]—the one the SESQUICITRATE OR CITRATE OF THE SESQUIOXIDE OF IRON; the other, the CITRATE OF THE PROTOXIDE OF IRON. An AMMONIO-CITRATE, a POTASSIO-CITRATE, and a SODIO-CITRATE have likewise been introduced.

METHOD OF PREPARING.

The *citrate of the sesquioxide*, according to Mr. Duhamel,[2] is prepared as follows:—Take of *Citric acid*, crystallized, ℥iij. or three parts; *Hydrated oxide of iron*, dry, ℥ij. or two parts; *Distilled water*, ℥xij. or twelve parts. If the moist hydrate be used, about ℥vj. are required; but as the degree of moisture is not always the same, Mr. Duhamel suggests, that the oxide should be in excess. The water may be heated to about 180°: a boiling temperature should be avoided, as it renders the sesquioxide less readily soluble.[3] The solution is filtered, and the filter washed with distilled water sufficient to obtain twelve parts of liquid. This forms what is kept by the French Pharmaciens under the name LIQUID CITRATE OF IRON, marking 24° of Beaumé. It holds in solution one-third of its weight of dry citrate of iron. The solution is evaporated to the consistence of thick syrup. It is then spread out on glass or porcelain plates, where it speedily dries in thin layers, which are separated and broken into fragments.

[1] Journ. de Chimie Médicale; cited in Amer. Journ. of Pharm., April, 1841, p. 72.
[2] Amer. Journ. of Pharmacy, Oct., 1842, p. 225.
[3] W. Procter, cited in Dispensatory of the United States, 8th edit., p. 1246. Phila., 1848.

Its taste is acid, but not disagreeable, and it is said to be, of all chalybeate salts, the least unpleasant to the taste.

Citrate of protoxide of iron is prepared by M. Béral,[1] by treating *iron filings* with *citric acid* previously dissolved in *distilled water*. It has a strongly marked chalybeate taste.

Citrate of sesqui-oxide of iron is a somewhat insoluble salt: it occurs in transparent laminæ of a garnet hue, which are permanent in the air. Citrate of the protoxide is of a dark-green colour; soluble, and the solution does not change its green colour by exposure to air.

AMMONIO-CITRATE OF IRON, *Citrate of iron and ammonia, Ammoniæ ferro-citras, A. ferrico-citras, Ferri et ammoniæ citras, Ferrum citricum cum ammoniaco, Ferrum ammoniaco-citricum*; German, Eisenoxyd mit Ammoniak, is prepared by neutralizing the excess of acid in preparing the nitrate of the sesquioxide by ammonia, and evaporating as before.[2] It is a much more soluble salt than the citrate of the sesquioxide, and is slightly deliquescent. If the acid or the citrate be neutralized by soda or potassa in place of ammonia, the SODIO-CITRATE, and the POTASSIO-CITRATE OF IRON, are formed, which greatly resemble the ammonio-citrate.[3] The AMMONIO-CITRATE—*Ferri ammonio citras*—is officinal in the last Dublin Pharmacopœia.[4]

A CITRATE OF MAGNETIC OXIDE OF IRON is prepared by combining the *magnetic oxide* with *citric acid*.

Mr. Edward Parrish[5] makes a *syrup of citrate of iron* as follows. He first prepares a moist protocarbonate of iron, by mixing together solutions of *sulphate of iron* and *carbonate of soda*, precisely as directed for Vallet's ferruginous mass, and washing with sweetened water. This is then dissolved by means of a slight excess of citric acid in water, and is evaporated to dryness. A greenish deliquescent, freely soluble, uncrystallizable salt results, the taste of which is ferruginous, but not very unpleasant. To make the syrup, one ounce, Troy, of this salt is dissolved in five fluidounces of simple syrup. The solution is easily effected, and forms a dark greenish-brown liquid. The dose is from thirty drops to a tea-spoonful. The syrup of citrate of iron of Béral, is a saccharine solution of the citrates of ammonia and sesquioxide of iron.

EFFECTS ON THE ECONOMY IN HEALTH.

The citrates of iron resemble, in their properties, the tartrate and the lactate of iron, and may be given in the same cases. The

[1] Amer. Journ. of Pharm., April, 1841, p. 72.

[2] For forms of preparation see Redwood, in his edition of Gray's Supplement to the Pharmacopœias. 2d edit., London, 1848.

[3] Ballard and Garrod, Elements of Mat. Med. and Therap., p. 389. London, 1845.

[4] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850, p. 43. Dublin, 1850.

[5] Amer. Journ. of Pharmacy, October, 1848, p. 649.

author has used the citrate largely, and is much pleased with it. It is unquestionably one of the most agreeable of the chalybeates, and equally effective perhaps with any.

MODE OF ADMINISTRATION.

The dose of citrate of iron may be the same as that of the salts above mentioned. The author generally prescribes it in the quantity of ten grains three times a day. The citrates are not decomposed by alkalies, and hence may be given with them if desirable. The ammonio-citrate, according to MM. Ballard and Garrod, is the most used, and may be conveniently administered in porter, which conceals its taste, without its own flavour being impaired.

It has long been administered in wine, of which the following are two forms;—the first from the Hamburg, and the latter from the Wirtemburg, Pharmacopœia.

Vinum ferri citratis aromaticum.

Aromatic wine of citrate of iron.

℞. Ferri limatur. ℥j.
Limon. succ. ℥iij.
Macera per noctem, et adde
Gentian. ℥ss.
Cinnam. ʒij.
Vini f ℥xvj.

Dose.—Of the decanted wine, f ʒss. to f ʒij. and more. This preparation, or one analogous to it, is said to be prescribed by certain physicians of this country—of Charleston, for example.[1]

Take of *Iron filings*, four ounces; *Bitter oranges*, four. Remove the peel, the white, and the seeds; beat them in a stone mortar, and let the paste remain at rest for two days; then pour upon it *Madeira wine*, ten ounces, and *Spirit of orange peel*, two ounces. After sufficient digestion, express and filter. This preparation is called, in the Wirtemburg Pharmacopœia, *Tinctura Ferri Aurantiaca* seu *Tinctura Martis cum Vino Malvatico et Pomis Aurantiis*.[2] According to Mr. Gore,[3] it possesses the most agreeable odour and taste of any medicinal compound ever introduced into practice. It is aromatic, carminative and tonic; and, he adds, that he has no doubt it will supersede the preparations in general use, when once it has been fairly tried. In *strumous habits;* in *passive uterine hemorrhage;* in *anasarca* from general debility; in *chlorosis;* in *malignant disease*, in which iron has been extolled; and in all diseases that arise from a *general deficiency of tone*, Mr. Gore considers this preparation to be "of exceeding utility, from its agreeable and chalybeate qualities." He suggests, also, its use in *chronic bronchitis*, in which he gives it in combination with ipecacuanha wine.

[1] Duhamel, loc. cit. [2] Jourdan, Pharmacopée Universelle, i. 545. Paris, 1828.
[3] Dublin Medical Press, April 29, 1840.

Aqua chalybeata effervescens.

Effervescing chalybeate water.

℞. Aquæ Oiss.
Ferri citrat. sicc. ℈j.
Acid. citric. ℈iv.
Sodæ bicarb. ℈v.

Add first the citrate of iron and citric acid, then the bicarbonate of soda, corking the bottle at once, and securing the cork.[1] This is a delicate but active chalybeate. It may be formed, also, conveniently and agreeably, by dissolving 5 to 10 grains of the *citrate* in f ℥vj. of the *mineral water* of the shops, and flavouring with *syrup of orange peel.* It is said, however, to be apt to excite unpleasant eructations.[2] It has been called '*Chalybeate Champagne.*'

A *citrate of iron and magnesia*, Ferri et Magnesiæ Citras, is prepared by dissolving *hydrated oxide of iron* in a solution of *citric acid*, saturating the liquid with *carbonate of magnesia*, and evaporating to dryness.[3] The salt presents itself in the form of brown brilliant scales, of a sweetish and feebly inky and not disagreeable taste. It is perfectly soluble in water, and has the advantage over the ferro-citrate of ammonia, that it is not deliquescent, so that it can be given in powder. Moreover, it does not induce constipation, like most of the salts of iron. The dose is from 4 to 15 grains in solution. It may also be given in powder or pill.

Syrupus ferri et magnesiæ citratis.

Syrup of citrate of iron and magnesia.

℞. Ferri et magnes. citrat. p. x.
Solve in
Aq. flor. aurant. p. xx.
Syrup. p. cc. M.

Van den Corput.

Pulvis ferri et magnesiæ citratis.

Powder of citrate of iron and magnesia.
(*Saccharure de citrate de fer et de magnésie.*)

℞. Ferri et magnes. citrat. p. v.
Sacchar. pulv. p. xl.
Canellæ albæ p. v. M.

Dose.—Fifteen grains. *Van den Corput.*

Troschisci ferri et magnesiæ citratis.

Lozenges of citrate of iron and magnesia.

℞. Ferri et magnes. citrat. p. v.
Sacchar. pulv. p. xl.
Vanill. Sacchar. (*Saccharure de vanille.*) p. 2.
Mucilag. tragacanth. p. v. M.

Each lozenge to contain fifteen grains. *Van den Corput.*

[1] Bullet. de Thérap. cited in Provincial Med. and Surg. Journ. Dec. 10, 1842.
[2] Pereira, Elements of Materia Medica and Thérap. 3d edit. i. 791. Lond. 1849.
[3] Van den Corput, cited in Bouchardat, Annuaire de Thérap. pour 1850, p. 186. The formula of Van den Corput, with remarks by Mr. Wm. Procter, Jr. is given in Amer. Journ. of Pharmacy, October, 1850, p. 314.

M. Béral has likewise introduced a *Citrate of Protoxide of Iron and Quinia*—Ferri et Quiniæ Citras, *Ferrum et Chininum citricum*; German, Citronensaures Eisenchinin; which is formed by the union of four parts of *Citrate of iron* with one part of *Citrate of quinia* in solution, and evaporating. It may be given in the form of pill, wherever a combination of these tonics is needed. An extemporaneous formula may be made by uniting citrate of iron, and citrate or even sulphate of quinia together, which may be given either in pills or solution.

LXXXIV. FERRI FERROCYANURETUM.

Synonymes. Ferri Cyanidum seu Cyanuretum seu Borussias seu Sesquicyanidum seu Ferrosesquicyanidum seu Percyanidum seu Ferrocyanas, Ferrum Cyanogenatum seu Cyanuretum seu Zooticum seu Borussicum seu Hydrocyanicum seu Oxydulatum Hydrocyanicum, Cæruleum Borussicum seu Berolinense, Prussiate or Cyanide or Cyanuret of Iron, Prussian Blue, Berlin Blue.

French. Trito-hydro-ferro-cyanate de Fer; Deutoxicyanure de Fer Hydraté, Tritohydrocyanate Ferruré de Fer, Prussiate de Potasse et de Fer, Bleu de Prusse.

German. Cyaneisen, Blaustoffeisen, Blausaures Eisenoxydul, Eisenblausaures Eisenoxyd, Blausaures Eisen, Eisencyanurcyanid, Berliner Blau, Pariser Blau.

In commerce, this preparation, with us, bears the name of "*Prussian blue*," but in Germany it is called "*Pariser blau*." It is not in a state of purity, and, consequently, that which the apothecary prepares is best adapted for internal use.

METHOD OF PREPARING.

The form given by Buchner is as good as any. *Ferrocyanuret of potassium*, as commonly met with in commerce, is dissolved in warm *distilled water*, and to the clear filtered solution is gradually added, in a glass vessel, a solution of chemically *pure sulphate of iron* so long as a precipitate is thrown down. After the precipitate has fallen to the bottom of the vessel, and the supernatant fluid, which contains sulphate of potassa, has been poured off, the precipitate is first digested with *dilute sulphuric* or *muriatic acid*, in order to dissolve the excess of oxide of iron; the beautiful dark blue precipitate is then collected on a filter, carefully washed with boiling water, and dried.

The following form for the preparation of "*pure Prussian blue*," is admitted into the last edition of the Pharmacopœia of the United States:—Take of *Sulphate of iron*, ℥iv.; *Sulphuric acid*, f ʒiiiss.; *Nitric acid*, f ʒvj., or a sufficient quantity; *Ferrocyanuret of Potassium*, ℥ivss.; *Water*, Oij. Dissolve the sulphate of iron in a pint of water, and, having added the sulphuric acid, boil the solution. Pour it into the nitric acid in small portions, boiling the

liquid for a minute or two after each addition, until it no longer produces a dark colour; then allow the liquid to cool. Dissolve the ferrocyanuret of potassium in the remainder of the water, and add this solution gradually to the first liquid, agitating the mixture after each addition; then pour it upon a filter. Wash the precipitate with boiling water until the washings pass tasteless. Lastly, dry it and rub into powder.[1]

Ferrocyanuret of iron is of a beautiful deep blue colour, and devoid of odour and taste. It is decomposed by heat, and is insoluble in water, alcohol, ether, oils and dilute acids. Potassa and soda decompose it. It adheres firmly to the tongue, which Riecke thinks is owing to its containing argil.

EFFECTS ON THE ECONOMY.

Of the effects of ferrocyanuret of iron on the human economy in health we have no evidence. Coullon gave it to various animals, but observed no action from it. It has been given, however, and not without success, in several diseases; and Dr. L. W. Sachs, who has not unfrequently administered it, considers it one of the most important chalybeates with which we are acquainted. He thinks it probable, that the hydrocyanic acid has not much agency; yet it certainly seems to differ from all the other preparations of iron. It has been especially recommended in *epilepsy* by Kirckhoff,[2] of Ghent; and more recently by M. Faivre d'Esnans.[3] In very obstinate cases, not dependent upon organic mischief, Kirckhoff succeeded entirely with it; with the adult, he commenced with half a grain daily, and raised the dose gradually to three, four, and even six grains and upwards. When the patient was plethoric, he premised blood-letting, or applied leeches, from time to time, to the temples. Hildenbrand and Gergères confirm its efficacy in epilepsy. M. Faivre d'Esnans used the following formula:—

R. Ferri ferrocyanuret. gr. xv.
Ext. Valerian. gr. xlv.
M. et divide in pil. xxiv.

One pill to be taken three times a day, at an interval of six hours, and each pill to be followed by a wineglassful of infusion of valerian.

It has also been administered by Dr. Zollickoffer[4] successfully in a case of *chorea;* three grains being given in the form of pill, three times a day. In six days, the girl, twelve years old, was entirely cured, after camphor, opium, quinia, and asafœtida, nitrate of silver, and subcarbonate of iron had been given in vain. In

[1] Pharmacopœia of the United States, p. 109. Philad. 1842.
[2] Journal de Chimie Médicale, iii. 285. See, also, Journ. des Connais. Méd. Chirur. Août, 1841; or Encycl. des Sciences Méd. Sept. 1841, p. 468.
[3] Journal de Médecine et de Chirurgie Pratiques, cited in Amer. Journ. of the Med. Sciences, July, 1850, p. 202.
[4] Medical Examiner, May 16, 1840, p. 314.

intermittent fever, Dr. Zollickoffer[1] found it so efficacious, that he even gave it the preference over cinchona: and his experience has been confirmed by that of Eberle,[2] Hosack,[3] J. E. Craighead,[4] Hasse,[5] and others. Wutzer, in Germany, also exhibited it successfully; and Stosch gave it advantageously, in combination with cinchona and rhubarb, in a case of obstinate intermittent. Sachs likewise tried it frequently, but as often without, as with, success. When it has proved efficacious in intermittents, the dose has been by no means large. Some have given six or eight grains every four hours during the apyrexia, and even as much as a scruple has been administered. Sachs found it several times efficacious, when four doses of two grains each were taken; and Riecke[6] affirms, that his father obtained essential service from it in the *leucophlegmatic conditions resulting from intermittent fever*. Zollickoffer extols the ferrocyanuret also in *remittent fever;* and there may, doubtless, be periods when it may be administered with benefit; but it is not often used. He recommends it, likewise, in *dysentery*,[7] when the inflammatory condition has passed away, either spontaneously or under the efforts of art; and Sachs remarks, that in *atonic conditions of the intestinal canal*, which supervene on dysentery, it may doubtless be of great service. Gergères administered it successfully in *chronic diarrhœa*. L. W. Sachs enters into a long theoretical disquisition on the precise action of the remedy, in which there is, doubtless, much that is speculative. He used it, he says, with success, in many cases which it would be difficult to classify under any formal nosology; their common bond, however, was, that they were dependent upon "nervous disorders, especially of the plastic functions of the abdominal organs, the mischief appearing first of all to be gastric." In such affections he found a combination of the ferrocyanuret of iron with rhubarb especially serviceable. He gave it in not less than two grain doses, which were gradually augmented to six, three times a day. Dr. Moll saw decidedly good effects from its use in a case of *immoderate menstruation from atony of the uterus*, with general elevation of nervous excitability, after he had employed the remedies, commonly recommended, unsuccessfully. He found it also extremely beneficial to *children of a strumous habit*, and of great *torpor*. Stosch found it serviceable in a case of *scrofula*, in which hæmatosis was imperfectly accomplished; and Dr. Bridges[8] obtained great advantage from it in a case of severe and protracted *facial neuralgia*.

[1] American Medical Recorder, v. 540.
[2] Materia Medica, 2d edit. i. 233.
[3] New York Medical and Physical Journal, 1823.
[4] American Medical Intelligencer, May, 1842, p. 230.
[5] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 122. Erlangen, 1848.
[6] Op. citat. S. 217.
[7] Chapman's Philadelphia Journal, Aug. 1823.
[8] Wood and Bache's Dispensatory, art. Ferri Ferrocyanuretum.

It has been also recommended as probably more effective than any other remedy in inveterate cases of *ascarides* in the rectum. With this view, five grains of the salt may be rubbed up in two ounces of warm water or mucilage of gum arabic, and be thrown up into the rectum, to be retained there "until the next regular defecation." This must be repeated daily, gradually increasing the quantity of the cyanuret, until perfect and permanent relief is afforded.[1]

Externally, the ferrocyanuret has been used in the form of ointment, in cases of *ill-conditioned*, *torpid* and *foul ulcers*, and even of *noli me tangere*. Stosch applied it in a case of *fungous ulcer* with marked advantage; making it into a paste with water and using it in that form.

MODE OF ADMINISTRATION.

Pulvis ferri ferrocyanureti.

Powder of ferrocyanuret of iron.

℞. Ferri ferrocyan. gr. iij. ad. xxxvj.
Sacchar. ʒij. M. et divide in pulveres vj.

Dose.—A powder, two or three times a day, in *epilepsy*.
Kirckhoff.

℞. Ferri ferrocyan. gr. j., iv., vj., ad xij.
Sacch. ʒj.
Fiat pulvis in partes xij. æquales dividendus.

Dose.—A powder, every two hours, in *epilepsy*.
Von Hildenbrand.

℞. Ferri ferrocyan.
Guaiac. pulv. āā. ʒj.
Misce et divide in chartulas xij.

Dose.—One, three times a day.—Employed successfully in *intermittents*.[2]

Pilulæ ferri ferrocyanureti.

Pills of ferrocyanuret of iron.

℞. Ammoniac.
Rhei
Ext. taraxac. āā. ʒj.
Ferri ferrocyan. gr. xviij. ad. xxxvj.
M. et fiat massa in pilulas lx. dividenda.

Dose.—Four to six, twice a day, in *disorder of the ganglionic system*. *L. W. Sachs, & Radius.*

Unguentum ferri ferrocyanureti.

Ointment of ferrocyanuret of iron.

℞. Ferri ferrocyan. ʒj.
Unguent. cetacei ℥j. M. et fiat unguentum.

[1] Amer. Journ. of the Medical Sciences, Jan. 1847, p. 247.
[2] Ellis's Formulary, 8th edit. p. 186. Philad. 1846.

LXXXV. FERRI IO'DIDUM.

Synonymes. Ferri Ioduretum, Ferrum Iodatum, Iodated Iron, Iodide or Ioduret, Protoioduret, Protoiodide or Protiodide of Iron.
French. Iodure de Fer, Protoiodure de Fer.
German. Iodeisen.
In solution, Ferri Hydriodas, Ferrum Hydriodatum seu Hydroiodicum Oxydulatum, Hydriodated Iron, Hydriodate of Iron, Hydriodate of Protoxide of Iron.
French. Hydriodate de Fer.
German. Hydroiodsaures Eisenoxydul, Iodeisen, Iodwasserstoffsaures Eisenoxydul, Eiseniodür.

Although attention had been directed, several years ago, to this preparation, it was not much used, until Prof. A. T. Thomson,[1] of the London University, recommended it strongly in a special monograph several years since. It has been received into different Pharmacopœias.

METHOD OF PREPARING.

The following method is recommended by Dr. Thomson. One part of *iron wire* should be rubbed in a porcelain or wedgewood mortar with about three or four parts of *iodine*, gradually adding *distilled water*, until fifteen parts of the fluid have been used; the whole is then to be introduced into a Florence flask, with an additional portion of *wire* and of *distilled water*. This excess of iron is a matter of indifference in the preparation of the hydriodate, and in that of the iodide it is necessary for preserving the combination from decomposition during the evaporation of the solution. These materials are next to be boiled together, until the fluid acquires a pale greenish colour, when it must be filtered. This solution contains a hydriodate of the protoxide of iron; and, if the exact quantity of the iodine be previously ascertained, so as to enable the solution to be procured of a definite strength, it may be kept in this state for medicinal use. In general, however, the solution is evaporated to dryness, and, for this purpose, it may be poured into a clean flask, containing a piece of iron wire sufficiently long to reach from the bottom to the surface of the fluid, and the boiling should be continued until the bulk of the solution is reduced to one-third. It must then be filtered, after which the evaporation should be continued to dryness. It is necessary to break the flask as soon as the mass is cold, in order to obtain the solid iodide, which should be immediately transferred to a dry bottle, accurately fitted with a ground stopper. The bottle should not hold more than two ounces of the preparation; for when it is large and not full, the iodide deliquesces nearly as rapidly as when it is exposed to the free action of the atmosphere.

[1] Some Observations on the Preparation and Medicinal Employment of the Ioduret and Hydriodate of Iron, 8vo. p. 64. Lond. 1834.

When the flask is broken, and the iodide bottled before the mass is cold, deliquescence also takes place, a peroxide of the metal is formed, and iodine is evolved.

The form for the preparation of the solid iodide recommended in the last edition of the Pharmacopœia of the United States is the following:—Take of *Iodine*, ℥ij., *Iron filings*, ℥i., *Distilled water*, a pint and a half. Mix the iodine with a pint of the distilled water in a porcelain or glass vessel, and gradually add the iron filings, stirring constantly. Heat the mixture gently until the liquid acquires a light greenish colour; then filter, and after the liquid has passed, pour upon the filter half a pint of the distilled water boiling hot. When this shall have passed, evaporate the filtered liquor, at a temperature not exceeding 212°, in an iron vessel, to dryness. Keep the dry iodide in a closely stopped bottle.[1]

The plan proposed by Mr. Durand,[2] of Philadelphia, after that by MM. Baup and Caillot,[3] for preparing the solution of the protiodide of iron (hydriodate of protoxide of iron) is the following:—Take of *Iodine*, ʒx., *Iron filings*, perfectly pure and unoxidized, ʒv., *Distilled water*, ℥xiiss. Put the iodine into a porcelain capsule, with one half the quantity of water, and add the iron filings by small portions, stirring the mixture with a glass rod. The combination soon takes place; heat is evolved with the disengagement of a small quantity of vapour of iodine, and the mixture acquires an orange colour, which gradually deepens to a dark red. When the whole of the iron has been added, the capsule is put in a sand bath, or over the flame of a spirit lamp, and heated slowly; continuing to stir the liquid. An ioduretted hydriodate of iron is first produced, which, under the action of heat, soon passes to the state of a simple hydriodate. This point is indicated by the entire discoloration of the solution. In this state it is filtered; and the dregs and filter are carefully washed with the remaining half of the distilled water, previously heated to the boiling point. In this manner, a solution forming twelve and a half fluidounces is afforded, one ounce of which represents one dram of iodide of iron.

The solution, which is at first colourless, acquires a deep red colour by standing, and precipitates some oxide of iron; by which it is reduced to the state of an ioduretted hydriodate of iron; but it may be easily restored to its former state by heating it again with a small quantity of iron filings, until the liquid becomes colourless: or, to prevent these changes, a coil of soft iron wire may be kept immersed in it; a fact which has been long known,[4] but which M. Dupasquier has recently rediscovered.[5]

[1] Pharm. of the United States, p. 110. Philad. 1842.
[2] Philad. Journ. of Pharmacy, iv. 287. Philad. 1833.
[3] Ibid. i. 201.
[4] Squire, Annals of Philosophy, May, 1836, p. 79.
[5] Journal de Pharmacie, Mars, 1842, p. 224.

The iodide of iron is obtained by evaporating to dryness the filtered solution, taking care, towards the end, to stir incessantly with an iron spatula, and to detach the salt from the bottom of the capsule as it forms. The heat must be managed most carefully, diminishing it gradually, and removing the capsule quickly from the fire as soon as the odour of iodine is evolved. The solution of this salt, when the iodide is well prepared, is of a pale greenish colour, and deeper in proportion to the decomposition which some parts may have undergone towards the end of the operation.

Iodide of iron requires to be well secured from the influence of the atmosphere, both on account of its deliquescent property, the rapid oxidation which the metal undergoes when deliquescence occurs, and the consequent decomposition which takes place. It is important to prevent this, as the peroxide of iron is comparatively inert as a medicinal agent; whilst the free iodine extricated during its oxidation, according to Dr. Thomson, alters altogether the virtues of the medicine. This partial decomposition of the iodide is rendered immediately apparent on dissolving it in twenty times its weight of distilled water, and filtering: instead of a permanent, clear, very pale greenish-yellow, we obtain an ochre-coloured, completely insoluble precipitate. Much of the iodide usually prepared is of this description, and to this may, doubtless, be referred some of the disappointment and discrepancy amongst practitioners as to the operation of the medicine in cases apparently similar. Even when the iodide has been carefully prepared, it often contains a little free iodine; but, according to Thomson, it is chiefly owing to the carelessness of assistants and apprentices in compounding prescriptions, by frequently exposing the iodide to the air, that its properties, and, consequently, its medicinal powers, are impaired: hence, it is preferable to keep it in solution, or in the form of hydriodate, which it becomes, whenever water is added to it.

If the solution be prepared with a definite quantity of iodine, as described, it will keep without changing its characters; but as it is usually made by dissolving the iodide in distilled water, it requires to be rendered neutral by the following means:—Introduce into a flask the solution of any given strength, and place in it two or three doubles of clean and soft iron wire, sufficiently long to extend to the surface of the fluid; boil for a few minutes, and then leave it at rest, until the solution becomes clear, after which it may be either decanted off from the precipitate which forms, or filtered: no farther change takes place in a solution thus treated, however long it may be preserved, provided it be kept in a blackened or a green bottle. In this process, the wire affords iron to saturate any free iodine present in the solution, or that may have been extricated by the formation of the peroxide of iron in

the iodide; and a perfectly neutral solution being thus obtained, by the immediate conversion of the newly formed iodide into the hydriodate of the protoxide, no subsequent change takes place so long as the solution is kept secluded from the light. The best proportions, according to Dr. Thomson, for forming the medicinal solution, are three grains of the dry solid iodide to each fluidram of distilled water. If the water be not either distilled or filtered rain water, perfectly free from foreign ingredients, and particularly if it contain any earthy or saline carbonates, decomposition instantly takes place, iodine is extricated, and a carbonate of iron, which rapidly passes into the state of a peroxide of that metal, is precipitated.

To protect the solution of iodide from decomposition, it has been advised to associate it with sugar, which appears to exert the same protective agency as it does on the protocarbonate. With this view, the following preparation has been proposed by Mr. Procter.[1] Take of *Iodine*, eleven drams; *Iron filings*, four drams; *Syrup*, *Uncrystallizable honey*, or *Uncrystallizable sugar*, four ounces; *Distilled water*, a sufficient quantity. Mix the iodine with eight fluidounces of the distilled water, and gradually add the iron filings, stirring constantly; then apply a gentle heat until the solution shall have acquired a light green colour, or shall not give a blue colour to a solution of starch; then add whichever of the three protecting saccharine substances may be chosen; continue the heat a short time and filter. Lastly, wash the filter with as much distilled water as will make sixteen fluidounces of solution of iodide of iron.

Liquor Ferri Iodidi, or *Solution of Iodide of Iron* of the last edition of the Pharmacopœia of the United States (1842,) is essentially the same as this. The saccharine matter employed in it is prepared honey. The solution, thus obtained, is of a pale-greenish colour. It has little or no sediment.

M. Oberdörffer, of Hamburg,[2] gives the following form for the preparation of the *sesqui-iodide of iron;* whose effects, and mode of administration are the same as those of the iodide. It may be preserved a long time without undergoing decomposition. Mix in a glass vessel half an ounce of *iodine;* a dram and a half of *iron filings;* and an ounce of *water*. When the reaction is completed, the mixture is to be slightly shaken, until it becomes of a clear green colour, which is due to the iodide of iron. It is then diluted with four ounces of water, filtered, and some water is passed through the filter. To the solution two drams of iodine are afterwards added, which are readily dissolved. A deep reddish-brown liquid results, to which a sufficient quantity of water

[1] American Journal of Pharmacy, for July, 1840, p. 13; and Ibid. for January, 1841, p. 323.

[2] Zeitschrift für die gesammte Medicin. Juin, 1840,

is added to make the weight of the whole ten ounces. Each dram contains about four grains and a half of iodine.

When iodide of iron is carefully prepared, it is of an iron-gray colour, foliated texture, brittle, and exhibits a crystalline arrangement similar to metallic antimony, except that it is darker. In the dry state, it is inodorous; but, when moist, it smells somewhat of iodine: the taste, when dry, is simply styptic; when moist, somewhat acrid, before it impresses the gustatory organs. At 350° of Fahrenheit it fuses; and, at a higher temperature, is decomposed—the iodine being volatilized, and the iron remaining in the state of oxide. It dissolves in all proportions in water,—the changes supervening, which have been already indicated. It is decomposed by chlorine, the mineral acids, oxide of arsenic, meconic acid—consequently by opium and laudanum—gallic and tannic acids, the pure and carbonated alkalies, different metallic salts, and by the infusions of digitalis, belladonna, hyoscyamus, tobacco, amylaceous substances, &c.: such articles ought not, therefore, to be given in combination with it.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments made on his own person, Dr. Thomson states the following to be the physiological effects of iodide of iron. When taken in doses of from three to five grains, it makes no sensible impression on the stomach, although it sharpens the appetite, and improves the digestive function: it seems to stimulate moderately the digestive canal through its entire length; for it opens the bowels; and, whilst it produces the black colour of the alvine discharges, characteristic of all the preparations of iron, it corrects their fœtor. When it does not affect the bowels, it augments the action of the kidneys, increasing the flow of urine; and if the solution be taken two or three times a day, for several days in succession, the presence of both the iodine and the iron can be readily detected in the urine. The temperature of the skin is moderately elevated, and the insensible perspiration increased. On one occasion, having taken ten grains for a dose, it almost immediately caused an uneasy sensation at the epigastrium, accompanied with nausea, that continued for several hours, and a slight degree of headach. These symptoms were relieved by a copious evacuation, which was perfectly black. Two hours after taking the medicine, a large quantity of urine was discharged; which, on being tested, displayed the presence of both iodine and iron. The experiments on animals, made by Dr. Cogswell,[1] induced him to infer:—1. That it acts as a local stimulant, possessing the power of affecting peculiar disorganization.—2. That its action is more particularly directed to the tract of the alimentary canal.

[1] Essay on Iodine, p. 132. Edinburgh, 1837.

When added to blood out of the body, it promotes its coagulation.[1]

EFFECTS ON THE ECONOMY IN DISEASE.

From the chemical composition of iodide of iron, Dr. Thomson considered it might be specially adapted for cases in which augmented activity of the capillary or intermediate system, with a tonic effect, might be indicated, and particularly in *scrofulous affections*, *tabes mesenterica*, *chlorosis*, *incipient scirrhus*, *rickets*, *amenorrhœa*, *bronchocele*, *atonic dyspepsia*,—indeed in all cases accompanied by debility. In such affections, he conceives the iodide will act more efficiently than any of the other preparations of iron. In *secondary syphilis*, it may be combined, he suggests, with iodide of potassium; and in *incipient cancer*, its efficacy is aided by the administration of arsenic at the same time. Dr. Thomson has found it serviceable in *atonic gastric dyspepsia*, when combined with bicarbonate of potassa, and taken at the moment of admixture, in the dose of from three to eight grains or more.[2] A great advantage it possesses is its ready solubility, owing to which it can enter the circulatory system with facility, and modify the condition of the fluids. In *chronic scrofulous cases*, it produces all the good effects of the preparations of iron, without any of the concomitant and subsequent symptoms that are so apt to supervene, especially in impressible individuals. Where the case is accompanied by vascular erethism, or fulness, it must be reduced before the iodide can be esteemed appropriate. In *chlorosis*, *occurring in strumous habits*, it has been found most serviceable. Dr. Ashwell[3] prescribed it with success in such cases, in association with colomba or gentian, according to the formula given hereafter. Its efficacy in cancer is elucidated by Dr. Thomson, by the details of a case of *scirrhous mamma*, which, after protracted and fruitless treatment by other agents—as by other preparations of iron combined with conium—ultimately yielded to a combination of iodide of iron and conium. Some cases are also detailed in which it was very effective in removing *old syphilitic affections*, *especially of the skin*. M. Baumes,[4] who employed the iodide with the most satisfactory results in old and obstinate *syphilitic ulcers*, especially when the patient was feeble and scrofulous, gave it in the form of pills with extract of opium,—increasing the dose of the iodide from two or three to twelve or twenty grains in the twenty-four hours. Along with the cicatrization of the sores, the improvement of the general health was most remarkable.

[1] Magendie, Leçons sur le Sang, &c.; or translation in the Lancet, Jan. 26, 1839.

[2] London Dispensatory, and Brande's Dictionary of Mat. Med., p. 252. Lond., 1839. See, also, Solon, in Dict. de Méd. et de Chirurg. Pratiq., art. Iode; and Ashwell, in Guy's Hospital Reports, pt. i. 128; and pt. iii. 555.

[3] A Practical Treatise on the Diseases Peculiar to Women, American edit., p. 32. Philad., 1845.

[4] Medico-Chirurgical Rev., Oct., 1840.

Prior to the publication of Thomson, Pierquin had given the iodine in cases of *leucorrhœa*, and *amenorrhœa;* and Eager[1] had recommended it in *scrofula.* Ricord[2] found the very best effects from its internal use in cases where tonics required to be combined with antisyphilitic remedies, especially where any *scrofulous vice* (*lymphatisme*) constituted a complication. He administered it, likewise, with great success, to remove the *consequences of syphilis;* and found it advantageous in *atonic ulcers of the legs*, and in *spreading ulcers of the throat*, which had been aggravated or had not yielded to mercury. The strength of M. Ricord's solution was half a dram of the iodide to ℥viij. of water, given, we presume, in the twenty-four hours. M. Ricord[3] also uses it in the form of injection in cases of *blennorrhœa:* wherever, indeed, tonic astringent injections are needed, the iodide, in his opinion, should occupy the first rank. Its use, he thinks, can only be contraindicated when there is much inflammation or pain in passing the urine, or when cystitis exists. The strength of the injection should be three grains to the fluidounce of water.

In consequence of its promoting the coagulation of the blood out of the body, Magendie[4] prescribed it in the form of injection (f ʒi. to Oij. of water,) several times a day in a case of severe *uterine hemorrhage.* The hemorrhage ceased.

A case of confirmed *diabetes*[5] was treated in the Hôtel-Dieu of Paris, by the iodide given in the form of pill, each pill containing five grains. Four pills were taken in the twenty-four hours. In this case, the iodide must have been efficacious, for the usual animal diet recommended in such cases had failed previously to do good, until the iodide was associated with it.

It has likewise afforded apparent benefit in cases of *tubercular phthisis*, and in the mass of such cases is as well adapted for modifying the morbid action of the system of nutrition, so deeply implicated in that fatal malady, as any other agent, with the exception, perhaps, of cod liver oil. The syrup is the best preparation.

Dr. C. J. B. Williams[6] considers the iodide to answer better than any other chalybeate in *chorea.* It pervades the system more rapidly, he thinks, and keeps the secretions more free. He gives it in doses of one grain three times a day, increased to four or five grains, taking care, at the same time, that the bowels are open.

[1] Dublin Journ. of Med. Science, 1834; also, Cogswell on Iodine, p. 138. Edinb. 1837.
[2] J. J. L. Rattier, in La Lancette Française, 4 Fév., 1837.
[3] J. J. L. Rattier, Ibid. 16 Fév., 1837; see, also, Revue Médicale, Janvier, 1838, cited in Amer. Med. Intel., Sept. 15, 1838. [4] Op. cit.
[5] Cited in Provincial Med. and Surg. Journal, Nov. 5, 1842. The results obtained in the Hôtel-Dieu are referred to in London Lancet, July 8, 1843, p. 517; see, also, M Boissière, Gazette Méd. de Paris, 24 Dec., 1842; cited in Amer. Journ. of the Med. Sciences, April, 1843, p. 454. [6] Medical Times, May 24, 1845, p. 133.

Mr. B. Phillips[1] prefers it in scrofula to any of the preparations of iodine. The minimum dose was a grain twice a day; the maximum, three grains, three times a day. In 232 cases, it was only necessary to intermit its use for a few days in three cases. In one, it excited ptyalism. About once a week he gave an aperient or cathartic. In cases of scrofulous ulceration, as a consequence of abscess, or from other causes, he employed, with the best effect, a lotion containing three or four grains of the iodide to an ounce of distilled water. Where parts are irritable, he usually recommends the ointment of iodine to be applied to the part on lint.

Stauss[2] gives the case of a young female affected with *ascites*, *hydrothorax* and *anasarca*, who had been tapped for the ascites, and had taken gratiola and lactuca virosa without any benefit, who was cured by a mixture of *Tinctura ferri iodid.*, *Tinct. cort. aurant.* āā. ʒij., and *Aq. flor. aurantior.* ℥ij., of which a spoonful was given four times a day. Under this, the *status hydropicus* disappeared.

The author has frequently given this remedy in public and private practice, and has considered it especially adapted for those cases in which there appears to be torpor in the system of nutrition, as in *asthenic dropsy*, *old visceral engorgements*, and indeed of *hypertrophy of any kind, accompanied by deficient action in the system of nutrition.* In *oligæmia*, where there is paucity of red corpuscles of the blood, and the fluid is altogether too thin, it would seem to be especially indicated, from its property, mentioned above, of promoting the coagulation of the blood, and, therefore, of inspissating it. Hence, in all cases of *scorbutic*, *hydropic* and *other dyscrasies*, and in *hemorrhages occurring in such pathological conditions*, the author has prescribed it largely, and with excellent effects. It appears to him to be the best remedy we possess wherever a eutrophic and tonic is indicated.

MODE OF ADMINISTRATION.

The dose of iodide of iron, administered in the cases above referred to was generally three or four grains two or three times a day.

Pilulæ ferri iodidi.

Pills of iodide of iron.

These pills may be prepared in the following manner, according to a formula communicated by Mr. Robert Leslie, of Glasgow, to Dr. Christison of Edinburgh.[3] Take of iodine, 127 grains; iron

[1] London Med. Gazette, Jan. 10, 1840; see, also, Scrofula; its Nature, Causes, &c. by B. Phillips, F. R. S., Amer. edit., p. 248. Philad. 1846.

[2] Casper, Wochenschrift, No. 24, cited in Canstatt und Eisenmann's Jahresbericht über die Fortschritte in der Heilkunde im Jahre 1848, V. 135.

[3] Pharmaceut. Transact., Aug. 1, 1844, p. 79.

wire, of about the thickness of a thin quill, half an ounce; distilled water, 75 minims. Agitate them briskly together in a strong ounce phial provided with a well fitted glass stopper, until the froth which forms becomes white. This will happen in less than ten minutes. Pour the liquid upon two drams of finely powdered loaf sugar in a little water, and triturate immediately and briskly for a few minutes; add gradually a mixture of the following powders,—liquorice powder, half an ounce; powder of gum Arabic, a dram and a half; flour, a dram. Divide the mass into 144 pills. Each pill will contain about a grain of iodide of iron.

Vinum ferri iodidi.

Wine of iodide of iron.

℞. Ferri iodidi ℥ss.
Vin Bordgalens. Oj. M.

Dose.—A tea-spoonful, morning and evening. *Pierquin.*[1]

Tinctura ferri iodidi.

Tincture of iodide of iron.

℞. Ferri iodidi ʒij.
Alcoholis,
Aquæ, āā. f ℥ij. M.

Dose.—A tea-spoonful, morning and evening. *Pierquin.*

Mistura ferri iodidi composita.

Compound mixture of iodide of iron.

℞. Ferri iodidi gr. xvj.
Tinct. colomb. seu
——— gentianæ comp. f ℥j.
Aquæ destillat. f ℥vij. M.

Dose.—Two table-spoonfuls two or three times a day.
Ashwell.

Syrupus ferri iodidi.

Syrup of iodide of iron.

Various forms have been given for this preparation.[2] The following is the one admitted into the last edition of the Edinburgh Pharmacopœia:—Take of *Iodine* (dry,) 200 grains; *Fine iron wire*, recently cleaned, 100 grains; *White sugar* in powder, four ounces and a half; *Distilled water*, six fluidounces. Boil the iodine, iron and water together in a glass matrass, at first gently, to avoid the expulsion of iodine vapour, afterwards briskly till about two fluidounces remain. Filter this quickly, while hot, into

[1] Journal de Chimie Médicale, p. 310, Mai, 1831.

[2] Frederking, Repertor. für die Pharmacie, 1839, cited in Amer. Journ. Med. Sciences, Feb. 1840, p. 499; Dupasquier, Journ. de Pharm. Mars, 1841, p. 116, and Mars, 1842, p. 225; F. Boudet, ibid. Sept. 1841, p. 335; Béral, Journ. de Chim. Méd. cited in Amer. Journ. of Pharmacy, April, 1841, p. 74; A. T. Thomson, Lond. Pharmac. Transactions, Aug. 1841; and Leistner, Journ. de Pharmacie, Février, 1842, p. 122.

a matrass containing the sugar; dissolve the sugar with a gentle heat, and add distilled water to make up six fluidounces.

Twelve minims of this syrup contain one grain of the iodide. It ought to be nearly colourless or pale yellowish-green, and without sediment. Dr. Christison states, that it will always be defective in strength "when made with British iodine, as now commonly met with in the market, unless allowance be made for the water, which it very generally contains in large proportion."[1]

Trochisci ferri iodidi.

Lozenges of iodide of iron.

℞. Ferri iodidi ʒss.
Croci pulv. ʒij.
Sacchar. ℥iv.
M. fiant trochisci No. 120.

Dose.—Six to ten, daily. *Pierquin.*

Solutio ferri iodidi.

Solution of iodide of iron.

(French, *Eau d'Hydriodate de Fer.*)

℞. Ferri iodidi ℥ss.
Aquæ Oij. M.

Added to enemata, lotions and injections.

℞. Ferri iodidi ℥ss. ad ℥ij.
Aquæ destillat. Oj. M.

To be added to a general bath in cases of *leucorrhœa, amenorrhœa,* &c.

Injectio ferri iodidi.

Injection of iodide of iron.

℞. Ferri iodid. gr. iij.
Aquæ destillat. f ℥vi. M.

The quantity may be increased to nine grains to the ounce of water, care being taken to avoid irritation.

Used in *gonorrhœa.* *Ricord.*[2]

Unguentum ferri iodidi.

Ointment of iodide of iron.

℞. Ferri iodidi ʒiss.
Adipis ℥j. M. ut fiat unguentum.

A piece the size of a hazelnut to be rubbed, morning and evening, on the inner part of the thigh, in cases of *leucorrhœa* and *amenorrhœa.*

[1] Dispensatory, p. 431. Edinb. 1842.

[2] A Practical Treatise on Venereal Diseases, translated by Drummond, Amer. edit. p. 237, 249. Philad. 1843.

LXXXVI. FERRI LACTAS.

Synonymes. Ferrum lacticum, Lactas ferrosus, Lactate of Iron, Lactate of Protoxide of Iron.
French. Lactate de Fer.
German. Milchsaures Eisenoxyd, Milchsaures Eisenoxydul.

This preparation was recommended by MM. Gelis and Conté, *internes* at La Charité, in Paris, and has been favourably reported upon by M. Bouillaud, in the name of a committee, consisting of MM. Bally, Fouquier, and Bouillaud.[1]

METHOD OF PREPARING.

MM. Gelis and Conté prepare lactate of iron by treating *pure iron filings* with *lactic acid*, diluted with *water*. M. Louradour[2] extracts *lactic acid* from whey, which he collects from the dairies in the neighbourhood of Paris, where much cheese is made. The whey, exposed a long time to fermentation under the influence of an elevated temperature, becomes charged with a large quantity of lactic acid. It is evaporated to one-third or one-fourth of its volume, decanted and filtered; and is then saturated with *milk of lime*, which produces an abundant deposit, chiefly of phosphate of lime. The filtered solution is precipitated by *oxalic acid*, and again filtered, and then concentrated to a syrupy consistence. It is now diluted with *alcohol*, which precipitates the lactine and the salts. The solution, on being filtered, and the alcohol distilled off, yields pure lactic acid. Lactate of protoxide of iron is prepared by digesting in a sand-bath, at a low temperature, this *acid*, diluted with *water*, upon *iron filings*. At the end of six or seven hours of reaction, the liquid is boiled, filtered, and concentrated; when, on cooling, it deposits crystals. These crystals, drained on a funnel, and washed with *alcohol* by displacement, should be dried rapidly, and be preserved from any contact with air. The salt presents itself under the form of crystalline plates, which are very white, and but slightly alterable. It is sparingly soluble in water; reddens litmus paper, and possesses the ferruginous taste in a tolerable degree. When dissolved in water, it attracts oxygen, and quickly becomes yellow.

The sparing solubility of the lactate has permitted M. Louradour to simplify still more his process, by omitting the purification of *lactic acid* by alcohol, and treating it immediately with *iron filings:* the liquor, suitably evaporated, affords crystals of the lactate: the foreign salts and the lactine remain in the mother waters, which are rejected.

[1] Journal de Pharmacie, cited in Amer. Journal of Pharmacy, July, 1840, p. 121. See, also, Béral, Journ. de Chimie Médicale, cited in Amer. Journ. of Pharm. April, 1841, p. 74; and Gélis and Conté, in Bouchardat, Annuaire de Thérapeutique pour 1848, p. 166. Paris, 1848.

[2] Bulletin Général de Thérapeutique, Mars, 1840.

As the lactate would seem to be often adulterated with effloresced sulphate of iron, or the same precipitated with alcohol, or with starch or sugar of milk, M. Louradour recommends, that no lactate should be used except what is under the form of crystalline plates, which do not readily admit of fraud.[1]

EFFECTS ON THE ECONOMY.

Lactate of iron has been used in cases in which protocarbonate of iron is employed, and chiefly in *chlorosis*. MM. Gelis and Conté are disposed to refer the beneficial agency of the protocarbonate to its becoming lactate of iron in the stomach, by uniting with the lactic acid, which has been presumed to be one of the healthy gastric acids. This idea led them to administer lactate of iron ready formed. In *chlorosis* the remedy has been given by MM. Fouquier, Bally, Beau, Rayer, Nonat, Andral, Bouillaud, Gerdy, Franz, and others, who have collected a great number of cases, which show its success in that disease.[2] M. Bouillaud[3] made trial of it in twenty-one cases, fourteen of which were treated at La Charité. One of the last cases not being decidedly chlorotic may be excluded. Of the thirteen, ten were females, and three males. Of the ten females, eight presented well marked chlorosis; two were rather of anæmia. The dose was carried to six, eight, ten, twelve, and fifteen lozenges, each containing about five *centigrammes* of the salt (gr. $\frac{3}{4}$) in the twenty-four hours. It was well borne, and always sensibly increased the appetite; but, as Mialhe[4] and Pereira[5] remark, there seems to be no evidence of its superiority over the citrate or tartrate of iron.

MODE OF ADMINISTRATION.

MM. Gelis and Conté form freshly prepared lactate of iron into lozenges, in which the sugar prevents the superoxidation of the iron, and preserves the medicine; whilst, at the same time, a form is given, which allows of great facility of administration. MM. Andral and Fouquier seldom exceed twelve grains of the lactate in twenty-four hours; and M. Bouillaud never gives more than twenty.

The following formulæ have been proposed by Mr. Cap:[6]

[1] Journ. de Pharmacie, and Amer. Journ. of Pharmacy, Oct. 1840, p. 230. Wöhler' process is given by Christison, Dispensatory, Amer. edit. by R. E. Griffith, p. 978. Philad. 1848. F. Roder's process, which resembles it, is given in Dierbach, Die neuesten Entdeckungen in der Mat. Med. 3er Band. 2te Abth. S. 856. Heidelb. und Leipz. 1847 See, also, on this subject, Dispensatory of the United States, 8th edit. p. 1278. Philad 1849.

[2] Bulletin Général de Thérapeutique, Mars, 1840; also, La Lancette Française, cited in London Lancet, Feb. 8, 1840, p. 707.

[3] Encyclographie des Sciences Médicales, Mars, 1840, p. 226. Académie Royale de Médecine de Paris, Seance du 4 Février, 1840.

[4] Traité de l'Art. de formuler, p. 184. Paris, 1845.

[5] Elements of Mat. Med. and Therap. 3d edit. i. 790. Lond. 1849.

[6] Journal de Pharmacie, and Amer. Journ. of Pharmacy, Oct. 1840, p. 228.

Trochisci ferri lactatis.

Lozenges of lactate of iron.

℞. Ferri lactat. ʒvij. gr. 43 (30 *grammes.*)
Sacchar. ℥xiss. (360 *grammes.*)
Mucilag. acaciæ q. s.

Make into lozenges, each weighing gr. x. (65 *centigrammes*) which will contain gr. ¾ (5 *centigrammes*) of the salt.

Syrupus ferri lactatis.

Syrup of lactate of iron.

℞. Ferri lactat. ʒi. (4 *grammes.*)
Aquæ destillat. bullient. ℥viss. (200 *grammes.*)
Sacchar. alb. ℥xiij. (400 *grammes.*)

M. Cap considers the use of this syrup to be more convenient than that of the lozenges, because the ferruginous taste does not remain so long in the mouth.

Pilulæ ferri lactatis.

Pills of lactate of iron.

℞. Ferri lactat.
Althææ pulv. ää. gr. xvss. (1 *gramme.*)
Mellis q. s. ut fiant pil. xx.

Chalybeate bread has been administered in one of the largest hospitals of Paris to chlorotic patients, and with the best effects. From four to five grains of lactate of iron may be mixed with every three and a half ounces of bread, without giving it any unpleasant taste or injuring its quality.[1]

LXXXVII. FERRI NITRAS.

Synonymes. Ferri Pernitras, Ferrum Nitratum seu Nitricum Oxydatum, Nitras Ferri, Nitras Ferricus, Nitrate of Iron, Pernitrate of Iron.
French. Nitrate de Fer.
German. Salpetersaures Eisenoxyd.

LIQUOR FERRI PERSESQUINITRA'TIS.

Synonymes. Liquor seu Solutio Nitratis seu Pernitratis Ferri, Liquor Ferri Nitrici Oxydati, Solution of Persesquinitrate of Iron, Solution of Nitrate of Iron.

METHOD OF PREPARING.

This preparation, which has been introduced of late years into practice, may be formed in the following manner:

Take of small chips or pieces of *Iron wire*, an ounce and a half; *Nitric acid*, three ounces by measure; *Water*, twenty-seven ounces; *Muriatic acid*, one dram. Put the iron into an earthenware vessel, and pour on the nitric acid, previously diluted with fifteen ounces of the water. Set the vessel aside till the whole of

[1] Provincial Medical and Surgical Journal, June, 1841.

the acid has united with the iron, so as to form a persesquinitrate; then decant the liquid from the portion of iron, which remains undissolved; strain, and filter. Add the muriatic acid with the remainder of the water, or with as much of that liquid as will increase the whole solution to thirty ounces. When the process is finished—which takes some hours—the liquid has a red colour, so dark, that when viewed by reflected light, it seems almost black.

Three ounces of nitric acid of the usual strength (1.4) generally dissolve an ounce of iron, so that when the process is completed, a portion of the metal remains undissolved. The solution then consists entirely of persesquinitrate of iron; and, if speedily decanted, it may be preserved in that state; but if allowed to stand for a few hours longer on the iron, it will undergo a farther change, becoming gradually converted into pernitrate and protonitrate of iron. The first of these is insoluble, and renders the liquid turbid; and the latter, which remains dissolved has not the medicinal properties that render the persesquinitrate valuable. When the solution contains nothing but nitric acid and peroxide of iron, it slowly undergoes decomposition on standing, so that, at the end of a few weeks, the whole liquid begins to become turbid. The addition of some muriatic acid prevents this decomposition, and the quantity sufficient for this purpose is too small to affect the medicinal powers of the persesquinitrate. The solution, when properly prepared, is of a beautiful dark red colour, when viewed with transmitted light. Its taste is very astringent, and not at all caustic.[1]

A formula, since given by Mr. Kerr, is the following. Take of *Iron wire*, (No. 17,) one ounce; *nitric acid*, three fluidounces; *water*, fifty-seven ounces; *muriatic acid*, a dram. Mix the nitric acid with fifteen ounces of water in an earthen vessel, capable of holding three or four times the quantity. Put into this the iron wire broken into a number of pieces: cover the vessel lightly. In eight or twelve hours, the solution must be poured off, and the remainder of the water, with the muriatic acid, be added.

The formula admitted into the last edition of the Dublin Pharmacopœia[2] is the following. Take of fine *Iron wire*, free from rust, ℥j, (avoirdupois;) pure *nitric acid*, three fluidounces; *distilled water*, a sufficient quantity. Into the acid first diluted with ℥xvj. of the water introduce the iron wire, and leave them in contact until gas ceases to be disengaged. Filter, and add as much water as will make the bulk one pint and a half. (f ℥xxx.)

[1] Kerr, in American Journal of the Medical Sciences, for May, 1832, cited from the Edinb. Med. and Surg. Journal.

[2] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850, p. 88. Dublin, 1850.

EFFECTS ON THE ECONOMY.

This preparation greatly resembles solution of chloride of iron in its medicinal properties. Mr. Kerr considers, that to an astringent power it unites that of diminishing the *irritability and tenderness of the mucous membranes* with which it comes in contact; and, of late, he has called attention to it as a remedy in *cholera*.[1] In *chronic diarrhœa* an experience of eighteen years has proved its great value; but he has not found it serviceable where ulceration of the bowels is present; and, therefore, he thinks it not applicable in the *diarrhœa of phthisis*. Kopp administered it with the greatest success in many cases of *chronic diarrhœa*, that had resisted every approved remedy. The fæces were blackened by it, as by the preparations of iron in general. He remarks that it must be continued for some time. The dose he gave was ten drops several times a day in oatmeal gruel, and this was gradually raised to twenty and twenty-five drops. When the cure was accomplished, the remedy was gradually diminished, until it was left off altogether.[2] Dr. Graves[3] speaks in equally high terms of the persesquinitrate in these cases; and Dr. T. C. Adam, of Lenawee County, Michigan, has recorded the remarkable assistance which he has derived from its use in the treatment of several diseases, especially *diarrhœa* and other *affections of the mucous membranes accompanied by discharges*.[4] In *chronic diarrhœa*, depending mainly on an excess in the sensibility of the organic nerves which supply the digestive tube, Dr. Adam rarely orders less than fifteen drops at the commencement, and after a few days' employment of the remedy, he increases the quantity to twenty, twenty-five, and thirty drops. In *leucorrhœa*, occurring in such as are pale, exanguious, feeble, and languid, the internal, conjoined with the external, use of the persesquinitrate has been found very advantageous. In these cases, Dr. Adam adds such a quantity of water as a diluent as will still leave in the vagina a gentle degree of heat or smarting. Dr. Adam recommends it, also, in cases of *aphthous sores;* and he affirms that its application has afforded relief in *toothach*. Dr. J. W. Williams[5] employed it successfully in the *diarrhœa* and *intestinal hemorrhage* of *typhoid fever*.

Mr. Kerr gave it in a case of *urticaria*, which yielded speedily, after having resisted other remedies. He found it also potent in allaying *hiccough*.

It is, doubtless, a powerful astringent, but it is questionable whether it possesses any advantage over the tincture of chloride of iron.

[1] Monthly Journal of Med. Science, Jan. 1848.
[2] See, also, Twining on the Diseases of India, i. 217. Calcutta, 1835.
[3] Clinical Lectures, Amer. Med. Library edition, p. 128. Philad. 1838.
[4] Amer. Journal of the Medical Sciences, May, 1839, p. 61.
[5] Boston Med. and Surg. Journal, April 7, 1841.

LXXXVIII. FERRI OXIDUM HYDRATUM.

Synonymes. Ferri Sesquioxidum Hydratum, Ferrugo, Hydras Ferricus, Ferrum Oxydatum Hydratum, F.O. Hydricum, Oxidum Ferri seu Ferricum Hydratum, Hydro-oxide of Iron, Hydroxide of Iron, Hydrated Oxide of Iron, Hydrated Peroxide of Iron, Hydrated Tritoxide of Iron, Hydrated Sesquioxide of Iron, Oxyhydrate of Iron.

German. Eisenoxydhydrat, Wasserhaltiges Eisenoxyd.

Hydrated oxide of iron has been introduced into practice as an antidote to white arsenic. Dr. Bunsen, of Göttingen, had already made frequent experiments with it, which satisfied him, that it was an efficacious agent; but, along with Dr. Berthold,[1] he subjected it to fresh trials. The results of their investigations were published, and since then it has received attention every where.

METHOD OF PREPARING.

The best mode of preparing it, according to Dr. Bunsen, is to take a solution of *pure sulphate of iron*, increase the dose of oxygen by treating it with *nitric acid*, and precipitate the oxide by adding *pure ammonia* in excess,—washing the precipitate. In order not to deprive the precipitate of its water, and to diminish its loose state of aggregation as little as possible, it is not filtered, but is put aside for a few days, until the precipitate is wholly deposited, after which the supernatant fluid is poured off. It is then kept in well-stopped vessels.

Riecke[2] has added the formula for *pharmaciens*, which is recommended by Von Spécz:—

℞. *Vitrioli ferri puri crystallizati* libram; teratur in pulv. subtiliss. et detur in vas. porcellan. aut murrhinum, impositum balneo arenæ; dein adde *acidi nitrici concentrati* lbss.; terantur ope baculi vitrei usque dum massa resolvitur in pultem; nunc, igne animato, massæ pultaceæ calidæ affunde sensim terendo, sensim *acid. nitric. concentrat.* q. s. donec nullum amplius evolvatur gas nitrosum. Massa tunc leni igne evaporetur ad siccitatem et solvatur demum in aq. destill. q. s.; solutioni filtratæ instilletur *ammoniæ puræ* q. s. donec præcipitatio cesset; stent nunc per horam unam alteramve et liquor limpidus à sedimento bruneo decantetur; massæ residuæ fundum petenti adfunde *aq. destillat.* lbiij. et agitentur; nunc filtra, et præcipitatum in filtro aq. destill. q. s. edulcora donec aqua insipida defluat. Præcipitatum bene edulcoratum in umbrâ siccatum convertat. in pulv. subtilissim. qui servetur vase vitreo bene clauso.[3]

[1] Das Eisenoxydhydrat ein Gegengift der arsenigen Säure. Götting. 1834.

[2] Die neuern Arzneimittel, S. 227. Stuttgart, 1837.

[3] "Take of *pure crystallized sulphate of iron* a pound; rub it into a subtle powder, and place it in a porcelain or glass vessel in a sand-bath; then add half a pound of *concentrated nitric acid;* stir them with a glass rod until the mass is resolved into a soft paste; then—the fire being raised—pour gradually on the hot pultaceous mass *concentrated nitric acid*, until no more nitrous gas is evolved. Let the mass be evaporated by a gentle heat to dryness, and at last be dissolved in a sufficient quantity of distilled water. Into the filtered solution drop *pure ammonia* so long as any precipitate occurs; let it now stand for an hour or two, and then pour off the limpid liquor from the brown sediment. On the residuary mass remaining at the bottom, pour three pounds of distilled water, and shake them together: filter and wash the precipitate on the filter with distilled water, until the water is tasteless. The well-washed precipitate dried in the shade forms a subtle powder, which may be kept in a well closed vessel."

Lassaigne advises it to be prepared as follows:—Take *iron filings;* pour gradually upon them four times their weight of the *nitric acid of commerce* in small portions. Heat is thereby developed, and deutoxide of nitrogen, which is transformed by the atmospheric air into nitrous acid vapours. When the evolution of gas has ceased, ten or twelve parts of *water* are added; the mixture is then filtered, and *ammonia* added until the mixture begins to exhibit an alkaline reaction. The precipitate, thus formed, is the hydrated oxide of iron, which is collected on the filter, and washed with *boiling water* until it is tasteless, and ceases to exhibit any alkaline characters.

The mode of preparation recommended by Majesté, agrees with this, except that he boils one part of *iron filings* with four of *nitric acid* and four of *muriatic acid.*

The following form was advised by the late Dr. William R. Fisher,[1] who asserted that it was subjected to practice by Mr. Durand, an able *pharmacien* of Philadelphia, who obtained a perfect result, with a satisfactory economy of material. Take of *sulphuric acid,* (67° Baumé,) 8 oz. or 16 parts; *iron wire,* 8 oz. or 16 parts; *nitric acid,* (49° Baumé,) 5½ oz. or 11 parts; *water of ammonia,* as much as is sufficient; *water,* a gallon and a half, or 384 parts. Mix the sulphuric acid with the water in a glass vessel. Add the iron, and, after the effervescence has ceased, filter. Add the nitric acid in divided portions, and apply heat so long as orange-coloured fumes are given off. To the heated solution, pour in the water of ammonia until a decided excess has been added; then wash the precipitate by decantation, until the washings give no precipitate with nitrate of baryta. The water is then to be drawn off until just enough remains to give the consistence of thick cream.

It has been supposed that this preparation is not injured by keeping; but some careful experiments by Mr. Wm. Procter, Junr.,[2] show, that even when kept under water its power of neutralizing arsenious acid gradually decreases; that if kept in the form of a thick magma, it will retain its properties longer than when mixed with much water; and that this decrease of power is probably owing to a change in the relative proportion of the oxide, and the water chemically combined with it, as well as to an alteration in its state of aggregation. Mr. Procter advises, that a ferruginous solution similar to that directed in the United States Pharmacopœia should be kept in every shop as a source for obtaining the peroxide; that the solution of ammonia should be added to it when the demand occurs, and the peroxide be separated in the manner advised in the Pharmacopœia. In this mode the first doses may be given in ten or fifteen minutes. In

[1] American Journal of Pharmacy, vol. vi. No. 1, April, 1840.
[2] Ibid. April, 1842, p. 37.

the mean time, however, the moist peroxide prepared according to the Pharmacopœia should be given, and if recently prepared it may be sufficient; but for the reasons adduced by Mr. Procter it is advisable that the recent oxide should always be administered, especially where the amount of poison taken has been large.[1]

The form for this preparation admitted into the last edition of the Pharmacopœia of the United States (1842,) is the following: Take of *Sulphate of iron*, ℥iv.; *Sulphuric acid*, f ʒiijss.; *Nitric acid*, f ʒvj., or a sufficient quantity; *Solution of ammonia*, a sufficient quantity; *Water*, Oij. Dissolve the sulphate in the water, and, having added the sulphuric acid, boil the solution; then add the nitric acid in small portions, boiling the liquid for a minute or two after each addition, until the acid ceases to produce a dark colour. Filter the liquid, allow it to cool, and add solution of ammonia in excess, stirring the mixture briskly. Wash the precipitate with water, until the washings cease to yield a precipitate with chloride of barium, and keep it in close bottles with water sufficient to cover it.[2]

EFFECTS ON THE ECONOMY.

If a solution of arsenious acid be decomposed by freshly precipitated oxyhydrate of iron suspended in water, traces of arsenic can no longer be detected in the filtered liquid made acid and tested by a stream of sulpho-hydric acid gas. To throw down one part of arsenic, in this manner, requires a quantity of the oxyhydrate, which contains at least ten or twelve parts of oxide of iron. Yet, even where a smaller quantity is employed, the arsenious acid is almost wholly separated, as a stream of sulpho-hydric acid gas affords only very slight traces of sulphuret of arsenic in the filtered and acidulated liquid. When the substances are previously heated, or the arsenious acid is exposed in small portions to the precipitating agent, the reaction is still slighter. If a few drops of ammonia be added to water in which the oxyhydrate of iron is suspended, and the mixture be digested with finely powdered arsenious acid, an insoluble arsenite of iron is formed; a circumstance, which would encourage the belief—even had it not been sanctioned by experience—that freshly prepared oxyhydrate of iron may serve as an antidote to arsenic;—the union between it and arsenious acid forming—as has been seen—an insoluble compound, devoid of all poisonous influence on the economy, and only exciting gastric oppression when given in large doses.

Accurate microscopical investigation, in experiments on animals that had taken arsenious acid in the solid form mixed with the oxyhydrate, exhibited to the discoverer of the antidote, that

[1] Procter, loc. citat.
[2] Pharmacopœia of the United States, p. 112. Philad. 1842.

under the influence of animal heat and the peristaltic motion, it had become completely converted into subarseniate of protoxide of iron, and thus rendered innocuous. Such was the result of the observations of Boulet,[1] Orfila, Chevallier, Lassaigne, Soubeiran and Miquel,[2] Nonat, Borelli and Demaria,[3] Lesueur, Boulay, fils,[4] Monod,[5] Von Spécs, Mackenzie,[6] D. Maclagan,[7] and others.[8] On the other hand, the experiments of Brett,[9] Reginald Orton,[10] and Cramer, were unfavourable; but Messrs. Bunsen and Berthold remark, that the experiments of those gentlemen could not be expected to be successful, as they were made with doses of arsenic of from two to nine grains; and the stomach of the rabbit cannot retain more than from one-ninth to one-half the quantity of the antidote, prepared according to their formula, which is necessary to neutralize that quantity of the poison.[11]

Messrs. Bunsen and Berthold, from the results they have obtained, recommend the oxyhydrate as the chief antidote in all cases of *poisoning by arsenic;* and they advise emetics to be associated with it—along with the agents hitherto employed; first, when the quantity of the poison taken has been considerable, and, therefore, a very large quantity of the antidote is demanded; secondly, when, at the same time, substances containing tannic acid, as infusion of green tea, or sulpho-hydric acid developed after the eating of eggs, may be suspected in the alimentary canal,—as these substances are closely related to the antidote, and may weaken its action; and, thirdly, when, prior to taking the poison, the stomach has been overloaded with food, and is, therefore, capable of receiving only a small quantity of the antidote. But, whether vomiting may be excited or not, recourse must be had to the oxyhydrate as speedily as possible. Tepid mucilaginous drinks may also be given to envelop the particles of arsenic that may exist in the compartments of the stomach. If the quantity of the poison taken be unknown, the antidote may be administered in a considerable dose, and if the patient should vomit, it may be given afterwards in smaller quantity. But, if no vomiting should arise, it is recommended that he should continue to take the oxyhydrate until the arsenite of iron formed has had time to pass into the intestinal tube; and even after this it may be persevered with in small doses for a time, as portions of arsenic may possibly remain behind unchanged. With the same view, the oxyhydrate may be thrown up

[1] Gaz. Méd. de Paris, 1834.
[2] Bullet. Général de Thérap. Dec. 1834.
[3] Br. and For. Med. Rev. April, 1836, p. 594.
[4] Journal Hebdom. des Progrés des Sciences Médic. 14 Mars, 1835.
[5] Gazette Médicale, 22 Août, 1835, and Annales d'Hygiène, &c. xiv. 135.
[6] London Lancet, April 4, 1840.
[7] Edinb. Med. and Surg. Journal, July, 1840.
[8] T. R. Beck, Amer. Journ. of the Medical Sciences, July, 1841, p. 90.
[9] London Medical Gazette, xv. 220.
[10] Lancet, No. 8, 1834.
[11] See, also, Maclagan, op. cit.

in the way of clyster, whenever it is presumable that the compound, formed by the oxyhydrate and the arsenic, has reached the lower portion of the bowels. To aid this, cathartics may be administered. Of these, castor oil, which would first suggest itself, might interfere, it has been conceived, with the operation of the antidote. Sulphate of magnesia, or any of the neutral salts, should have the preference.

The antidote may be given suspended in water. Experience has shown Messrs. Bunsen and Berthold, that from ten to twenty parts of hydrated oxide of iron are more than sufficient to convert one part of arsenious acid into the basic salt of iron.

As the quantity of arsenic in the stomach and intestines can scarcely ever be appreciated, it is considered by them advisable, to allow the patient to take as large doses of the oxyhydrate as the stomach can tolerate; and it is of essential importance that it should be taken as hot as it can be borne. When the arsenious acid has been swallowed in the undissolved state—in the form of powder, or in larger or smaller pieces—it is necessary, in order to aid its solution, and to effect a speedy union with the oxide of iron, to add a small quantity of pure ammonia to the antidote, until a slight alkaline re-action is evinced. As the ammonia does not enter into the composition of the salt formed, and, consequently, only plays a secondary part, ten or twenty drops may be sufficient for the purpose. In the uncertainty as to the precise quantity of poison that has been taken, it has been recommended, that to an adult a table-spoonful, and to children a dessert-spoonful should be given every five or ten minutes until relief from the urgent symptoms is obtained.[1]

The various experiments that have been instituted on animals have shown the protective power of the hydrated oxide: it must be borne in mind, however, in all such experiments made on dogs, that they readily reject the poison by vomiting; but if the poison be retained in the stomach by a ligature passed round the œsophagus, it exerts its accustomed deleterious effects.[2] It would seem, also, that the same result occurs if the dose of the arsenic be too small to induce vomiting. The animal may then die of the poison.[3]

It would appear, that cases have occurred, in which this antidote has saved the lives of some who might have been destroyed without its agency. Buzorini[4] had a case in which about thirty-five grains of arsenic had been swallowed, and where it was successful, although twenty-four hours had elapsed since the poison had been taken; but this cannot be regarded as very satisfactory,

[1] T. R. Beck, Amer. Journ. of Med. Sciences, July, 1841, p. 95.

[2] MM. Miquel and Soubeiran, Bullet. Général de Thérapeutique, Dec. 1834. See, on this subject, Dr. Joseph E. Muse, in Amer. Med. Intelligencer, for April 2, 1838.

[3] Robert B. Hall, in Amer. Med Intelligencer, for Sept. 15, 1838, p. 181.

[4] La Lancette Française, Nov. 17, 1835.

inasmuch as the patient might probably have been saved by ordinary means. In another case, which was also treated by the antidote at a late period, marked alleviation of the suffering was induced. Three cases are related by Majesté, two by Bineau,[1] one by Benoist, and one by Geoffroy[2] of Paris, which were treated successfully in the same manner. The subject of the last was a hairdresser, thirty-five years of age, who, in a paroxysm of delirium tremens, swallowed a dram and a half of arsenic. Half an hour afterwards, the antidote was given suspended in water. He drank, in twelve hours, all the hydrated oxide produced by the decomposition of five ounces and five drams of the sulphate of iron. He had no violent colic; and, twenty-four hours afterwards, experienced scarcely any uneasiness. A successful case has, also, been related by Mr. John Robson, house-surgeon to the Warrington Dispensary.[3]

Dr. Richard H. Thomas, of Baltimore,[4] has published a case, in which it was believed that twenty grains of arsenic had been taken, which was relieved by the hydrated oxide, administered six hours after the poison was swallowed: there was no vomiting; but thirst, burning pain, and exquisite tenderness at the epigastrium existed, denoting endo-gastritis. Half a fluidounce of hydrated oxide, which was in the wet state, and about the consistence of thick cream, was given in a tumbler of cool water, and the dose was directed to be repeated every ten or fifteen minutes in two ounces of water, eight ounces of the suspended oxide were taken in the twenty-four hours, after which the patient seemed free from disease. "The length of time—six hours"—says Dr. Thomas, "before any very severe symptoms supervened, and before the antidote was administered, at first caused me to think that the patient might have been deceived. Professor Von Spécs, of Vienna, however, asserts, 'that a dram of arsenic, in powder, does not produce its deadly effect on the system in less than six or eight hours, while the same quantity, dissolved in warm water, destroys life in a much shorter time.' In the present instance, it was swallowed in a dry state, covered with sugar. The prompt relief which followed the exhibition of the peroxide is also confirmatory of the impression that the poison was really taken."

A case has been published by M. Deville,[5] which was treated by this remedy, but as the patient vomited much, and the vomited matters were not examined, it is doubtful what was its agency.

[1] Journal des Connaissances Médico-Chirurgicales, Nov. 1835.

[2] Journal de Méd. et de Chirurg. Pratiq. Sept. 1835; cited in Brit. and For. Med Rev., April, 1836, p. 572.

[3] Lond. Med Gaz. Nov. 5, 1836.

[4] American Medical Intelligencer, for July 16, 1838, p. 167.

[5] Revue Médicale Franç. et Etrangère, Sept. 1838; see, also, Br. and For. Med. Rev. and Johnson's Med.-Chir. Rev. for April, 1839; and Amer. Journ. of the Med. Sciences, May, 1839, p. 243.

Between five and six hours elapsed before it could be procured. These remarks apply still more forcibly to a case reported by Dr. Chāloner,[1] the subject of which took at eight o'clock, P. M. about half an ounce of arsenic, after which he vomited incessantly, and did not take the hydrated oxide until three P. M. on the day following. He got well; and the vomiting appeared to be relieved by it. More recently, several cases of the successful exhibition of the hydrated oxide have been published; one by M. Ansroul, of Brussels;[2] seven by Puchelt,[3] of Heidelberg; one by Dr. Macdonald;[4] one by Dr. Chilton;[5] and one by Dr. Murray,[6] of India, Drs. Smiley and Wallace,[7] of Philadelphia, administered it to a family of eight persons. Death followed in two cases. The antidote could not be retained by them, but was rejected immediately. In all the other cases, which recovered, the symptoms were mitigated.

As recommended in the Pharmacopœia of the United States, the hydrated oxide should be kept in the shops, ready mixed with a definite quantity of water, in order that it may be always at hand, so as to be administered without delay; and the recommendation is good. Even if not to be trusted to alone, the evidence is quite sufficient to show, that it ought to be regarded as an important element in the treatment of every case in which arsenic has been taken.

A commission of the Académie Royale de Médecine,[8] composed of MM. Deville, Sandras, Nonat and Guibourt, recommend that four ounces of dry hydrated oxide of iron, the subcarbonate of iron of the shops, or sesquioxide of iron, should be suspended in twenty-four ounces of water, and a good glassful of the mixture be taken every ten minutes. After four ounces are consumed, fresh doses of the same mixture may be administered in like manner, and the patient should not be considered out of danger, until he has taken at least half an ounce of the peroxide for each grain of arsenious acid supposed to have remained in the stomach.

Instead of pure hydrated oxide, Von Spécs[9] employed substances in which the peroxide is known to exist in considerable quantity, and which require no previous preparation, as rust of iron, and hæmatite, (*red iron ore*,) and, from his experiments, he is led to conclude that although these substances do not prevent

[1] Medical Examiner, April 18, 1840, p. 251.

[2] Annales de la Société de Médecine de Gand, Avril, 1840, cited in Encyclographie des Sciences Médicales, Mai, 1840, p. 494.

[3] Heidelberg Medicinisch. Annal. B. v.; cited in Encyclographie des Sciences Médicales, Mai, 1840.

[4] New York Journal of Med. and Surg. iii. 205.

[5] Ibid. p. 54.

[6] Calcutta Med. Journ. Dec. 1837, cited in Amer. Journ. of the Med Sciences, Feb. 1839, p. 503.

[7] Philad. Med. Examiner, iii. 679.

[8] Revue Médicale, Mai et Juin, 1839.

[9] Med. Jahrbücher des k. k. ö. St., B. xix. S. 621. Wien, 1836; and Ibid. B. xx. S. 149. Wien, 1836. Cited in Brit. and For. Med. Review, July, 1837, p. 237.

all the bad effects of arsenic on the system, they may—in the absence of the hydrated oxide—be employed as antidotes to that poison. The rust of iron has the advantage of being readily procurable.

A case has been published by M. Batilliat,[1] which induced him to infer, that the hydrated oxide, dried in the air, is as efficacious as that which is kept moist. It certainly would seem that the dry hydrated oxide—the *Ferri Subcarbonas* of the Pharmacopœia of the United States, (1842,)—possesses the power to a considerable extent, of neutralizing arsenious acid;[2] and hence it ought to be used in the absence of the moist and fresh preparation. The latter, however, as already remarked, may be obtained in a condition fit for use in ten or fifteen minutes, by using a solution of the persulphate of iron.[3] The experiments of M. Guibert[4] would seem to show, that the subcarbonate of iron, as ordinarily prepared, is about three times less active in neutralizing arsenic than the dry hydrate prepared with ammonia, and six times less active than the same hydrate in the moist state.

A case has been reported by Dr. Späth, of Esslingen,[5] in which the hydrated oxide was administered as an antidote to Scheele's green—*Arseniate of Copper*. A boy, three years of age, poisoned himself by licking a shell covered with the poison. Half an hour afterwards, he became pale: violent vomiting soon came on, with diarrhœa, pain in the abdomen and burning thirst. The hydrated oxide was given in divided doses in warm water, and in half an hour the vomiting, diarrhœa, colic and thirst ceased, and the next day all the symptoms had disappeared.

LXXXIX. FERRI PROTOCAR'BONAS.

Synonymes. Ferri Carbonas, Protocarbonate of Iron, Carbonate of Iron.
French. Protocarbonate de Fer.
German. Kohlensaures Eisen.

Precipitated carbonate of iron contains but little carbonic acid, —the remainder being chiefly peroxide of iron. The name has indeed been changed—in the last London Pharmacopœia—to "sesquioxide of iron." The protocarbonate readily absorbs oxygen, and, consequently, becomes converted into the sesquioxide; and this is an objection commonly urged both against the *Mis-*

[1] Journal de Chimie Médicale, Janvier, 1840. [2] T. R. Beck, loc. citat.
[3] W. Procter, Junr., Amer. Journ. of Pharmacy, April, 1842, p. 37, and the Report of the Committee of the College of Pharmacy on his paper, Ibid. p. 39.
[4] Bullet. Général de Thérap., Dec., 1841, cited in Amer. Journal of the Med. Sciences, Oct., 1842, p. 490.
[5] Journal des Connaissances Médico-Chirurg., Mars, 1840. Archives de Médecine, Février, 1842; cited in Journal de Pharmacie, Mars, 1842, p. 269.

tura Ferri Composita, and the *Pilulæ Ferri Compositæ*, of the Pharmacopœias. M. Vallet has discovered a method of obviating the objection, which consists in mixing the protocarbonate with saccharine matter.

METHOD OF PREPARING.

The following method is given by Mr. Procter[1] as a simplification of M. Vallet's process. Take of *Protosulphate of iron*, (pure,) sixteen parts; *Carbonate of Soda*, (crystallized,) nineteen parts; *Pure honey*, nine parts; *Syrup*, a sufficient quantity. Dissolve the sulphate in half a gallon of water, at the temperature of 180° Fahrenheit, and the carbonate of soda in a like quantity; to each of these solutions add four ounces of syrup; and then mix them in a jar, which should afterwards be entirely filled with sweetened water, and the access of air be prevented. After the precipitate has subsided, decant the supernatant fluid, and wash it with sweetened water, in the jar, until deprived of the adhering sulphate of soda. After the carbonate is thus purified, throw the precipitate on a flannel cloth; express forcibly, and mix it with the honey. The mixture should then be reduced by evaporation as rapidly and carefully as possible, to a pilular consistence. The mass constitutes the "*Ferruginous Pills*" of M. Vallet.

The following form, founded on the above, has been introduced into the Pharmacopœia of the United States, (1842.)

Pilulæ ferri carbonatis.

Pills of carbonate of iron.

(*Vallet's Ferruginous Pills.*)

Take of *Sulphate of iron*, ℥iv.; *Carbonate of soda*, ℥v.; *Clarified honey*, ℥iiss.; *Syrup*, *Boiling water*, each a sufficient quantity. Dissolve the sulphate of iron and carbonate of soda, each, in a pint of the water, and to each solution add a fluidounce of syrup; then mix the two solutions in a bottle just large enough to contain them, close it accurately with a stopper, and set it by that the carbonate of iron may subside. Pour off the supernatant liquid, and having washed the precipitate with warm water, sweetened with syrup in the proportion of a fluidounce of the latter to a pint of the former, until the washings no longer have a saline taste, place it upon a flannel cloth, and express as much of the water as possible; then immediately mix it with the honey. Lastly, heat the mixture by means of a water bath, until it attains a pilular consistence.

A formula for the Ferri Carbonas Saccharatum is introduced into the last edition of the Edinburgh Pharmacopœia. On the continent of Europe the preparation is known under the name

[1] Amer. Journ. of Pharmacy, Jan., 1839, p. 272.

of Klauer's *Ferrum Carbonicum Saccharatum.*[1] It is in the Pharmacopœia of Baden.[2]

When prepared in this manner, the protocarbonate has a dark olive colour, strong ferruginous taste, contains about 30 *per cent.* of protoxide of iron, and, if carefully prepared, dissolves wholly and directly in acids.

EFFECTS ON THE ECONOMY.

The pills of M. Vallet have been prescribed in most of the diseases in which chalybeates in general are considered to be indicated; and especially in *chlorosis* and *amenorrhœa.*[3] It has been affirmed, that in cases in which the alterative effects of iron are proper, Vallet's preparation is superior to any other derived from that metal.[4] This can only be decided therapeutically; and as yet the trials have been too few. The author has exhibited it freely, but has not had reason to assign it any pre-eminence. It is certainly preferable to any other form of preparing the protocarbonate for medical use, in consequence of its stability, but it has to be determined, whether the conversion into the sesquioxide renders it less efficacious as a medicine. Blaud, as will be seen presently, says distinctly not. Fifteen grains of this preparation have been observed to occasion sickness; and ten grains, twice a day, have produced headach and a sense of fulness in the head.[5] The author has never witnessed such effects from its administration.

MODE OF ADMINISTRATION.

The mass of pilular consistence, described above, may be made up into pills, each weighing three grains, and containing somewhat less than a grain and a half of proto-carbonate. They may be given to the extent of eight or ten pills daily, and be continued for weeks, if necessary.

A medicine which greatly resembles the *Pilulæ Ferri Compositæ* of the Pharmacopœias, and in which the iron, when it is newly prepared, is in the state of protocarbonate, has acquired great celebrity in the south of France on account of its beneficial effects in *chlorosis.* It is given in the form of pill, and is called after its inventor,—M. Blaud, senior physician to the Hospital of Beaucaire,—"BLAUD'S PILLS." Blaud's formula for the preparation of his pills is as follows:—Take of *Gum tragacanth*, in powder, six grains; *Water*, one dram. Macerate in a glass or

[1] Pereira, Elements of Materia Medica, &c., 2d edit., p. 861. London, 1842, or 2d Amer. edit. Philad. 1846.

[2] Oesterlen, Handbuch der Heilmittellehre, S. 457. Tübing. 1845.

[3] Soubeiran, Rapport sur les nouvelles pilules ferrugineuses de M. Vallet, in Bulletin Général de Thérapeutique, Mai, 1838, cited in Amer. Journ. of Pharm., x. 244. See, also, Berthemot, in Bull. Général de Thérapeut. Juillet, 1839.

[4] Wood and Bache's Dispensatory of the United States, 8th edit. Phila. 1849.

[5] Christison, Dispensatory, p. 426. Edinb., 1842.

porcelain mortar, until a thick mucilage is formed; and if it be desired to prevent the formation of peroxide of iron, and to make the pills similar to those of Vallet, substitute—says M. Blaud—a dram of powdered sugar for the mucilage. Add, afterwards, of *Sulphate of iron*, in powder, half an ounce. Beat well, until the mixture is quite homogeneous; and add, of *Carbonate of potassa*, half an ounce. Beat until the mass, which soon becomes of a yellowish-green colour, passes to a deep green, and assumes a soft consistence. Divide into 48 pills or boluses; which M. Blaud considers sufficient for the cure of a chlorotic patient.[1] M. Guibourt substitutes the bicarbonate for the simple carbonate or subcarbonate; and he gives as reasons: *First*, the avoidance of a very alkaline salt, an excess of which may prove prejudicial to the stomach; and, *Secondly*, the formation of a double carbonate of potassa and iron, which is, of all the compounds of iron, the most fitted for absorption by the economy, as it is not only soluble, but not astringent. His form is the following:—Take of pure crystallized *sulphate of iron*, crystallized *bicarbonate of potassa*, each four drams; powdered *gum Arabic*, one dram; powdered *marshmallows*, half a dram. Mix and divide in ninety-six pills.[2]

A proper objection made to Blaud's pills is their excessive size; and farther it has been urged, that a chemical change quickly occurs in the mass; the carbonate of the protoxide being, after a short time, converted into the sesquioxide of iron.[3] Blaud,[4] however, maintains properly, that the virtue of medicines cannot be appreciated from chemical experiments: "It is," he remarks, "to therapeutical trials, and not to chemical experiments that we must have recourse, to learn accurately the medical properties of any agent. What signifies it to practitioners that my pills contain little or no protoxide of iron, provided they cure chlorosis?" To prove that they do possess this power, Blaud adduces a long list of cases in which a cure was obtained in three or four weeks. To prevent, however, the change to which the chemists object, but which Blaud appears rather to regard with favour, M. Adorne has suggested the addition of sugar, and the pulvis althææ according to the following form:—Take of *Sulphate of iron*, recently prepared, according to the method of Bonsdorff,[5] which is a pure sulphate; *Carbonate of potassa*, or, what is better, *Carbonate of soda; Powdered root of marshmallow* and *Sugar*, each, half an ounce; *Mucilage of gum Arabic*, as much as is sufficient.—Make into ninety-six pills, which must be covered with a very fine layer of gum and sugar, aromatized with essential oil, to correct the disagreeable odour.[6] With similar views, M. Simonin,

[1] Revue Médicale, Mars, 1832, Dec. 1838.
[2] Pharmacopée Raisonnée, i. 383; cited in Amer. Journ. of Pharm., April, 1839, p. 61.
[3] Soubeiran, Bull. Général de Thérap., Mai, 1838. [4] Ibid.
[5] See Wood and Bache's Dispensatory, 4th edit., p. 906. Phila., 1839.
[6] Bulletin Médical du Midi, Janvier, 1839; cited in Encyclographie des Sciences Médicales, Mars, 1839.

of Nancy, has proposed the following formula for the preparation of Blaud's pills, which, he considers, has the double merit of prompt and easy execution, and of furnishing pills which keep without undergoing alteration. Take of *Protosulphate of iron* and *Pure carbonate of potassa*, each equal parts. Reduce them separately to a fine powder; mix accurately by triturating them together until they begin to liquefy; then add enough clarified honey to give the mixture complete liquidity: afterwards, heat the mass over a very gentle fire, until it has acquired the pilular consistence. This process was repeated by M. Felix Boudet,[1] by employing pure crystallized sulphate of iron, 100 *grammes;*[2] pure carbonate of potassa, 100 *grammes;* white honey, 50 *grammes;* from which he obtained 130 *grammes* of a deep green mass, very ductile, and easily rolled into pills, as M. Simonin had said. The addition of the honey prevents the farther oxidation of the iron.

Dr. W. H. Robert, of Madison, Georgia,[3] who considers Blaud's pills to be a capital remedy in chlorosis, the best he has ever used, recommends that after pulverizing the sulphate of iron and the carbonate of potassa, they should be mixed intimately, and be formed into a pilular mass with freshly made corn bread. If fluid be added, the mass will be entirely too soft to be divided into pills.

M. Blaud commences with his "antichlorotic pills," in the dose of one a day; and, in the course of a few days, gives two, and afterwards, three, daily.

Mr. Donovan[4] recommends the protocarbonate of iron to be administered in the following manner, for extemporaneous use:—*Blue sulphate of iron*, in fine powder, half an ounce; *Calcined magnesia*, two scruples; *Water*, six ounces; *Tincture of quassia*, two drams. Divide into six draughts, one to be given night and morning.

Mr. Carmichael,[5] of Dublin, has advised the following mode of exhibiting the precipitated carbonate:—Take one dram of *Bicarbonate of soda*, dissolved in four ounces of *Spring water*, and add a dram of *tincture of chloride of iron*. This draught to be taken three times a day during effervescence. Mr. Carmichael remarks, that although the quantity of carbonate of iron formed is not considerable, yet it is in such a state of minute subdivision, and combined with a solution of chloride of sodium equally minute—"the saline most congenial to the system of red-blooded animals, as it renders the hematosine active and vivifying," that, thus given, he always found it answer the object of a chalybeate much better than the large doses of from one to two drams

[1] Journal de Pharmacie, Mars, 1841, p. 153.
[2] A *gramme* is gr. 15.444 Troy.
[3] Southern Med. and Surg. Journal, July, 1846.
[4] Dublin Journal of Medical Science, March, 1840, p. 159.
[5] Dublin Medical Press, March 4, 1840.

of the subcarbonate. If ulceration existed, it was very generally improved; and he has seen many cases of *lupus* attacking the face cured by its joint internal and external use. He formerly thought the phosphate of iron, administered internally, possessed superior advantages to the carbonate; but now thinks the carbonate given during the precipitation answers every purpose of a chalybeate, without causing any derangement of stomach. Dr. Stegmann[1] has recommended the carbonate in the treatment of *hooping cough*, in the dose of half a grain at least, to be taken every three hours with sugar, and increased to as many grains as, and even more than, the number of years in the child's age. It should not, he advises, be administered in the first stage of the disease; and in all cases should be preceded by an emetic. Similar testimony is said to have been afforded by Ghisholme,[2] and recently it has been strongly advised by R. Froriep,[3] who gives it in the same doses in which it is prescribed in chlorosis, and has succeeded in removing the disease in two weeks, or, at the farthest, in six.

XC. FERRI SUBCAR'BONAS.

Synonymes. F. Carbonas seu Carbonas Præcipitatus, Ferrum Carbonatum Præcipitatum seu Carbonicum Oxydulatum, Oxydum Ferri Fuscum, Ferri Oxidum Rubrum seu Sesquioxidum, Deuto-carbonas Ferri Fuscus, Crocus Martis Aperiens, Subcarbonate of Iron, Sesquioxide of Iron, Peroxide of Iron.

French. Souscarbonate de Fer, Safran de Mars Apéritif.

German. Kohlensaures Eisenoxydul, Kohlensaures Eisen, Kohlensaures Eisenoxyd, Braunes Eisenoxyd.

This preparation, which is officinal in the British, United States and other Pharmacopœias, is formed by adding a solution of *carbonate of soda* to a solution of *sulphate of iron:* the precipitate is the subcarbonate, or—as it is now called in the London Pharmacopœia—the *sesquioxide of iron*, which must be washed with water, and dried.

EFFECTS ON THE ECONOMY.

Subcarbonate of iron possesses the properties of chalybeates in general, and has been highly recommended as a tonic, wherever such remedies are indicated. It is introduced here mainly on account of the favour which it has received, of late years, as a remedy for *neuralgia*. Nearly forty years ago, its use was strongly advised in *cancer* and *carcinomatous ulcerations of the uterus*, by

[1] Horn's Archiv., 1835, Juli and August, S. 651; and Medicin. Correspondenzz Blatt, cited in Gazette Médicale de Paris, 20 Juin, 1838.

[2] Trousseau and Pidoux, Traité de Thérapeutique, &c., 3me édit., i. 26. Paris, 1847.

[3] Tagsberichte, Märs, 1850, No. 48; cited in Keller and Tiedemann's Nordamerikanischer Monatsbericht für Natur und Heilkunde, Sept., 1850, S. 104.

Mr. Carmichael,[1] and, subsequently, by Rust, Völker, and Kopp; as well as in a case of *lupus of the ala nasi*, by Key:[2] but, in similar cases, it proved unsuccessful in the hands of Clarke, El. Von Siebold, Meissner, Richter, and others.[3] In *chronic nervous diseases, of a spasmodic nature*, and especially in *tic douloureux of the face*, it was first highly extolled by Dr. Benjamin Hutchinson, about thirty years ago,[4] who published several cases of cure effected by its agency. Soon afterwards, cases, equally fortunate in their termination, were published by various observers, by Drs. A. T. Thomson,[5] Stewart Crawford,[6] R. Macleod,[7] Mr. J. E. Beale,[8] and many others, and its efficacy is now almost universally admitted. Dr. Rowland[9] has often witnessed the most happy results from its exhibition, even after various powerful medicines had been tried in vain. Dr. Elliotson[10] published several cases, in which it had been efficacious in large doses; and he remarks, that *true chronic neuralgia*, not arising from cold, and coming on in a violent, stabbing, plunging form, aggravated by the least shake of the patient, and by touching the surface, is best treated by subcarbonate of iron. He observes, however, in a more recent publication,[11] that he does not recollect that he ever cured the disease, but in almost every case improved it, and caused it to disappear for a time. In one of the severest cases of neuralgia under the form of *hemicrania*, which the author ever witnessed, and which had rendered the patient's life miserable for years, the subcarbonate, in large doses, proved entirely successful. The patient had been bled repeatedly; and when the author saw her, she was under the most favourable circumstances for the exhibition of the remedy,—with the surface pale and cool; the pulse small; complaining much of debility, and yet suffering under the most intense headache, which the least light and noise rendered almost intolerable; yet, after she had persevered in the use of the remedy for a month, in large doses, the symptoms gradually disappeared, and she has since remained entirely well. It need scarcely be said, that where plethora exists, or febrile irritation supervenes, it must be removed: the subcarbonate rarely, however, disagrees with the stomach, and where it does, the inconveniences are removed by the addition of an aromatic, or the administration of a cathartic.

Subcarbonate of iron, in large doses, has, likewise, been found

[1] An Essay on the Effects of the Carbonate and other Preparations of Iron upon Cancer, 2d edit. Dublin, 1809. [2] Lancet, xiv. 92.

[3] Osann, in Encyclopäd. Wörterb. der Medicinisch. Wissensch. x. 424. Berlin, 1834.

[4] Cases of Tic Douloureux successfully treated. Lond. 1820.

[5] Medical and Physical Journal. Feb. 1823.

[6] Ibid. [7] Ibid. June, 1823. [8] Ibid. Sept. 1823.

[9] Treatise on Neuralgia, by Richard Rowland, M. D. p. 84. Lond. 1838; or the reprint in the author's American Medical Library.

[10] Medico-Chirurgical Transactions, xv. 161.

[11] Principles and Practice of Medicine, &c. by John Elliotson, M. D.; with Notes, &c. by Nathaniel Rogers, M. D. p. 507. Lond. 1839.

a valuable agent in a kindred condition of the nervous system—*chorea*. Dr. Elliotson[1] affirms, that he has had—he should suppose—forty cases, in succession, all cured by it; but perseverance in its use is demanded, the affection generally disappearing when the remedy has been given about six weeks or two months; but in some obstinate cases it has been necessary to continue it for twelve weeks.

Like other tonics, it has been prescribed in *intermittents*, and not long ago, M. Gimon,[2] physician at Thouars, published two cases elucidative of the effects of large doses in *long protracted intermittents, complicated with ascites and enlargement of the spleen*. One of these occurred in a boy, nine years old, and the other in a young man of twenty-one. Both had taken the sulphate of quinia, in large doses, but ineffectually. To the former, he prescribed twelve grains of the subcarbonate in the twenty-four hours, augmenting the dose by six grains daily. The treatment was commenced in the latter end of July, 1835, and the quantity taken in the day was pushed progressively to one ounce. In six months the traces of ascites and splenocele had disappeared, and the cure was complete. The medicine was discontinued by gradually diminishing the dose. In the second case, the same dose was prescribed in the first instance; and it was ultimately carried to six drams, with complete success.

The great efficacy of this preparation—as of every tonic—in diseases that are paroxysmal, appears to consist in the new impression which it makes upon the nerves of the stomach, and, through them, upon those of the whole system; but to effect the revulsion to the requisite extent, it appears to be necessary—as in the cases of artemisia and indigo in epilepsy—to keep up the effect of the remedy by gradually increasing the dose.

MODE OF ADMINISTRATION.

The dose of subcarbonate of iron, in cases of neuralgia and chorea, should be large. Dr. Hutchinson prescribed it in the quantity of ʒss. to ʒij., twice a day; but where it fails to remove the complaint in those doses, Dr. Elliotson recommends, that it should be increased gradually to one or two ounces. The best vehicle for it is molasses. The following formulæ have been recommended:[3]

Pulvis ferri subcarbonatis.

Powder of subcarbonate of iron.

℞. Ferri subcarb. gr. x.
Pulv. aromat. gr. v.
M. Fiat pulvis manè et meridie sumendus.

[1] Op. citat. p. 515.
[2] Journal des Connaissances Médico-Chirurgicales, Mai, 1837.
[3] Brande, Dictionary of the Materia Medica, p. 248. Lond. 1839.

Boli ferri subcarbonatis.

Boluses of subcarbonate of iron.

℞. Ferri subcarb. gr. x.
Valerianæ pulv. ʒss.
Syrup. zingib. q. s.
Fiat bolus.

Pilulæ ferri subcarbonatis.

Pills of subcarbonate of iron.

℞. Ferri subcarb.
Extract. anthemid. āā. ʒss.
Misce et divide in pilulas xij. quarum sumat binas ter quotidie.

℞. Ferri subcarb. ʒj.
Pilul. aloes cum myrrhâ, ʒss.
Misce et divide in pilulas xviij.: duæ bis terve indies sumendæ.

Pilulæ ferri subcarbonatis et hydrargyri.

Pills of subcarbonate of iron and mercury.

℞. Ferri subcarbonat. ʒj.
Hydrargyr. ʒij.
Confect. rosæ. ʒiij.

Rub until the globules are no longer seen.

This formula is proposed as a substitute for blue pill. It is made in five minutes, whilst blue pill requires a week. Dr. Collier[1] recommends it as especially eligible for the *strumous*, the *irritable*, and for *reduced anæmic constitutions* requiring mercury.

Five grains of the subcarbonate are sufficient to amalgamate and divide a large quantity of mercury; but Dr. Collier proposes the larger quantity as a remedy.

Electuarium ferri subcarbonatis.

Electuary of subcarbonate of iron.

℞. Ferri subcarb.
Confect. aurant. āā. ℥j.
Syrupi zingib. q. s.
ut fiat electuarium cujus sumatur cochleare minimum bis vel ter die.

XCI. FERRI TANNIS.

Synonymes. Ferrum Tannicum.
French. Tannate de Fer, Tannate de Peroxyde de Fer.
German. Gerbesaures Eisenoxyd.

Tannate of iron has been recently employed internally in diseases in which chalybeates are indicated.

[1] From his second edition of the London Pharmacopœia, cited in Lond. Lancet, Mar. 24, 1843.

METHOD OF PREPARING.

To a boiling solution of 90 parts of pure *tannic acid* add gradually 440 parts of *subcarbonate of iron* prepared from pure sulphate of iron and carbonate of soda dried at a moderate heat. Agitate the solution until the effervescence ceases. Evaporate at 176° Fahr., in a porcelain vessel, until it becomes thick; and spread it on glass or porcelain to dry in a stove at 95° Fahr. It is usually obtained, however, by adding a solution of a *salt of sesquioxide of iron*, as the persulphate, to a decoction of *nut-galls*. The result is a *tanno-gallate of iron*, as in common ink.

Tannate of iron is of a blue colour, tasteless, and insoluble in water. It is possessed of tonic and astringent properties; and has been highly extolled in *chlorosis* by Benedetti,[1] and been used wherever chalybeates, especially astringent chalybeates, are indicated; but it does not appear to possess any special virtues. As an external application in *herpes circinnatus* or ringworm, ink has been long a popular remedy.

MODE OF ADMINISTRATION.

The dose of tannate of iron is from 10 grains to half a dram in the day, given in syrup or in the pilular form.

Syrupus ferri tannatis.

Syrup of tannate of iron.

℞ Syrup. ℥xij.
—— aceti ℥iv.
Ferri oxidi magnetici citrat. ʒijss.
Ext. gallæ. ʒj. M.

This preparation was first proposed by MM. Trousseau and Pidoux,[2] and as the iron, they remark, "is in the state of ferroso-ferric tannate, and associated with an acid, it is soluble, sapid, and susceptible of useful applications."

XCII. FERRI VALERIA'NAS.

Synonymes. Ferrum Valerianicum, Valerianate of Iron, Valerianate or Sesquioxide of Iron.
French. Valérianate de Fer.
German. Baldriansaures Eisenoxyd.

This salt may be formed, according to Ruspini,[3] by putting clear *iron filings* into a wedgewood mortar, adding gradually an equal weight of *valerianic acid*, and stirring continually. In an hour, *add distilled water;* pour the whole into a flask; warm gently, and filter. The surface exposed to the air becomes co-

[1] Bouchardat, Annuaire de Thérapeutique, pour 1847, p. 186. Paris, 1847.
[2] Traité de Thérapeutique et de Mat. Médicale, 3ème édit. i. 7. Paris, 1847.
[3] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 54.

vered with a crystalline layer of valerianate of iron. Collect this on a filter, and repeat the process as long as crystals are formed. It is a dark, brick-red, loose, amorphous powder, of feeble taste and smell of valerianic acid. It is insoluble in water.[1] It has been given in the form of pill, in the dose of from two to four grains in *hysterical symptoms* complicating *chlorosis*. The salt is officinal in the last Dublin Pharmacopœia.[2]

XCIII. FILIX MAS.

Synonymes. Filix, Nephrodium seu Aspidium seu Athyrium seu Polypodium seu Polystichum Filix Mas, Male Fern, Male Shield Fern.
French. Fougère Mâle.
German. Farrenkraut, Johanniswurzel, Männlicher Farrenkraut, Farrenkrautmännlein, Männlicher Nierenfarrn, Bandwurmwaldfarrn, Mannleinwurmtüpfelfarrn.

The rhizoma of male fern, which is indigenous in this country, and in the secondary list of the Pharmacopœia of the United States, has long been celebrated—since the time of Dioscorides indeed—as an anthelmintic; and especially for the destruction of *tænia*.[3] For these properties, it has been introduced into most of the Pharmacopœias. It was the basis of Madame Nuffer's or Nouffer's celebrated remedy for tænia, which was purchased by Louis XVI., in 1775, for 18,000 francs.[4] It is noticed here on account of the proposition of Peschier,[5] of Geneva, to administer the ethereal extract, which has since been carried into effect, and apparently with the best results.[6] It appears to possess the advantage of being by no means unpleasant to the taste, and to be accompanied by none of the disagreeable effects that are associated with the action of most of the other vermifuges.

To prepare the extract, the *root* is cut small, and digested for ten or twelve days, in the cold, in a sufficient quantity of *sulphuric ether:* the tincture is then pressed, concentrated by distillation, and the ether thereby fully removed. From a pound of the root, about eighteen drams of a brownish-green thick extract are obtained, which possesses the repulsive odour of the plant, and has an acrid taste.

[1] Aschenbrenner, Die neueren Arzneimittel und Arzneibereitungsformen, S. 132. Erlangen, 1848.
[2] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850, p. 166. Dublin, 1850.
[3] Mérat and De Lens, Dict. de Mat. Méd. art. Polypodium.
[4] For the various forms in which it has been given as an anthelmintic against tænia, as well as for the methods of Von Beck, Herrenschwand, Matthieu, Measeed, Nuffer, Odier, and Wawruch: see Linke, Vollständiges Recept-Taschenbuch, u. s. w. i. 232. Leipzig, 1840.
[5] Nouvelle Bibliothèque Médicale, Sept. 1828, p. 151, and Biblioth. Univer. 324, 1826.
[6] Rayer, Annal. de Thérap., Mai, 1847, cited in Schmidt's Jahrbücher, u. s. w. No. 5, p. 162. Jahrgang 1848.

In Germany, the extract is generally prepared according to the formula of the Prussian Pharmacopœia, which is as follows:—Take an ounce of the *powdered root*, and pour thereon eight ounces of the *sulphuric ether* of commerce; close the vessel, shaking it occasionally, and let it stand until the fluid has acquired a yellowish colour; then separate the fluid as before described; distil off the sulphuric ether until only a third remains, and evaporate the remainder in a water bath, until a thin brownish-yellow coloured extract remains.

This extract contains not only the volatile oil of the fern, but also a fixed oil, tannic acid, acetic and gallic acids, a muco-saccharine matter, green and red colouring matter, and a semi-resinous substance. By some it is called OLEUM FILICIS MARIS. The active constituents of the fern are highly concentrated in it; and as the result of numerous trials, it was found, that from eighteen to twenty grains, given at night, and the same quantity in the morning, fasting, destroyed tænia; so that, on the administration of a cathartic, the parasite was discharged—often in the form of a ball. Not unfrequently, indeed, it was voided before the cathartic was given.

In Germany, this new preparation has been chiefly recommended by Hufeland, who maintained, that in rapidity, certainty, and gentleness of action, it exceeds all known means, and many other physicians have testified to the accuracy of this opinion. Radius,[1] who frequently prescribed it, says he never gave it without bringing away large pieces of the worm, but frequently the head remained behind.[2] Peschier had found it to be successful in one hundred and fifty cases when he wrote;[3] Ullersberger had used it in sixty cases, and a medical friend of his in two hundred cases, with invariable success. It is affirmed to have proved more successful in cases of *Bothriocephalus latus* than of *Tænia solium;* and a part of the discrepancy of results amongst observers has been ascribed to this circumstance. For example, it has not been found as effective in the treatment of tænia at Paris, and the tænia most common there is *Tænia solium*.[4]

Buchner[5] thought, that the extract might be prepared with alcohol, but many physicians have objected to this menstruum—that it does not dissolve the fixed oil.

The male fern is preferred by M. Rouzel[6] to the bark of pomegranate root in the treatment of tænia.

[1] Auserlesene Heilformeln, u. s. w. Leipz. 1836.

[2] See, also, Ebers, in Hufeland und Osann's Journal, lxvi. St. 1, S. 43, cited in Gazette de Santé, Sept. 25, 1828. [3] Mérat and De Lens, loc. cit.

[4] Christison, Dispensatory, p. 451. Edinb. 1842.

[5] Repertorium für Pharmacie, xxiii. 433, xxvii. 337, and Funk, in Medicin. Zeitung. 17 Mai, 1837, S. 102.

[6] Revue Médicale, Oct. 1840. See, also, M. Wawruch, Oesterreich. Med. Jahrbuch. cited in Encycl. des Sciences Med. Nov. 1841, p. 264; Brit. and For. Med. Rev. Oct. 1844; and M. Daumerie, Archives de la Méd. Belge, Sept. 1841, p. 5.

MODE OF ADMINISTRATION.

The extract is commonly given in the form of pill: an emulsion does not answer, because the active constituents are apt to be enveloped and masked in this form. In Geneva, it is now frequently united with castor oil, which renders it unnecessary to give a cathartic after it. For the cathartic, when needed, they advise, in Bern, infusion of senna with Epsom salts, manna, and aniseed.[1] To children, it may be given in syrup.

An *ethereal tincture of the buds* (one part of the *buds* to eight of *ether*) has been used with advantage as an anthelmintic;[2] and a *decoction* (one ounce of the *rhizoma* to a pint of *water*) has been occasionally prescribed.

Mel filicis maris.

Honey of male fern.

℞. Ext. æther. filicis maris ʒss.
Mel. rosæ ℥ss. M.

Half of this to be taken on going to bed; the other half early in the morning fasting.

XCIV. FUCUS AMYLA'CEUS.

Synonymes. Plocaria candida, Gracilaria seu Sphærococcus seu Gigartina seu Fucus lichenoides, Ceylon Moss, Marine Moss, Jaffna Moss, Edible Moss.

The attention of physicians has been directed to this vegetable by Messrs. Sigmond and Farre,[3] and by Dr. O'Shaughnessy, of Calcutta.[4] Like Chondrus, (p. 210,) it belongs to the Natural Order Algæ, and was first introduced, some years ago, into England from India. As met with in commerce, it is white, filiform, and fibrous, and has the usual odour of sea-weeds. When analyzed by Dr. O'Shaughnessy, it was found to be composed as follows:—Of vegetable jelly, 54.50; true starch, 15; wax, a trace; ligneous fibre, 18; gum, 4; sulphate of soda, and chloride of sodium, 6.50; sulphate and phosphate of lime, 1; iron, a trace; loss, 1:—Total, 100. When boiled in water, a liquid results, which gelatinizes on cooling. It has also been examined chemically by Guibourt, Wonneberg and Kreyssig, Bley and Riegel.[5]

EFFECTS ON THE ECONOMY.

The medical properties of fucus amylaceus are similar to those of chondrus. The decoction is an agreeable, light, nutritious article of food. According to Dr. O'Shaughnessy, its nutritive qualities are best obtained in the following manner:—Put into a clean stew-pan a table-spoonful of prepared *marine moss*, add to it a

[1] Hufeland und Osann's Journal, lxiv. St. 1, S. 133.
[2] London Lancet, for 1834–5, ii. 597.
[3] The Ceylon Moss. Lond. 1840.
[4] Medico-Botan. Transactions, vol. i. pt. iv. p. 184.
[5] Cited in Pereira, Elements of Mat. Med. and Therap. 3d edit. ii. 913. Lond. 1850.

pint and a half of *hot* or *cold water*, and boil gradually for twenty minutes; then take a little in a spoon, and let it cool for a minute or two, to see if the liquid is sufficiently boiled to congeal firmly; if not, let it boil until it is; then strain it through a cloth into another stew-pan while it is warm, so as to draw all the liquid from the sediment produced by the moss. The sediment must be well squeezed. Add to the liquid a table-spoonful of fine loaf *sugar*, half a table-spoonful of *lemon juice*, a table-spoonful of *honey*, or not, at the option of the maker; add a small piece of *lemon peel*, and a very small piece of *cinnamon:* boil the whole gradually for ten minutes, and pass it once or twice through a piece of flannel into a basin or tumbler, and in ten minutes it will be fit for use. Should it be required to be very clear and transparent—which is not considered necessary for an invalid, as by clarifying it partly loses its strength—add the white of an egg, well beaten into froth, before the second boiling; taking care, that after the second boiling it rests for some minutes by the fire-side, with some hot charcoal on the cover of the stew-pan so as to render it perfectly clear; otherwise, by adding the whole of an egg, it will have a milky-white appearance, which is not so pleasing to the eye, although its quality may be the same. When clear, and of a lemon colour, it may be passed two or three times through a flannel bag. It may then be suffered to cool, or be taken in a liquid state, if preferred by the patient.

The jelly is as good for the table as for the sick chamber. Blanc-manger and Italian cream can be made with it without isinglass; but in such case, the jelly must be made much stronger before it is mixed; and at all times it must be blended whilst warm. The quantity it takes for a mould of either is two table-spoonfuls of moss to a quart of water, which must be reduced to half a pint.

Ceylon moss has the advantage over isinglass and the other mosses, that it will stand firm and good for twenty-four hours in the hottest days of India; whilst neither isinglass nor any other jelly will stand firm for half an hour, even with the aid of ice. It also possesses the advantage, that a delicious jelly can be made from it in about fifteen or twenty minutes. It has been pronounced by all the medical faculty of Calcutta to be unequalled for its delicate and nutritious qualities, and has been especially and highly recommended for the use of the sick. When all other nourishment has failed, this has proved successful; and Dr. O'Shaughnessy says he has no doubt, that when the article is better known by the faculty in England, it will be much more appreciated, and receive the same patronage and support, which it has done from the whole of the faculty in India for the last fifteen or sixteen years.[1]

[1] Braithwaite's Retrospect of Pract. Med. and Surg. No. 1, Jan. to June, 1840, 3d edit. p. 70. Lond. 1842; and Sigmond and Farre on the Ceylon Moss. Lond. 1840.

XCV. FULI'GO.

Synonymes. Fuligo Splendens seu Fornacum seu Ligni, Soot, Woodsoot.
French. Suie.
German. Glanzruss, Spiegelruss, Kaminruss, Ofenruss, Russ.

The discovery of creasote, and its extensive application to the treatment of disease, gave occasion to the resuscitation of this article—much employed by the ancients, but subsequently fallen into oblivion. The older physicians frequently used it as an exciting diaphoretic agent in *cachexiæ* of every kind, in *chronic rheumatism*, *cutaneous affections*, and especially in the evil results of their sudden repercussion; in *glandular indurations*, *rickets*, *exostoses*, &c. It has also been employed as a domestic remedy, in *colic*, and in the *simple* and *dysenteric diarrhœa*, and *cholera of children*. Several modern recommendations—as by Schütte and Weisenberg—remained unheeded until the attention of physicians was drawn to it, especially by Blaud.[1] He is of opinion, that the costly—and by no means easily prepared—creasote may be wholly replaced by soot. Both are products of the dry distillation of organic substances; their odours are analogous, and as soot is much cheaper and more easily obtained, it deserves, he thinks, to be tried more extensively in therapeutics. Soot has a nauseously empyreumatic, more or less bitter, and acrid, saline taste.

EFFECTS ON THE ECONOMY.

Blaud[2] has exhibited soot in different diseases, especially in the form of ointment, or in decoction, with excellent and rapid effects, in *herpes*, *itch*, *tinea*, *gutta rosea*, and *pruritus vulvæ;* and he asserts, that he even healed *cancer of the breast* by frequent ablutions with a tepid decoction of it, and an ointment composed of equal parts of lard and soot with one-eighth part of the extract of belladonna; but the same applications were of no benefit in a case of *cancer of the nose*, and in one of *cancer of the uterus*. He also cured a *scabby eruption of the mucous membrane of the nose* by an ointment of it. In *diphtheritis*, he used, in two cases, a decoction, as a mouth-wash, with the best effects. In confirmation of Blaud's remarks, Voisin asserts, that he cured a case of *cancer of the face* by soot ointment.

Dr. J. R. Marinus[3] has found it very efficacious in *chronic eruptions* (*dartres*,) and in *tinea;* and his observations have been confirmed by MM. Nobele[4] and Le Montagnier.[5] M. Nobele's

[1] Revue Médicale, Juin, 1834, et Janvier, 1835, and E. Gräfe, in Gräfe und Walther's Journal, xxiii. 310. Berlin, 1835.

[2] Journal des Connaissances Médico-Chirurg. Mai, 1834.

[3] Bulletin Médical Belge, Nov. 1838, p. 289. For farther testimony in its favour, see London Lancet, Nov. 25, 1843.

[4] Annales de la Société de Médecine de Gand, Gazette Médicale, or Encyclographie des Sciences Médicales, Mars, 1840, p. 540.

[5] Bullet. Génér. de Thérap. Nov. 1840, or Encycl. des Sciences Méd., Fév. 1841, p. 299.

conclusions are,—1. That it cannot be applied, with any expectation of success, until the crusts have been removed, and the irritation of the parts has been diminished by means of emollient applications. 2. That the gray layer, left by it on the skin, whether it be used in the form of ointment or of decoction, should be removed by a weak wash of soap and water. 3. That in children an ointment, made with equal parts of soot and lard, is frequently too irritating for the small wounds exposed by the falling off of the crusts; that it is better to commence with one part of soot to three parts of lard; and lastly, that wood soot is alone useful,—soot from coal being devoid of any agency.

Dr. Ebers, of Bourdeaux,[1] has employed a decoction of soot with great advantage in a case of *severe burn* in which the patient was suffering from the profuse discharge. A handful of soot was boiled in eight pounds of water, until the fluid was reduced to two pounds. Lint was then soaked in it and applied to the granulating surface.

Carron du Villards[2] advises a collyrium prepared from soot in cases of *strumous ophthalmia.* He infuses two ounces in boiling water, filters and evaporates to dryness; the shining residuum is then infused in very strong *boiling vinegar*, and to every twelve ounces of the liquid, twenty-four grains of *extract of roses* are added. A few drops of this solution, in a glass of tepid water, form an excellent resolutive collyrium, which may be made stronger or weaker at pleasure. He has, also, in cases of *spots on the cornea*, used soot—either blown into the eye alone, or mixed with powdered sugar-candy, and has seen good effects from it. United with butter, it forms an eye-salve, not inferior perhaps, he says, to any other. As in the treatment of *specks on the cornea*, by dropping laudanum into the eye, the organ quickly becomes accustomed to it, Carron du Villards advises, that the eye should be excited to a more lively action by means of the combination of soot and tincture of opium given below. It is, he says, an energetic agent, and may be applied by means of a pencil to granulations on the cornea. He likewise recommends a decoction of soot as an injection in *discharges, which are the consequence of chronic inflammation of the vagina.*

M. André Gibrin[3] has detailed to the Académie Royale de Médecine of Paris, six cases of *chronic inflammation of the bladder*, in which soot was beneficially used in the way of injection. M. Gibrin took from the chimney two ounces of compact soot, broke it up, washed it, and boiled it in a pound of water. The decoc-

[1] Journ. de Méd. et Chirurg. Pratiq. Juin, 1841, cited in Amer. Journ. of the Medical Sciences, Jan. 1842, p. 231.

[2] Gazette Médicale, Janvier, 1831; see, also, Baudelocque, on its Use in Scrofulous Ophthalmia, in Bulletin Général de Thérapeutique. Mars, 1834.

[3] Bulletin de l'Académie, 15 Mars, 1837.

tion was filtered through paper, and injected into the bladder twice a day. The good effects supervened so closely on the administration of the remedy, that there could be no doubt as to the cause. The pain ceased, and the patient obtained sleep, to which he had been for some time a stranger. The urine gradually became clear, and recovered its natural appearance.

To these remarks may be added, that, according to Schütte, an ointment composed of two parts of fresh butter or hog's lard, and one part of soot—is a popular and efficacious remedy on the Rhine for cases of *porrigo*, *itch*, and *herpes;* not more than a dram being rubbed in at a time. Weisenberg ascribes to the soot a protective power against contagious affections of the skin, and recommends, especially, lotions of soot water,—partly, as a preventive agent, and partly as a therapeutical application in *itch*.

Employed as an injection, an infusion of soot was found by Dr. Hewson, of Philadelphia, an efficacious remedy in *ascarides vermiformes*.[1]

But soot has not been used, of late, externally only; its internal use, in the form of the old "*tincture of soot*," has been revived. This was long known under the name of "*soot drops*," "*hysteric mixture*," and "*fit drops*," and was employed as an anti-spasmodic in *hysterical and other affections;* but its employment has been extended, and it is given in *chronic rheumatism*, *chronic affections of the chest*, *suppressed cutaneous eruptions*,—in many cases under precisely the same notions that prevailed years ago. From thirty to sixty drops of the following tincture are given several times in the course of the day.

MODE OF ADMINISTRATION.

Mistura fuliginis.

Mixture of soot.

Tinctura Fuliginis Clauderi.

℞. Fulig. ℥ss.
Potassæ carbonat. ℥iss.
Ammoniæ carb. ʒij.
Aq. sambuc. f ℥ix.

Digere leni calore, et filtra.

Dose.—From thirty to sixty drops, several times a day.

A similar preparation has been used in Philadelphia, under the names *medical lye*, *soot tea*, *alkaline solution*, and *dyspeptic lye*, as a popular remedy in *dyspepsia*. It is made by infusing a pint of clean *hickory ashes* and a gill of *soot* in half a gallon of *boiling water*, allowing it to stand for twenty-four hours, and then decanting. Of this, a small wine glassful is taken three or four times a day.

[1] United States Dispensatory, 6th edit. p. 1297. Philad. 1845.

Lotio fuliginis.

Lotion of soot.

℞. Fulig. manip. maj. ij.
Coque cum aq. Oi. per semihoram. Cola cum expressione.

Used as a wash, several times a day, in *herpetic*, *psoric* and *syphilitic ulcers*. *Blaud.*

Unguentum fuliginis.

Ointment of soot.

℞. Fulig.
Adipis āā. ℥ss.
Extract. belladon. ʒj. M. exactè.

To be spread upon lint or tents in case of *cancer*. *Blaud.*

℞. Adipis,
Fulig. āā. ℥ij.
Coque leni igne per horas vj.

As a dressing in cases of *tinea* and of *foul ulcers*. *Blaud.*

℞. Fulig.
Cinchon. flav. āā. ℥ss.
Carbon. pulv.
Sulph. āā. ℥j.
Cerati simplicis q. s. ut fiat unguentum.

A dram to be rubbed in, once or twice a day, in cases of *tinea*. *Carron du Villards.*

℞. Fulig. ℥ss.
Opii ℥ij.
Caryoph. ʒj.
Aq. cinnam. f ℥viij.
Alcoholis f ℥iv.
Digest in a gentle heat for six days; filter and express the residuum.

Applied in cases of *specks of the cornea*. *Carron du Villards.*

℞. Fulig. ℥iss.
Zinci sulphat. ʒvj.
Adipis ℥iv. M.

Applied in cases of *tinea*. It is the *Pommade contre la teigne*, of Bories.[1]

Cataplasma fuliginis.

Cataplasm of soot.

℞. Fulig. ℥ij.
Alb. ovi No. vj.
Tere simul.

As a dressing for *herpes* and *tinea*. It is the *Pommade resolutive* of Sainte Marie.[2]

[1] Formulaire de Montpellier. Montpellier, 1822.
[2] Nouveau Formulaire Médicale et Pharmaceutique. Paris et Lyon, 1820.

XCVI. FULIGO'KALI.

SYNONYME. *German.* Russkali.

This new remedy called from *fuligo*, 'soot,' and *kali*, 'potassa,' has been introduced as an analogous preparation to *anthrakokali* (p. 80.)[1]

METHOD OF PREPARING.

Fuligokali is prepared as follows:—Take of *Potassa*, 20 parts; *Shining soot*, in powder, 100 parts; *Water*, a sufficient quantity. Boil for an hour; suffer the decoction to cool; dilute with water so that filtration may be better accomplished; filter, evaporate, and dry, in order to obtain the fuligokali in scales or powder; and enclose it in dry and warm bottles.

A SULPHURETTED FULIGOKALI has been prepared as follows:—Take of *Fuligokali*, 60 parts; *Potassa*, 14 parts; *Sulphur*, 5 parts. Dissolve the sulphur and potassa in a little water; then add the fuligokali; evaporate, dry, and enclose in dry and warm bottles.

EFFECTS ON THE ECONOMY IN DISEASE.

Fuligokali has been employed by M. Gibert at the Hôpital Saint-Louis of Paris, both internally and externally, but chiefly in the latter mode, in various *chronic cutaneous diseases*. An ointment may be made of either the simple or the sulphuretted article, by mixing one or two parts with thirty of lard. M. Gibert ascribes to these ointments resolvent, detergent and slightly excitant virtues.[2]

Mr. E. Wilson[3] thinks it probable, that both anthrakokali and fuligokali owe much of their therapeutic value to the alkali which forms their basis. He has employed fuligokali in several cases, and especially in *psoriasis palmaris*, and with better success than he has obtained by the usual remedies. The preparation referred to on the last page but one, as having been used in Philadelphia under the names of *medical lye*, &c., may be regarded as a weak solution of fuligokali.[4]

[1] Journ. des Connaiss. Méd. Chir. and Encyclogr. des Sciences Méd., Juillet, 1842, p. 9.

[2] See, also, Duhamel, Amer. Journ. of Pharmacy, Jan. 1843, p. 284, and Deschamps, in Bouchardat, Annuaire de Thérapeutique, pour 1843, p. 153. Paris, 1843.

[3] A Practical and Theoretical Treatise on the Diagnosis, Pathology, and Treatment of Diseases of the Skin, p. 397. Lond. 1842; or Amer. edit. Philad. 1843.

[4] Duhamel, op. cit.

XCVII. GALEOP'SIS GRANDIFLO'RA.

SYNONYMES. Galeopsis Ochroleuca seu Prostrata seu Villosa seu Segetum seu Angustifolia seu Dubia, Herba Sideritidis.
German. Grossblüthiger Holzahn, Grossblumige Hanfnessel, Gelbe grossblüthige Hundsnessel, Katzermaul.

This plant, which belongs to NATURAL FAMILY Labiatæ, SEXUAL SYSTEM Didynamia Gymnospermia, grows in the western part of Germany, in sandy corn-fields.[1]

EFFECTS ON THE ECONOMY.

The fresh plant has a peculiar, feeble, balsamic smell, and a somewhat bitter and saltish taste, and has been considered, in Germany, to be worthy of a distinguished place amongst the "bitter resolvents." It has been much sold as a nostrum under the name of "Blankenheimer Tea," (Blankenheimer Thee,) or "Lieber's pectoral and phthisical herbs," (Liebersche Brust oder Auszehrungskräuter,) and enjoyed great repute. In the Ardennes also, particularly in the district of Malmedy, it has been long employed as a popular remedy. In the year 1828, Lejeune[2] directed attention to its therapeutical importance. According to his observation, it is very useful in *diseases of the mucous membrane of the respiratory and digestive organs*, and especially in *chronic pulmonary catarrh*, even when it exists to such a degree as to merit the name *Phthisis mucosa* (Schleimschwindsucht.) In *actual phthisis*, the affection seemed to him to be diminished by it; the hectic being moderated, the expectoration rendered easier, or the cough assuaged. Lejeune generally boiled half an ounce of the *plant* in a pint of *water* down to half; sweetened the decoction with *sugar* or *honey*, and directed the whole to be taken in the twenty-four hours. In other cases, in which a milk diet was appropriate, the decoction was made with an equal quantity of milk. Wesener[3] found it advantageous in *phthisis mucosa* and *chronic pulmonary catarrh*. Günther, who had many opportunities for observing the action of the remedy, affirms that the Liebersche Kräuter not unfrequently produced some amelioration in *phthisis*, especially in *scrofulous phthisis*, but he never saw any actual recovery therefrom. It seemed to him to moderate the *colliquative sweats*, and to facilitate and diminish the expectoration. In one case especially, of *scrofulous phthisis* in the last stage, it appeared to be of essential service, and to prolong life; and from all his observations he is disposed to infer, that if it be not the sole or the main remedy to be employed in every stage of

[1] Von Schlechtendal, in Encyclopäd. Wörterb der Medicin. Wissenschaft. xiii. 115. Berlin, 1835. [2] Annales Générales des Sciences Physiques, p. 331, Sepr. 1820.
[3] Hufeland und Osann's Journ. der Pract. Heilk. 1823, 1824.

phthisis, it may be used with advantage throughout the disease as a supporting agent.

Riecke[1] asserts, that he has seen many cases in which the Lieberschen Kräuter were of great service in *thoracic affections threatening phthisis*. In one case, which promised to terminate unfavourably in a short time, owing to the complication of violent *hæmoptysis with hectic fever*, and in which an experienced physician had exhausted every effort of art, they were given with the best effect. The thoracic affection ceased, and at that time—a period of five or six years since the use of the remedy—the patient—an officer—was capable of performing his military duties without difficulty. On the other hand, Richter affirms, that in two cases in which he administered the galeopsis, no benefit resulted from it. In this country, it has not been employed; so that we have chiefly the testimony afforded by the German writers. This, as they themselves admit,[2] is not yet sufficient to enable them to lay down any positive rules as to the exact indications and counter-indications that must regulate its employment. It is probably of no farther service than as a mild bitter; and its place may be supplied, perhaps advantageously, by many of the tonics that are admitted into the lists of our remedial agents. Geiger[3] subjected it to analysis, and found in it 2.765 parts of fatty matter, wax and chlorophyll; 0.247 of a brown, bitterish resin, insoluble in ether; 0.312 of a yellowish, stimulating and bitter resin, soluble in ether; yellow, bitter extractive matter, soluble in ether, and a brownish matter, insoluble therein; phosphate and malate of lime; salts of potassa; muco-saccharine matter and fecula, and 65.882 of ligneous matter.

MODE OF ADMINISTRATION.

Decoctum galeopsidis grandifloræ.

℞. Galeopsid. grandifl. summitat. ℥j.
Coque in Aquæ Oj. per minut. xv. et cola.

To be used in the twenty-four hours. *Wesener.*

℞. Galeop. grandifl. summitat.
Althææ āā. ℥j.
Glycyrrhiz. ʒij. M.

A fourth part of this to be boiled in a pint and a half of water: to be used daily in *chronic catarrh*, and in the expectoration produced by the softening of pulmonary tubercles.—*Radius.*[4]

Galeopsis versicolor, and galeopsis villosa, which have also been examined by Geiger,[5] appear to be possessed of the same virtues as *galeopsis grandiflora.*[6]

[1] Die neuern Arzneimittel, u. s. w. S. 241. Stuttgart, 1837.
[2] Reicke, Ibid.
[3] Magaz. für Pharmacie, ix. 134.
[4] Auserlesene Heilformeln, u. s. w. S. 274. Leipz. 1836.
[5] Allgem. Med. Annalen, S. 1141. 1825.
[6] Richter's Specielle Therapie, B. x. S. 397. Berlin, 1828.

XCVIII. GALVANIS'MUS.

Synonymes. Electricitas Animalis seu Galvanica seu Metallica, Irritamentum Metallorum seu Metallicum, Galvanism, Voltaism, Galvanic Electricity.
French. Galvanisme.
German. Galvanismus, Volta'sche Electricität.

The ordinary effects of common and galvanic electricity and of electro-magnetism are so well known as to require but little comment. They are decidedly excitant; and, like all excitants, when applied to a part of the frame, are counter-irritant or revellent. All have been employed in *paralysis*,—general and local,—*amaurosis, deafness and dumbness*[1] *of recent duration, asthma, rheumatism, neuralgia, amenorrhœa*,[2] *incontinence of urine*,[3] *sprains*,[4] &c. The effect, however, which galvanism exerts on the contractility of the muscular fibre, and the great similarity in its agency to the nervous influence,[5] has led to its employment more frequently in the various nervous and spasmodic diseases referred to, and in others belonging to the same class.[6] Resting on his views of the absolute identity between the nervous and galvanic fluids,[7] Dr. Wilson Philip employed it in many diseases, and especially in *asthma*. In a paper read by him before the Royal Society of London, in January, 1816, he details some experiments, which he made on rabbits. The eighth pair or pneumogastric nerves were divided by incisions made in the neck. After the operation, the parsley, which the animals had eaten, remained unchanged in their stomachs, and, after evincing much difficulty of breathing, they seemed to die of suffocation. But when, in other animals, whose nerves had been divided, the galvanic agency was transmitted along the nerve, below its section, to a disc of silver, placed closely in contact with the skin of the animal, opposite to its stomach, no difficulty of breathing occurred. The galvanic action being kept up for twenty-six hours, the rabbits were killed and the parsley was found digested.

The removal of *dyspnœa*, in these cases, led Dr. Philip to employ galvanism as a remedy for asthma; and, by transmitting its influence from the nape of the neck to the pit of the stomach, he gave decided relief in every one of twenty-two cases, of which four were in private practice, and eighteen in the Worcester Infirmary.

[1] See a case of *aphonia* cured by galvanism, cited in London Lancet, May 27, 1843.
[2] G. Bird, Guy's Hospital Reports, April, 1841, p. 84.
[3] Froriep, cited in Edinb. Med. and Surg. Journ., 1844, p. 491.
[4] Raciborski, Gaz. Méd. Chirurg.; cited in Med. Chir. Rev., April, 1846.
[5] See the author's Human Physiology, 7th edit., i. 118. Philad., 1850.
[6] Pereira, Elements of Mat. Med., 2d edit., p. 42. Lond. 1842; or 2d Amer. edit., Philad. 1846. See, also, the author's General Therapeutics and Mat. Med., 4th edit., i. 509. Philad. 1850.
[7] Experimental Inquiry into the Laws of the Vital Functions. London, 1817.

The power employed varied from ten to twenty-five pairs of plates. Since then, galvanism has been repeatedly used in such cases, and at times with manifest relief. Commonly, however, the plates, described hereafter, are employed for this purpose. The disease, in the majority of cases, appears to be dependent upon erethism of the pneumogastric nerves; all the phenomena indicating that there is a spastic constriction of the small bronchial tubes, occasioned by irritation at the extremity, or in the course of the nerve. The new impression, made by the galvanic agency, breaks in upon the concentration of nervous action, by exciting other portions of the nervous system, in the same manner as we observe spasms or ordinary cramp relieved, or paroxysmal diseases warded off, by agents that are capable of suddenly impressing some part of the nervous system.

Not long after these researches of Dr. Philip, galvanism was employed satisfactorily by Mr. Mansford[1] in a congenerous disease—*epilepsy*—and his plan was afterwards—although tardily—extended to some other paroxysmal disorders. The mode of application recommended by him is as follows. A portion of the cuticle, of the size of a sixpence, is removed by means of a small blister on the back of the neck, as close to the root of the hair as possible, and a similar portion is removed from the hollow beneath, and on the inside of the knee, as the most convenient place. To the excoriated surface on the neck, a plate of silver, varying—according to the age of the patient—from the size of a sixpence to that of half a crown, is applied, having attached to its back part, a handle or shank, and to its lower edge—and parallel with the shank—a small staple, to which the conducting wire is fastened. This wire passes down the back, until it reaches a belt of chamois leather, buttoned round the waist; it then follows the course of the belt to which it is attached, until it arrives opposite the groin of the side on which we desire to employ it; it then passes down the inside of the thigh, and is fastened to the zinc plate in the same manner as to the silver one. The apparatus, contrived in this way, is thus applied. A small piece of sponge, moistened in water, and corresponding in size to the blistered part of the neck, is first placed directly upon it; over this, a large piece, of the same size as the metallic plate, also moistened, is laid, and next to this, the plate itself, which is secured in its situation by a strip of adhesive plaster passed through the shank on its back; another above, and another below it. If these be properly placed, and the wire which passes down the back be allowed sufficient room, that it may not drag, the plate will not be moved from its position by any ordinary motion of the body. The zinc plate is fastened in the same manner, but in place of the second layer of

[1] Researches into the Nature and Causes of Epilepsy, &c. Bath, 1819.

sponge, a piece of muscle answering in size to the zinc plate is interposed; that is, a small piece of moistened sponge being first fitted to the exposed surface below the knee, the piece of muscle moistened, or—what has been found equally effectual and less inconvenient—a piece of moistened flannel[1] follows, and on this the plate of zinc.

The apparatus, thus arranged, will continue, according to Mr. Mansford, in gentle and uninterrupted action from twelve to twenty-four hours, according to circumstances. "This last is the longest period that it can be allowed to go unremoved; the sores require cleaning and dressing, and the surface of the zinc becomes covered with a thick oxide, which must be removed to restore its freedom of action: this may be done by scraping or polishing; but it will be better if removed twice a day, both for the greater security of a permanent action, and for the additional comfort of the patient."

The adoption of this plan of treatment in cases of *tic douloureux;* the confidence reposed by Laënnec in the use of plates on the breast and back in *angina pectoris*, and similar *neuralgic affections of the chest;* and the communications of Drs. Thos. Harris and Chapman, brought it into extensive use, so that ample trial was given to it in this country, both in public and private practice. In three cases, it was—to employ the language of Professor Chapman[2]—"triumphantly directed" by Dr. Harris; but it was only found effectual in affections of the face; and in these cases it had to be persevered in for some time before any marked benefit was experienced.[3] About the same period, this mode of applying galvanism was recommended by Dr. Miller,[4] formerly of Washington University, Baltimore, and a case of *paraplegia* and another of *general paralysis*, were published by him, in which it was found efficacious. A similar arrangement, employed for the purposes of counter-irritation, has been described by Dr. Golding Bird[5] under the title of the "*electric moxa.*" It was long ago observed by Humboldt, and afterwards by Grapengiesser, that when a simple galvanic arc was applied to a blistered surface, the part opposed to the most oxidizable metal was more irritated than that to which the negative plate was applied. In adopting such an arc in the treatment of *paralysis*, Dr. Bird was struck with the remarkable effects produced, and such a combination of its results induced him to propose the following ready mode of establishing a discharge from the surface of the body. Two small blisters, the size of a shilling, are applied to any part, one a few inches below the other. When the cuticle is raised, it must be snipped, and to

[1] Dr. Chapman says soft buckskin or parchment. American Journal of the Medical Sciences, Aug. 1834, p. 311.
[2] Op. citat. p. 311.
[3] Dr. Harris, in American Journal of the Med. Sciences, Aug. 1834, p. 384.
[4] Ibid. p. 321.
[5] Lond. Med. Gazette, June, 1847.

the one whence a permanent discharge is required, a piece of zinc foil must be applied; and to the other a piece of silver. They are then connected by a copper wire, and covered with a common water-dressing and oiled silk. If the zinc plate be raised in a few hours, the surface of the skin will look white, as if rubbed over with nitrate of silver. In forty-eight hours, a decided eschar will appear, which, if the plates are still kept on, will begin to separate at the edges in four or five days. A common poultice may now be applied, and a healthy sore, freely discharging pus, will be left.

Confirmation of the advantage to be derived from this method of applying galvanism has been afforded by Mr. Wells,[1] who records the results of his treatment in the Civil Hospital at Corfu. The cases, in which its efficacy was tested, were thirty of *ulcers;* five of *fistulæ;* five of *fungous growths;* and five of *nervous disorders*. Mr. Hinton,[2] however, does not give so favourable an account as Mr. Wells of the action of the galvanic plates. The scar left by the slough, he says, has a very uneven surface, and would not be borne in many cases.

The effect of galvanism on the uterus has been referred to under Electro-Magnetismus.

M. Matteucci,[3] from his researches, is induced to think, that *paralysis* and *tetanus* are the diseases in which galvanism is most likely to prove beneficial. In its application, however, in these diseases, he considers it necessary to bear in mind two electro-physiological facts. The first is, that an electric current, if transmitted through a nerve for a certain time, destroys the sensibility of the nerve, or in other words paralyzes it; but if the nerve be allowed to remain at rest, after a certain interval it recovers its excitability. But it has been ascertained by M. Matteucci, that the excitability may be restored in a much shorter period by passing a second current through the nerve in the reverse direction. The second fact to be borne in mind is, that if the nerves of a living animal be subjected to the passage of an electric current, renewed at short intervals, tetanic contractions are excited; and if the experiment be continued for some time, the nerves entirely lose their excitability. "These facts," says M. Matteucci, "independently of all theory or hypothesis, should guide us in the therapeutical application of the electric current to paralysis. It may in fact be admitted that, in some cases of paralysis, the nerves of the affected limb are in a condition similar to that produced by the continued passage of an electric current. We have seen, that to restore the excitability to a nerve which had been deprived of it by an electric

[1] Lond. Med. Gazette, May 26, 1848.

[2] Ibid., July, 1848, and Ranking's Half-yearly Abstract, July to Dec. 1848. Amer. edit. p. 216.

[3] Cited in Med. Chirurg. Rev. April, 1845.

current, it is requisite to conduct the current in the opposite direction. Hence, to cure the paralysis, the current should be passed in a contrary direction to that which has produced it. In a *paralysis of motion*, the inverse current should be employed; whilst, on the contrary, in a *paralysis of sensation*, the direct current should be used. In a case of *complete paralysis*—that is, of both motion and sensation, there is no reason to prefer the one current to the other. Theory also teaches a rule in its application: never to continue the passage of the current too long, lest we augment the disease we wish to cure. The more intense the current, the shorter should be its duration; and as we have seen that the passage of the electric current in the nerves, repeated at short intervals of time, considerably enfeebles their sensibility when continued for a long time, we must take care and not pass from one extreme to another. Theory advises us to apply the electric current of an intensity which should vary with the degree of the malady, and continue its passage for two or three minutes at intervals of some seconds. After these two or three minutes, during which we shall have communicated from twenty to thirty shocks, we should leave the patient at rest for some time, and then renew the treatment."

It is affirmed that Dr. Krusell,[1] of St. Petersburg, has employed galvanism successfully in the treatment of *syphilitic ulcers*. To this method he gives the name "electrolytic." It is not clearly described by the translator—and the author does not possess the original article; but it would appear, that of forty-three patients whose treatment commenced between the 4th of July and the 11th of September, 1844, inclusive, twenty-one were free from all appearances of disease on the 13th of September, and all the others, with the exception of three or four, were in the best condition,—the sores being nearly healed. Dr. Krusell employs an uninterrupted current.

Dr. Hays has stated, that the most useful remedy in certain cases of *amaurosis*, which fell under his care,[2] was unquestionably galvanism. This was evinced not only in the improvement which followed its application, but in the "still more striking fact," that the patient saw better whilst subjected to the galvanic action. Dr. Hays found a Cruikshank's battery of fifty pairs of plates three inches square—when in full activity—too powerful for the purpose, so that only one-half or two-thirds of the plates were usually employed. The connexion was made by means of leaden wire conductors, to one end of which was soldered a slip of copper, and to the other a hemisphere of brass, the flat surface of which was filed into grooves crossing at right angles, so as to form a number of sharp points. Over these were tied thin discs

[1] Journ. für Chirurg. und Augenheilkunde von Walther und Ammon. Bd. v. S. 92: cited in Lond. Med. Gaz. June 5, 1846, p. 1015.

[2] American Journal of the Medical Sciences, Aug. 1840, p. 288.

of sponge, which were kept moist with a solution of common salt, and when it was considered desirable to introduce strychnia into the system, the sponge attached to the negative pole—and sometimes that to the positive pole, also—was moistened with a solution of it. When the whole force of the battery was not wanted, instead of putting the slips in the extreme cells, they were placed in cells more or less remote, according to the power required; and the force was easily regulated. The galvanic current may be made to pass from the mastoid process to the superciliary ridge. Dr. Hays expresses his persuasion, that galvanism, properly employed, is a valuable and effective remedy for certain forms of amaurosis. There are doubtless—as already observed—cases of disease, in which the excitant and revulsive agency of galvanism may be employed with advantage, but they are not so numerous as was at one time believed. The author has used the plates extensively—in *neuralgic cases* especially—but has not experienced so much success as to induce him to advise them frequently, under the inconveniences that necessarily accompany their employment.

The ordinary modes of applying galvanism are referred to in another work.[1] An apparatus has been devised by Mr. Coad, of Philadelphia, which enables galvanism to be communicated either continuously, or in an uninterrupted manner, and the dose to be regulated according to the wishes of the practitioner. It is convenient, and well adapted for all cases in which it may be deemed advisable to apply galvanism.[2]

Recently, M. Duchenne,[3] of Boulogne, has published a long *mémoire* on what he terms a new method of galvanization, *Galvanisation localisée*. He states, that if the skin and the excitors *(excitateurs)*—as he terms metallic bodies communicating with the poles of a galvanic apparatus, which are placed on parts to be galvanized—are perfectly dry, and the epidermis of considerable thickness, the two electric currents are recomposed at the surface of the epidermis, without traversing the derma; and cause sparks and a peculiar crepitation without physiological phenomena. But if we place on the skin one excitor moist and the other dry, the individual experiences, in the point where the second excitor had developed only physiological effects, a superficial sensation evidently cutaneous. This is owing to the contrary electricities being recomposed in the point of the dry epidermis, but after having traversed the skin by the moist excitor. Again, if we moisten very slightly the skin where the epidermis is very thick in the points on which the metallic excitors are placed, a superficial sensation is experienced, stronger than the preceding, without sparks or

[1] General Therapeutics and Materia Medica, 4th edit. i. 509. Philad. 1850.

[2] Art. Galvanism, in Cyclop. of Practical Medicine, Amer. edit. by the author. Philad. 1845.

[3] Archives Générales de Médecine, Juillet, 1850, p. 257, and Août, 1850, p. 420.

crepitation. Here the electric recomposition takes place in the substance of the skin. Lastly, if the skin and excitors are very moist, neither sparks, crepitation, nor sensation of burning is experienced, but very variable phenomena of contractility or sensibility present themselves, according as we act on a muscle or a fasciculus of muscular fibres; on a nerve or a bony surface. In the last case, an acute pain of a very peculiar character is experienced; and consequently great care ought to be had not to place moist excitors over bony surfaces. M. Duchenne infers from these phenomena, that the electric power may be arrested at will in the skin; and that, without any incision or puncture, it may be traversed, and the action of electricity be limited to the organs which it covers, to the nerves, muscles and even the bones.

Some years ago, Professor Von Hildenbrand, of Pavia,[1] recommended, in cases of *frontal neuralgia*, an *anodyne metallic* or *galvanic brush*, which appears to have been as effectual in his hands as the galvanic plates in those of Dr. Harris. It consists of a bundle of metallic wires not thicker than common knitting-needles, firmly tied together by wire of the same material, so as to form a cylinder of about four or five inches long, and an inch or three-fourths of an inch in diameter. This is applied to the pained part, which has been previously moistened with a solution of common salt; and, according to Von Hildenbrand, it at times produces relief so instantaneously, that it appears to the patients to act like a charm. In his first experiments, he employed brushes constructed of two kinds of metal,—for instance, of silver and copper wire, copper and zinc wire, or zinc and brass wire, the individual wires being mutually commingled; but he subsequently ascertained, that bundles of wires of one and the same metal produced an effect scarcely less speedy, and that solid metallic bodies act in a similar manner, but in a much feebler degree. The nature of the metal, he thinks, occasions no difference.

It is not probable, that, in these cases, galvanism is the agency concerned. Like the metallic tractors of Perkins, the effect is probably induced by the new nervous impression made through the excited imagination of the patient.

Animal Magnetism, *Mesmerism*, *Neurogamia*, *Biogamia*, *Biomagnetismus*, *Zoomagnetismus*, *Tellurismus*, *Exoneurism*, as it has been termed—exerts an anodyne influence in probably the same manner. In highly impressible persons, more or less prolonged impressions made upon the senses—as by the operator looking steadfastly in the eyes of the patient, holding the thumbs or hand at the same time, or making passes in front of the patient—will induce an hysteric or hysteroid condition, in which

[1] Edinburgh Medical and Surgical Journal, April, 1833.

the patient may fall into what is called "*magnetic sleep*," of a very sound, and at times cataleptic character. During the existence of this sleep, the patient may be insensible to certain irritants, and yet extremely alive to others, so that operations—as the extraction of teeth, and even some of a more serious character—may be performed without eliciting the ordinary evidences of feeling. In cases of *delirium tremens*, accompanied by watchfulness, in which the whole nervous system is extremely impressible, sleep may be at times induced by the employment of this agency, which had resisted the ordinary anodynes.[1]

It has been proposed to introduce into the rectum, in cases of constipation, a kind of *galvanic suppository*, made of two metals —zinc and copper—and various forms of instruments have been devised by the prolific imaginations of the inventors; those intended for the rectum simply were doubtless of advantage, at times, by virtue of the excitation they induced in the nerves of the mucous membrane. Others, shaped somewhat like a bassoon—and so arranged as to have one metal in the mouth and the other in the rectum connected together by metal—did not appear to act differently from those of the simpler form. Both have gone into disuse, and if their efficacy on the frame has not been well marked, they have not failed to administer to the pockets of the inventors.

XCIX. GENTIA'NA CHIRAYI'TA.

Synonymes. Henricea Pharmacearcha, Swertia Chirayita, Agathotes Chirayta, Chiretta, Chirayita, Chirayta.

Gentiana chirayita is a native of the northern part of India, whence it is imported into England, tied up in bundles. It has been long in use there.

EFFECTS ON THE ECONOMY.

The herb and root are intensely bitter, and produce on the economy the ordinary effects of the pure bitters. They strikingly resemble gentian, and are employed in India in *dyspepsia*, and as an antiperiodic in *intermittents*.[2] The plant has been highly extolled by Drs. Currie, Sigmond, and others. These gentlemen consider that the secretion from the liver improves under its use; and the latter advises it not only in *torpor of the digestive function*, but he prefers it to sarsaparilla where the latter is considered to be indicated: as after large quantities of mercury have been taken, or where profuse salivation has been induced. Dr. Jackson, formerly of Calcutta, informed Dr. Christison, that he found it often have the effect of restoring the healthy alvine evacuations in costive

[1] Dr. Vedder, American Medical Intelligencer, Feb. 1, 1839, p. 331
[2] J. Johnson, Influence of Tropical Climates, 3d edit. p. 58.

habits; and he adds, that frequent trials made in Edinburgh confirm all that has been said by the practitioners of Bengal as to its efficacy as a tonic and stomachic.[1] It has also been advised in atonic *leucorrhœa*.

MODE OF ADMINISTRATION.

Gentiana chirayita yields its virtues to alcohol and water. (*Gent. chirayit.* ʒss.; *Aq. bullient.* Oj.) Dose, f ʒj. to f ʒij. The *tincture* is made by macerating five ounces of the *chirayita* for fourteen days in two pints of *diluted alcohol*. Dose, a teaspoonful. The dose of the powder is one scruple.[2]

C. GLYCERI'NA.

SYNONYMES. Glycerinum, Glycerine, Glycerin:—improperly cited as Glycyrrhine,[3] Hydrate of oxide of Glyceryl.
French. Glycérine.
German. Glyzerin, Glyceryloxyd, Oelsüss, Scheel' sches Süss.

This substance forms a base to the oleic, stearic, and margaric acids of the fat oils and tallow, and is separated when these acids are made to combine with an alkali, or any metallic oxide in the saponification of the oils.

METHOD OF PREPARING.

Glycerin is obtained by heating together *olive* or *other suitable oil*, *oxide of lead*, and *water*, as in the manufacture of the common lead plaster: an insoluble salt of lead is formed, and the glycerin remains in the aqueous liquid. This is treated with sulphohydric acid; digested with animal charcoal; filtered, and evaporated *in vacuo* at the temperature of the air.

In a pure state, glycerin forms a nearly colourless and very viscid liquid; s. g. 1.27. It has an intensely sweet taste, and mixes with water and alcohol in all proportions; but is insoluble in ether.[4]

EFFECTS ON THE ECONOMY.

Glycerin has been introduced by Mr. Startin,[5] as a new remedy for the cure of *certain cutaneous diseases;* and its usefulness is presumed to be most probably dependent upon its property of resisting evaporation even at a considerable temperature. Mr. Startin affirms, that a common plate wetted with it may be kept in an oven, side by side with a joint of meat, till the meat is cooked,

[1] Dispensatory, Amer. edit. p. 364. Philad. 1849.
[2] See "Note upon Gentiana Chirayita," by Dr. Carson, in Amer. Journ. of Pharmacy, new series, vol. vi. No. 1, Apl. 1840, p. 20.
[3] Braithwaite's Retrospect, xiii. 306, Amer. edit. New York, 1846.
[4] Graham's Elements of Chemistry, Amer. edit. by Dr. Bridges, p. 596. Philad. 1843, and Fownes's Elementary Chemistry, Amer. edit. by the same, p. 399. Philad. 1845.
[5] Med. Times, Feb. 8, 1846.

without any sensible diminution in the quantity of the liquid. Hence, when applied to the skin it remains moist, forming a coating or varnish, which is not distinguishable from the ordinary secretion of the part. A lotion composed of half an ounce to ten fluidounces of water effectually prevents the skin from becoming dry. When employed in its pure state, it makes the part stiff and uncomfortable; and consequently answers best diluted. It is also added with advantage to poultices, and even to baths. Mr. Startin speaks of its use chiefly in *psoriasis*, *pityriasis*, *lepra*, and *ichthyosis*, in all which diseases he describes it as producing excellent palliative effects; and in such cases the author has employed it with marked advantage. It keeps the part moist, and prevents the formation of scabs.

It is probable, that glycerin might be used with much advantage in *burns*, and wherever it is desirable to prevent the desiccative influence of the air from irritating an exposed surface.

In consequence of the publication, by Mr. Yearsley,[1] of some cases of *deafness*, in which the tympanum had been perforated by ulceration, having been astonishingly benefited by the insertion of wetted cotton into the meatus, Dr. Turnbull[2] and Mr. Thomas H. Wakley,[3] under the idea that the benefit resulted from the moisture and not from the cotton, thought of glycerin as an agent, which would retain its moisture and lubricate the auditory canal. Mr. Wakley accordingly used it in three hundred cases, and in a number of them the power of hearing was restored. "Contrary," he says, "to what might have been anticipated, the use of the remedy was successful in persons in whom the deafness had been of many years' duration—one, for example, thirty years; and also in cases where the existence of the malady could be traced to the eruptive fevers of childhood. In instances of deafness caused by inflammation, followed first by suppuration, and then by a horny dry condition of the auditory canal, the application of glycerin has been attended with signal advantage. Equally marked and peculiar is the success when it is used in cases where there is a partial or total *absence of ceruminous secretion*. In many instances of deafness belonging to these classes of cases, the employment of glycerin has been followed by a perfect restoration of the power of hearing. In other examples of deafness, where the membrana tympani had evidently become thickened and hardened, and an examination with the speculum denoted a whitish or pearly appearance, the use of the glycerin was followed by strikingly beneficial and gratifying effects. It is evident, therefore, that the application of glycerin is equally admissible, whether the tympanum [membrana tympani,] be in a sound state, or whether it has been destroyed by ulceration."

[1] Lancet, July 1, 1848. [2] Lond. Med. Gazette, June 1, 1849, p. 962.
[3] Lancet, cited in Med. Examiner, Sept. 1849, p. 561.

Dr. Paterson,[1] of Edinburgh, obtained some improvement in one of three cases in which he used it.

MODE OF ADMINISTRATION.

℞. Glycerin. f ℥j.
Tragacanth. pulv. ʒij. ad ℥ss.
Liquor. calcis f ℥iv.
Aq. ros. f ℥iij. M.

As a liniment or embrocation in *prurigo, lichen, strophulus, lepra, psoriasis, pruritus,* &c. *Startin.*

℞. Glycerin. f ℥ss.
Acid. nitric. dilut. f ʒss. ad ʒj.
Bismuth. subnit. ʒss.
Tinct. digital. f ʒj.
Aq. rosæ f ℥viiss. M.

As a lotion; to be used by dabbing the part for *chapped nipples* or *hands, fissures of the lips, irritation of the skin* of any kind, as after shaving, exposure to the sun, in *pityriasis,* &c. *Startin.*

℞. Glycerin. f ℥ss.
Sodæ borat. ʒss. ad ʒj.
Aq. ros. ℥viiss. M.

To be used by dabbing the affected part in *alopecia* following fevers; in *dryness or want of action of the scalp, thinness of the hair,* &c. *Startin.*

℞. Glycerin. f ℥ss.
Sp. ammon. aromat. f ℥j.
Tinct. cantharid. f ʒj. ad f ʒij.
Aq. rosmarin. f ℥vij. M.

As a lotion to be used with a wet hair-brush once or twice a day in *rheumatism* or *gout, neuralgic pains, sprains, bruises, stiffness,* &c.

℞. Glycerin. f ʒss.
Lin. sapon. comp. f ℥iss.
Ext. belladon. ʒj. M.

As an embrocation; to be used twice a day in the ordinary manner. *Startin.*

CI. GRANA'TUM.

Synonymes. Punica Granatum, Malogranatum, Pomegranate.
French. Grenadier, Balaustier.
German. Granatbaum, Granatapfelbaum, Apfelgranate.

Punica Granatum appears to be a native of the northern coast of Africa, whence it was transported to Italy at the time of the Carthaginian wars. It is now cultivated in all civilized regions, where the climate is sufficiently warm to allow the fruit to ripen.

[1] Monthly Retrospect, Aug. 1849; cited in Amer. Journal of the Med. Sciences, Oct. 1849, p. 461.

It belongs to the NATURAL FAMILY Myrtaceæ, and, in the SEXUAL SYSTEM, to Icosandria Monogynia.

All the parts of the plant contain more or less tannic acid. The bark of the root is externally of a yellowish-gray or ash colour; internally yellow, and has an astringent taste. According to Latour de Trie,[1] it contains wax, chlorophyll, a considerable quantity of resin, gallic acid, tannic acid, fatty matter, and a peculiar matter called *Grenadin;* in German, Granatin.

Grenadin, in its pure state, is of a white colour; inodorous, and of a sweetish taste; so much so, indeed, that according to Magendie, it might be presumed to be a variety of sugar, except that it differs from ordinary sugar in being devoid of the property of fermenting. According to the degree of its purity, it crystallizes in grains, tufts or stars. When thrown on red hot coals, it consumes without any residuum, and smells like burnt bread. It is fusible, and by a moderate heat may be almost wholly sublimed. It neither reacts as an acid nor an alkali, and is readily soluble in water. Cold alcohol dissolves only traces of it, but boiling alcohol dissolves it readily: a property which is to be taken advantage of in the formation of crystals. In ether it is insoluble. Nitric acid, with the assistance of heat, converts it into oxalic acid. An ounce of the bark yields six grains of grenadin; but it is not settled, whether it contains the whole of the medical properties of the bark. Cenedella,[2] from whom we have the most recent analysis of the bark of the pomegranate root, also found the grenadin discovered by Latour. This substance is readily prepared. The *bark* in powder is treated with *ether*, and afterwards with boiling *alcohol*, and the fluid is evaporated to the consistence of a soft extract. By treating this extract with *water*, grenadin is dissolved without difficulty, and it may be purified by suffering it to crystallize frequently from alcohol.

EFFECTS ON THE ECONOMY.

The therapeutical properties of the different parts of the pomegranate tree were known to the writers of antiquity. They employed not only the bark of the root as a remedial agent, but also the flowers, (*Flores Balaustiorum, Balaustes, Balaustia, Balaustine Flowers,*) the whole fruit, (*Poma Granati, Malogranata, Granata, Mala Punica, Pomegranate:* Fr. *Grenades,*) the rind of the fruit (*Malicorium, Malichorium, Malacorium,*) and the seeds. Dioscorides, Pliny, Celsus and Marcellus Empiricus speak of the employment of the bark of the root in *tænia.*[3] In more modern times, Punica granatum had been greatly neglected, al-

[1] Journal de Pharmacie, Fév. 1828, p. 109.

[2] Giornale de Farmacia, Agosto, 1831, p. 55. See, also, Journal de Pharmacie, ix. 219; x. 352; and xvii. 503; and Dierbach, in Heidelberg Klin. Annalen, B. x. H. 3, S. 365. Heidelb. 1834.

[3] Mérat and De Lens, Dict. de Mat. Médical. art. Punica Granatum.

though the juice of the fruit was recommended by Frederick Hoffman against *worms* in children. In India, it has been long held in great estimation as a remedy in *tapeworm;* and its efficacy having been noticed by some English physicians, it was recommended to the attention of Europeans, especially by Buchanan,[1] Fleming and Breton.[2] About the same time, a monograph was published by Gomez, a Portuguese physician, which appears to have had considerable agency in extending the reputation of the remedy, especially in Germany, where the monograph was translated into the Journal of Gerson and Julius.[3] Gomez directs two ounces of the *fresh rind of the root* to be boiled in a pint and a half of *water* down to a pint; and of this decoction two or three spoonfuls to be taken for a dose; the first, early in the morning, fasting, and then every half hour until the whole is used. The efficacy of this preparation he tested in fourteen cases, from which it appeared, that the worm could not withstand its action more than forty-eight hours. He found it exert most efficacy when portions of the worm were perceptible in the evacuations, a period when the patient generally suffers most inconvenience. If the exit of the worm did not take place on the first day after the use of the agent, the decoction was continued on the second day, when the worm was generally discharged. Did this not happen, however, a farther continuance of the remedy was of no avail; and he thought it better to intermit it until the appearance of fresh portions of the worm in the evacuations. Gomez also administers the dried rind in pills. If the dose be too large, or the appropriate dose be too frequently repeated, nausea, vomiting and diarrhœa at times supervene: should this be the case, the proper course is obvious.

In countries where the fresh rind can be obtained, Gomez advises, that it should be used; in colder countries, the dried rind, which is obtained from more southern regions, will have to be employed. According to Breton, the latter acts more powerfully. The dried rind loses more than half its weight, and two ounces of it may be esteemed equal to three of the fresh.

The strong testimony adduced in its favour by Gomez, gave occasion to numerous trials with it in England, France, Germany, and Italy, which were generally attended with favourable results. Such testimony has been afforded by Boiti, Marchese, Calabro, Majoli, Chevallier, Deslandes, Mérat,[4] Pichonnier, Mandrux, Claret, Bayle, Delaporte, Gendrin, Grimaud, Chapotin, Bour-

[1] Edinb. Med. and Surg. Journal, iii. 22, 1827.
[2] Medico-Chirurg. Transact. xi. 31.
[3] Magazin, u. s. w. vi. 427, or Journal Complémentaire des Sciences Médicales, xvi. 24, 1823.
[4] Du Tænia, &c., et de sa cure radicale par l'écorce de la racine de Grenadier. Paris, 1832; and Mérat and De Lens, op. cit.; and in Supplément au Dictionnaire, vol. 7, Paris, 1846.

geoise, Housson, Goupil, Ferrus, Wolff, Köstler, Meisinger, Berthold, Schmidt, Müller,[1] and others.[2] On the other hand, Keibel[3] complains of its uncertainty; and in the Polyclinical Institute of the University of Berlin, it was given without advantage; but Osann, in his report of that institution, is disposed to refer the want of success to some imperfection in the rind employed, which, he remarks, is found to vary greatly in its character, as met with in the shop of the apothecary. It would appear, also, that it is not unfrequently mixed with the rind of the root of the Box tree and Guelder rose.

To introduce more precision on this matter, Wolff recommends that the druggists should purchase the bark of the root of the genuine East India, or, at all events, the Portuguese tree. Boiti[4] advises that the root should be obtained from mountainous regions, where the tree grows wild; that it should be taken only from young trees, and that it should not be more than an inch thick; that it should be carefully separated from the woody portion, and be collected in the spring of the year, when the tree has most sap, and be dried in the shade. Chevallier,[5] also advises, that only the rind of the root of the wild tree should be used. Gendrin, Montault and Pichonnier affirm, that the fresh rind was alone certain in its operation; the dry frequently disappointing them. According to Breton, the rind of the trunk is to be preferred to that of the root, because it preserves its virtues longer. Chevallier recommends, before the decoction of the pomegranate tree bark is administered, that a gentle cathartic of castor oil with lemon juice should be premised. This may be taken the evening before, the patient fasting during the following day. He directs the DECOCTION to be made of two ounces of the *rind* macerated for twenty-four hours in two pints of *water*, and then boiled until a pint of the strained liquor remains. This must be divided into three portions, which are taken in half hourly doses. The first and second doses with many persons excite vomiting, but this need not prevent the administration of the third, as it rarely produces the same effect. This quantity of the decoction commonly occasions three or four evacuations, preceded by slight colic pains; at other times, but one evacuation is produced, with which the worm is usually expelled. The period that elapses between the administration of the last dose of the remedy and the commencement of its operation is from a quarter of an hour to a whole hour —rarely longer.

M. Merck[6] states that, when properly administered, it never

[1] Hannov. Annal., vii., 1847; cited in Schmidt's Jahrbücher, No. 8, S. 161. Jahrgang 1848.
[2] Riecke, Die neuern Arzneimittel, S. 247.
[3] Rust's Magazin, xvi. St. 3, S. 566.
[4] Revue Encyclop. xxxii. 234.
[5] Journal de Chimie Médicale, i. 378; 1825.
[6] Revue Médicale, cited in Medical Times, Jan. 11, 1845, p. 323.

fails. The mode he recommends is the following.—Whenever a patient has evacuated portions of tænia, he must take, on the same day, or the next, a decoction of two ounces of the fresh bark in a pint and a half of water, reduced to a pint, in three doses, leaving an interval of half an hour between each dose. The worm will be evacuated at the utmost in twenty-four hours, and no relapse need be feared. Want of success, he affirms, is owing to the fact that sometimes the dry bark is employed; and sometimes it is adulterated with other kinds of bark; or that it is taken too long after the portions of tænia have been expelled; or because the dose was too weak, or combined with purgatives, &c. Where this bark is used, a purgative is not necessary. Filix mas, on the other hand, requires a cathartic.

Cenedella advises, that the bark of the root should be macerated before boiling; that the decoction should be made in earthen, not in metallic, vessels, and that it should be filtered or strained whilst hot,—different constituents, which are probably efficacious, being deposited as the liquor cools.

According to M. Constant, the decoction is commonly prepared in France in the following manner:—The *rind of the fresh root* —or the *bruised root dried*—is macerated through the night in from a pint and a half to a quart of *water;* the liquor is then boiled to one half; strained; and, in the morning, a third part is taken lukewarm, fasting, and repeated every three hours until the whole has been administered. The quantity of the rind, used for the decoction, is, in the case of the adult, ℥j.; of children, from six to fifteen years old, ʒvj.; and of those under six years of age, ℥ss. At times, however, it has been administered in much larger doses. A girl, twenty-four years of age, had suffered from *tænia* from her infancy, and had frequently passed fragments of worms in her evacuations. She took two ounces of the bruised bark of the pomegranate root, boiled in two pounds of water, at thrice, with half an hour's interval between the doses, but without effect. The dose was now increased to three ounces, and two tapeworms were expelled; so that, in two days, and without any abdominal disturbance, the patient took the decoction of five ounces of the bark of the root.[1]

To ensure the proper action of the decoction, it must be given as directed above, without the addition of sugar or syrup, which changes its properties. During its operation, the patient should drink nothing except when the tormina are urgent, and then a little of any aromatized water, without sugar, may be taken. The remedy should be given only on days in which portions of tænia are evacuated, or on the following morning; and the alimentary canal should be free from every evidence of inflammatory irrita-

[1] Forget, in Gazette des Hôpitaux, 19 Février, 1839, or London Medical Gazette, April 20, 1839.

tion. By some, as by Latour de Trie and Ferrus, an infusion of the rind has been found serviceable; and Deslandes recommends an *Extractum spirituosum*, and an *Extractum aquosum corticis radicis granati.*

MM. Ferrus, Berthold, Goupil, and others, have published cases in which, along with the expulsion of *tænia*, *various neuroses* were removed under the use of the rind, and accordingly it has been thought that it might be usefully employed in such affections where no tænia exists; in *epilepsy* and *hysteria*, for example.

METHOD OF PREPARING.

Decoctum granati radicis corticis.

Decoction of pomegranate root bark.

℞. Granati radicis corticis ℥ij.
Aquæ Oij.
Boil to a pint and a half.

Dose.—℥ij. every half hour. Three or four doses are usually sufficient to expel the *worm*.[1] The formula given by Dr. Ainslie,[2] directs the DECOCTION to be prepared with ℥ij. of the *fresh bark*, boiled in a pint and a half of *water*, until only three quarters of a pint remain.

Electuarium extracti granati radicis corticis.

Electuary of extract of pomegranate root bark.

℞. Extract. alcohol. granat. rad. cort. ʒvj.
Aquæ florum tiliæ,[3]
Succi limon. āā. f ℥iij.
Tragac. q. s. ut fiat electuarium.

Dose.—One-half, from half hour to half hour. *Deslandes.*

Mistura extracti granati radicis corticis.

Mixture of extract of pomegranate root bark.

℞. Extract. alcohol. granat. rad. cort. ʒvj.
Aquæ menthæ,
—— flor. tiliæ,
Succ. limon. āā. f ℥ij. M.

To be divided into four parts, one of which may be taken every quarter of an hour. *Deslandes.*

CII. GUACO.

SYNONYMES. Huaco, Eupatorium Huaco.

It would appear, that owing to some extracts in the Allgemeine Zeitung, the attention of the German physicians had been directed to this article as an important agent in the cure

[1] Jourdan's Pharmacopée Universelle, i. 638. Paris, 1828.
[2] Materia Indica, ii. 175. London, 1826.
[3] Any simple aromatic water may be substituted for this.

of epidemic cholera; and various testimonials have been brought forward in its favour, which, as Riecke[1] properly suggests, may not be confirmed by farther experience; and yet the circumstance may have led to the introduction of a valuable article into the catalogue of medicinal agents.

Many species of the genus Eupatorium, and of the kindred genus Mikania,—which has been recently separated from it,—belonging to the NATURAL FAMILY Compositæ (Synanthereæ, subdivision Corymbiferæ,) and in the SEXUAL SYSTEM, to Syngenesia Æqualis, have been prized in various parts of America, particularly in cases of *bites of serpents*. This is especially the case with *Eupatorium ayapana* (*E. triplinerve*.) According to Von Martius, a quantity of the bruised leaves is applied to the scarified wound, and the application of fresh leaves is renewed, over and over again, until the patient is freed from the dangerous symptoms, and especially from the violent suffering. At the same time, a few spoonfuls of the expressed juice are administered every now and then. The *Mikania opifera* (*Eupatorium crenatum*,)—in Brazil termed *Erva da cobra*—and the *Eupatorium saturejæfolium* (*Mikania saturejæfolia*,) also belong to many Synanthereæ, which, in South America, are reputed specifics against the *bites of serpents*. The most important species appears to be that called in Peru *Guaco* or *Huaco*, which is held there in high consideration, as well as in New Grenada, and Venezuela, not only in these cases, but in the prevention of *hydrophobia*.[2] This is presumed to be the *Mikania guaco* of Humboldt. Dr. Hancock, however, affirms, that the names *Guaco* and *Bejuco de Guaco* were given—in the parts of America where he sojourned—to different species of Aristolochia.

Guaco was made known, forty or fifty years ago, by Mutis,[3] who refers to its effects in cases of the bites of serpents.

EFFECTS ON THE ECONOMY.

Of the efficacy of the guaco in *Indian cholera*, M. E. de Chaniac, *Officer de Santé* in the French navy, and Dr. Chabert, physician to the military hospital in Mexico, have published the results of their experience. When the brig Adonis, on her voyage from Havana to Mexico, in the year 1833, arrived at Vera Cruz, some of her crew were attacked with cholera, which prevailed at the time in Mexico. Of all the remedies employed, the guaco was found most beneficial; its effects, indeed, were so wonderful, that it was regarded almost as a specific. Its action is chiefly exerted on the heart and the circulation, which it renders more

[1] Die neuern Arzneimittel, u. s. w. S. 250. Stuttgart, 1837.

[2] See Prof. W. R. Johnson, in Silliman's Journal, xxiv. 272 and 388, New Haven, 1833; and ibid. xxvii. 171, New Haven, 1835; also, Dr. Hancock, in Quarterly Journal of Science, &c., from January to June, 1830, p. 333.

[3] Virey, in Bulletin de la Société de Pharmacie, vi. 241; and Riecke, op. cit. 251.

energetic. All the patients to whom it was exhibited in the commencement of the disease were saved, and even of those in whom the cholera had already reached a certain stage, the greater part were saved, as soon as a free and complete reaction was established. Dr. Chabert, who first administered guaco in cholera, as well as in *yellow fever*, observes on its use in the former disease: —In simple cases, a small teacupful of a warm decoction was given every half hour, until a general diaphoresis and proper warmth of surface supervened, which was kept up for some days, when the remedy was gradually discontinued. To allay the thirst, the decoction was given, diluted with two-thirds, or half, water. In dangerous cases of cholera algida, with coldness, loss of pulse, &c., a spoonful of the tincture was mixed with six or eight spoonfuls of water, and, every quarter of an hour, a spoonful of this mixture was given alternately with a small cupful of the decoction. When the pulse returned, the warmth became restored and the perspiration re-established, the tincture was omitted, and the decoction continued alone at longer intervals. In the majority of cases, after the cessation of the cholera symptoms, pain was experienced in the epigastrium, with burning thirst, which yielded when the decoction was diluted with half or two-thirds water. When the decoction could not be retained by the stomach, it was given in clyster. Blood-letting, general and local, was employed along with other external means, but nothing was given internally except the guaco. To make the DECOCTION; —two drams of the *stalks*, and half a dram of the *leaves*, were boiled in two pints of the *water*, down to one. The TINCTURE was prepared like other tinctures.

In consequence of the communications of Chabert and De Chaniac, as well as of the parallel drawn by Harless[1] between the cholera and the effects of the bites of serpents, Professor Beckers of Munich recommended that experiments should be made with guaco; and it was accordingly tried in Munich, but not with as favourable results as had been expected. Romerio asserts that it was given in the *stadium asphycticum* in the form of INFUSION, made of half an ounce of the stalks, but with uncertain results. It appeared to combine the effects of valerian and ipecacuanha, yet it excited less vomiting than the latter. The tincture appeared to render greater service. It was given in the dose of a coffee-spoonful every half hour, and, subsequently, every hour, and every two hours. It would appear, that in the district of Prague, its administration was attended with very favourable consequences.[2] To account for the different results, it is affirmed, that different drugs are met with in commerce under the name guaco. Riecke says, that M. Jobst had sent him two kinds, which were evidently from

[1] Die Indische Cholera, u. s. w. Braunschweig, 1831. [2] Riecke, op. cit. S. 256.

different plants: the one variety was obtained from Hamburg and Bourdeaux; the other, from Paris: descriptions of these are given by Riecke. The truth, probably, is, that this, like most of the cholera specifics which have been brought forward, is efficacious in certain cases of the disease, but that its agency has been egregiously exaggerated.

CIII. HIPPOCAS'TANUM (CORTEX.)

Synonymes. Æsculus Hippocastanum, Castanea Equina seu Pavina, Horse Chestnut, Buck Eye (the Bark.)
French. Marronier, Marronier d'Inde.
German. Rosskastanie, Pferdekastanie, Rosskeste, Pferdekeste.

The tree whence this bark is derived is Æsculus Hippocastanum or Horse Chestnut—of the Natural Family Hippocastaneæ; Sexual System, Heptandria Monogynia—which is wild on the mountains of Asia Minor and Persia, and grows in this country as well as in Europe. The bark has a very astringent taste; is somewhat bitter, and contains a great deal of tannic acid. Canzoneri thinks he discovered a peculiar principle in it, which he calls *æsculine*, but the existence of this is contested.

EFFECTS ON THE ECONOMY.

The Cortex hippocastani has long been advised as an astringent, but without receiving much attention.[1] In modern times, it has been proposed by Zannichelli, Hufeland, Voigtel, and others, as the best substitute for cinchona. These recommendations have caused the bark to be more frequently administered of late, in Europe, by which means it has been discovered to accord almost entirely in its effects with that of the willow: the latter, however, appears to be more effective, and to agree better with the digestive organs. In the wars of Napoleon, when bark was very scarce, it was much employed. Hufeland and Voigtel recommended it especially in *intermittents*. Sinogowitz[2] advises that it should be given after the removal of intermittents by quinia, to prevent a relapse; and, also, in combination with diuretic agents, in the cases of *dropsy* which often succeed to that disease. Krügelstein found it always extremely efficacious in *atonic gout*, and in removing the *weakness of the digestive apparatus* that remains after attacks of gout. The Austrian, Brunswick, Danish, Russian and Saxon Pharmacopœias[3] have an aqueous extract of the bark, which Voigtel administered with good results in *intermittent fever*, and often found serviceable in *chronic discharges from*

[1] Mérat and De Lens, art. Æsculus Hippocastanum.
[2] Rust's Magazin, B. xxix. H. i. p. 84.
[3] Pharmacopée Universelle, ii. 14. Paris, 1828.

the mucous membranes. It agrees better with the stomach than the powder or the decoction. Externally, the decoction has been advised as a good astringent.

MODE OF ADMINISTRATION.

Pulvis corticis hippocastani compositus.

Compound powder of horse chestnut bark.

Pulvis Chinæ Factitius.

Factitious Powder of Bark.

℞. Hippocast. cort.
Salic. cort.
Gentian rubr. cort.
Calam.
Caryophyll. āā. ʒij.
Misce et fiat pulvis.

Hufeland[1] affirms, that this powder is an adequate substitute for cinchona in three cases out of four.

Hufeland, and *Prussian Pharmacopœia.*

Decoctum corticis hippocastani.

Decoction of horse chestnut bark.

℞. Cort. hippocastan. ℥iss.
Coque cum aquæ f ℥xviij. ad reman. colat. f ℥ix.; cui refrigerat. adde
Spir. æther. sulph. f ʒj.—ʒij.
Syr. cort. aurant. f ℥j. M.

To be used during the *apyrexia.* *Voigtel.*

Decoctum chinæ factitiæ.

Decoction of factitious bark.

℞. Salic. cort. pulv. crass.
Hippocast. cort. āā. ℥ss.
Calam.
Caryophyll. āā. ʒij.
Coque cum aq. fontan. f ℥xvi. ad reman. colat. f ℥viij.

Prussian Pharmacopœia.

Decoctum hippocastani acidum.

Acid decoction of horse chestnut.

℞. Hippocast. cort. pulv. ʒvj.
Coque cum
Acid. sulphur. dilut. f ʒj.
Aquæ f ℥x.
ad. colat. f ℥vj.

Used in the after treatment of *intermittents.—Sinogowitz.*

Electuarium corticis hippocastani.

Electuary of horse chestnut bark.

℞. Hippocast. cort. pulv. ℥ss.
Calam. ʒss.
Roob. juniperi ℥iij. M. ut fiat electuarium.

A tea-spoonful to be taken every hour, or every two hours, in *dropsies supervening on intermittent fever.—Sinogowitz.*

[1] Armenpharmacopoë 4te Ausgab. Berl. 1825.

HYDRAR'GYRI PRÆPARA'TA.

SYNONYMES. Preparations of Mercury.
French. Les Préparations de Mercure.
German. Quecksilberpräparate.

CIV. HYDRAR'GYRI BRO'MIDUM.

SYNONYMES. Hydrargyrum Bromatum, Brometum Hydrargyrosum seu Hydrargyri, Protobromuretum Mercurii, Bromide of Mercury.
German. Bromquecksilber, Quecksilberbromür.

Mercury unites with bromine in more than one proportion. A solution of *hydrobromate of potassa* produces with a solution of *nitrate of protoxide of mercury* a white precipitate, which resembles calomel; and appears to be a bromide of quicksilver, answering to the proto-chloride (*Hydrargyrum Bromatum, Hydrargyri Protobromidum;* German, Quecksilberbromür, Bromquecksilber, Protobromüre des Quecksilbers.) On the other hand, the bromide, which is formed by the direct union of *bromine* with *mercury*, corresponds probably to the bichloride. A white substance results, which can be sublimed by heat, is soluble in water, alcohol, and especially in ether; is coloured red or yellow by the alkalies, and exhibits considerable resemblance to corrosive sublimate;—(*Hydrargyrum perbromatum, H. bibromatum, H. perbromidum, H. deutobromidum* seu *bibromidum;* German, Quecksilber-deuto-bromür, Bromquecksilber in maximum.)

EFFECTS ON THE ECONOMY.

The effects of these preparations on the sound and diseased organism are not yet well known. They have, however, been employed by some physicians. The PROTOBROMIDE strongly resembles calomel in its properties. In the dose of one or two grains, it produces no effect in health, even when taken fasting. In a higher dose—four or five grains, and upwards—it purges moderately, augmenting, at the same time, the secretion of urine. When used in *primary syphilitic affections*, in the way of friction on the gums, or internally in pill, it removes them like calomel; but it does not seem to affect the mouth as speedily or as severely as it.[1]

The DEUTOBROMIDE OR BIBROMIDE, *Hydrargyri perbromas* seu *bibromas, Hydrargyrum perbromatum, Brometum hydrargyricum, Bromidum* seu *deutobromuretum mercurii;* German, Doppeltbromquecksilber, Quecksilberbromid, resembles the bichloride of mercury in its action,—producing, in too strong a dose, vomiting and purging, with colic

[1] Bulletin Général de Thérapeutique, No. 14, 30 Juillet, 1837.

and cramp of the stomach; affecting the mouth, and exciting violent salivation.[1] Werneck, of Austria, has administered it frequently in *syphilis*. In recent cases, he prescribes it in the form of pill, beginning with one-twentieth of a grain. This dose he increases by one-twelfth every two days; the chancres being covered at the same time with compresses, wetted with a solution formed of six grains of the same substance to a pint of distilled water. After a few days' treatment, he remarked that the sores assumed a better appearance; and from twenty to thirty days were sufficient to effect their entire cicatrization. The total quantity of the bromide administered was about five grains; it was rarely necessary to carry it as high as ten or twelve grains. It has been believed, that deutobromide of mercury is less liable to act on the salivary glands than the corrosive chloride, and to affect less severely the stomach and chest.[2]

Desorgues has recommended the second (?) preparation as a prophylactic and curative agent in *syphilis*. It was doubtless, also—Riecke suggests—the second preparation which was administered with excellent effects by Prieger in *porrigo favosa* of an obstinate character. He terms the preparation *bromas mercurii*, but the true bromate is probably insoluble in ether.[3] The first of the following formulæ is recommended by Prieger.

Guttæ hydrargyri deutobromidi.

Drops of deutobromide of mercury.

℞. Bromatis mercurii, (vel potius hydrargyri perbromidi,) gr. vj.
Solve in
Æther. sulphuric. f ʒiij. M.

Dose.—Ten to twenty drops, according to the age of the patient, daily, in water.

℞. Hydrargyr. deutobromid. gr. j.
Æther. sulphuric. f ʒj. M.

Dose.—Ten to twenty drops in barley water, a short time after taking dinner;—in *syphilis*. *Werneck* and *Prieger*.

CV. HYDRAR'GYRI CYANURE'TUM.

Synonymes. Hydrargyri Cyanidum seu Prussias seu Bicyanidum seu Borussias, Hydrargyrum Cyanogenatum seu Cyanatum seu Cyanicum seu Borussicum seu Zooticum seu Hydrocyanicum, Cyanuretum seu Cyanetum Hydrargyri, Mercurius Hydrocyanicus, Cyanidum Mercurii, Cyanide or Prussiate or Hydrocyanate or Bicyanide of Mercury.
French. Cyanure ou Hydrocyanate ou Prussiate de Mercure.
German. Cyanquecksilber, Blaustoffquecksilber, Blausaures Quecksilberoxyd, Quecksilbercyanid.

This mercurial preparation is contained in the Pharmacopœias of the United States, Dublin, London, Belgium, Paris, Ferrara, &c.

[1] Glover, Edinb. Med. and Surg. Journ., Oct., 1842. [2] Ibid.
[3] Die neuern Arzneimittel, S. 261. Stuttgart, 1837, & 2te Auflage, S. 371. Stuttgart, 1840.

METHOD OF PREPARING.

According to Proust and Gay-Lussac, two parts of good and finely powdered *Prussian blue* must be boiled with one part of *deutoxide of mercury* and eight parts of *water*, until the mixture acquires a bright-yellowish tint. It is then filtered, and the filtered liquor, which is the hydrocyanate of deutoxide of mercury —containing, however, some iron—is digested or boiled with an excess of deutoxide of mercury, whereby the oxide of iron is completely precipitated. As, however, the hydrocyanate is combined with an excess of oxide of mercury, this must be saturated with free *hydrocyanic acid*, and the solution be evaporated to induce crystallization. In this mode the cyanuret is formed.

The formula of the Pharmacopœia of the United States is the same as that adopted in the *Codex Medicamentarius* of Paris, which was recommended by Berzelius. It is as follows:—Take of *Red oxide of mercury*, three ounces, or a sufficient quantity; *Ferrocyanuret of iron*, four ounces; *Distilled water*, three pints. Put the ferrocyanuret of iron, and three ounces of the oxide of mercury, previously powdered and thoroughly mixed together, into a glass vessel; and pour upon them two pints of the distilled water. Then boil the mixture, stirring constantly, and if, at the end of half an hour, the blue colour remains, add small portions of the oxide of mercury, continuing the ebullition until the mixture becomes of a yellowish colour; after which filter through paper. Wash the residue in a pint of the distilled water, and filter as before. Mix the solutions, and evaporate by the fire till a pellicle appears; then set the liquor aside that crystals may form. To purify the crystals, dissolve them in distilled water; filter; evaporate the solution, and set it aside to crystallize.[1] Dr. Christison[2] does not approve of this preparation. He regards it as a "needless incumbrance of the London and Dublin Pharmacopœias." "It was introduced," he remarks, "into the latter, as the source of the hydrocyanic acid; which may now be obtained more cheaply, and equally well, from other materials." Schräder directs it to be prepared by mixing a solution of *red oxide of mercury* with *hydrocyanic acid*, filtering and evaporating.[3]

Cyanuret of mercury forms white, opake, four-sided prisms; is inodorous, and its taste is extremely disagreeable and metallic. It is decomposed by heat; is readily soluble in water, and becomes converted thereby into hydrocyanate of mercury. It is insoluble in alcohol. It contains, at times, ferrocyanuret of potassium, proceeding from the Prussian blue, with which it has been prepared.[4]

[1] Pharm. of the United States, p. 118. Philad., 1842; see, also, Mr. Ellis, in Journal of the Philadelphia College of Pharmacy, vi. 24. Philad., 1834–5.

[2] Dispensatory, p. 519. Edinb. 1842.

[3] See a new process for its preparation, by MM. Chevallier and Deleschamps, in Journ. de Chimie Médicale, Janv. 1830.

[4] Orfila, Toxicologie, i. 331.

EFFECTS ON THE ECONOMY.

According to Coullon, the poisonous action of this salt is as rapid as that of hydrocyanic acid. A fatal case has been published.[1] In the dose of from two to five grains, M. Ittner found it produce on dogs only signs of indisposition, tremors, &c.[2] It is one of the substances which Magendie,[3] in his experiments, found to promote the coagulation of the blood.

Parent,[4] who frequently used this preparation, prefers it greatly to corrosive sublimate, in consequence of its greater solubility, and the capability of more readily affecting the organism by it. According to his experience, *syphilis* yields more readily under its use, than under that of any other of the mercurials. He did not observe pains in the abdomen accompanying its protracted employment, which he so frequently witnessed when the corrosive chloride was taken. Another advantage which it possesses is, that it is not so readily decomposed. No salt, no alkali—not even caustic alkali—disturbs it; neither do substances that contain nitrogen or gallic acid, which speedily convert the corrosive chloride into calomel. Moreover, cyanuret of mercury appears to act on the animal textures differently from the corrosive chloride. When the latter is placed in contact with flesh, it becomes quickly changed, in part, into calomel; whilst the cyanuret preserves the flesh equally well, without being decomposed. The hydrocyanic acid appears to play no important part in the action of the remedy. According to Olivier's experiments,[5] the cyanuret, like the corrosive chloride, acts as a powerful excitant to the tissues on which it is applied. He saw a man destroyed by inflammation of the intestines, who had taken twenty-three grains of it.

Cyanuret of mercury was first, perhaps, recommended in Italy, by Brera, and in Spain. Mendoza especially made many trials with it, from which he was induced to conclude, that it is the best agent we possess in *venereal affections*—an opinion in which he was joined by several of his professional brethren in Malaga. He advises, that laudanum should be added to it, on account of its liability to excite vomiting. When too large doses were administered, or when the patient was unusually impressible, he found that the nervous system became especially disordered—as indicated by syncope, oppression, anxiety, and convulsions. Chaussier, likewise, as well as Thaer and Horn, proposed the cyanuret as a remedial agent at an early period. On the other hand, Wendt,

[1] Thibert, cited by T. R. Beck, in Amer. Journ. of the Med. Sciences, April, 1842, p. 490.

[2] Mérat and De Lens, Dict. de Mat. Méd., art. Cyanogène.

[3] Leçons sur le Sang; and translation in Lond. Lancet, Jan. 20th, 1839, p. 636.

[4] Journ. de Chimie Médicale, viii. 473.

[5] Journ. de Chimie Médicale, i. 269; see, also, Letheby, Lond. Med. Gaz., Jan. 9, and Feb. 14 and 17, 1845.

Cullerier and Plisson complain of its little efficacy; whence it has been inferred that the preparation must differ.[1]

Neumann[2] advises it in *chronic inflammation of the lungs, of the membranous organs of the chest and abdomen*, and *of the ovaries*. In particular cases, its use has to be soon pretermitted, in consequence of its powerful action on the salivary glands, even in small doses—as one-eighth of a grain, three times a day. In other cases, it can be continued long without the supervention of any unpleasant consequences. In the Charité, at Berlin, it was used with advantage in a case of *obstinate cephalalgia*, the origin of which was *syphilitic*. Biett has employed it externally—in the form of the ointment given below—in *humid tetter*, accompanied with inflammation and itching. Parent recommends it to be applied in *chancre*, and Brera uses it in solution, as a gargle, in *syphilitic ulcerations of the fauces*. Dr. Strohl[3] cures *chancres*, even when complicated, usually within twelve days, with an ointment composed of two grains of the cyanuret to a dram of lard. The ointment is spread upon a piece of lint of the size of the sore: the dressing is apt to be painful at first, and it must be taken off occasionally, after it has been on for an hour or two, and be applied in a weaker form. The pain is said to be most violent in half an hour or an hour, and frequently ceases in two or three hours. When the chancre is extensive and painful, after the ointment has been on for from four to ten hours, according to the sensibility of the patient, it is dressed with mercurial ointment or opium cerate. By Carron du Villards it was used in the form of ointment in *scrofulous conjunctivitis;* and by Desmarres in the *blepharitis glandulosa* of scrofulous individuals: and Fischer and Dührsen observed good effects from the use of an ointment composed of it in the *hydrocephalus* of children.[4]

Such is the chief testimony recorded in favour of the medical action of the cyanuret of mercury. Dr. Christison[5] thinks, that "the few trials hitherto made of its effects in disease scarcely justify its introduction as a remedy." Although, however, it has been but little used in Great Britain, many trials have been made with it, on the continent of Europe more especially.

MODE OF ADMINISTRATION.

Cyanuret of mercury may be given in pills or in solution. Horn prescribed it in powder, but this form is less appropriate. The

[1] Riecke, Die neuern Arzneimittel, u. s. w. S. 264. Stuttgart, 1837, & 2te Auflage, S. 376. Stuttgart, 1840.

[2] Hufeland and Osann's Journal, lv. 66.

[3] Oesterreich, Med. Wochenschrift, cited in Lond. Med. Gaz., Nov. 1842. Gaz. Méd. de Strasbourg, Nos. 15, 17; or Encycl. des Sciences Méd. Sept. 1841, p. 525.

[4] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 147. Erlangen, 1848.

[5] Dispensatory, p. 519. Edinb. 1842.

dose is from one-sixteenth of a grain to a grain, several times a day. As a *gargle*, half a grain to a grain may be dissolved in f ℥j. of water; as an *ointment*, from one and a half to two grains may be united with ʒj. of lard. Chaussier used it in friction on the soles of the feet, in the same way as the corrosive chloride.

Liquor hydrargyri cyanureti.

(*Liqueur Antisyphilitique de Chaussier.*)

℞. Hydrargyri cyanur. gr. viij.
Aquæ destillat. Oj.

Each ounce contains half a grain of the cyanuret.

Chaussier[1] and *Parent.*

℞. Hydrarg. cyanuret. ℈ss.
Solve in
Aq. destillat. Oj.
Adde
Tincturæ opii f ʒj. M.

Dose.—Morning and evening, a spoonful, in a decoction of sarsaparilla or barley. *Mendoza* and *Parent.*

Pilulæ hydrargyri cyanureti.

Pills of cyanuret of mercury.

℞. Hydrarg. cyanuret. gr. v.
Opii ℈ss.
Micæ panis ʒj.
Mellis q. s. ut fiant pilulæ xcvj.

Dose.—One to four, three times a day. *Parent.*

Gargarisma hydrargyri cyanureti.

Gargle of cyanuret of mercury.

℞. Hydrarg. cyanur. ℈ss.
Decoct. ten. sem. lini, (vel rad. althææ,) Oj.
M. et fiat gargarisma.

Parent.

℞. Hydrarg. cyanur. ℈ss.
Decoct. hordei Oj.
Mellis rosæ ℥j. M. et fiat gargarisma.

Brera.

Unguentum hydrargyri cyanureti.

Ointment of cyanuret of mercury.

℞. Hydrarg. cyanur. gr. xij.
Adipis ℥j. M. ut fiat unguentum.

Brera.

℞. Hydrarg. cyanur. gr. xvj.
Adipis ℥j.
Ol. limonis gtt. xv. M.

From half a dram to a dram, to be rubbed in, in cases of *tetter.*

Biett.

[1] Rattier, Formulaire Pratique des Hôpitaux Civils de Paris, 3ème édit. Paris, 1823

CVI. HYDRAR'GYRI IO'DIDUM.

Synonymes. Hydrargyri Proto-iodidum seu Proto-ioduretum seu Subiodidum, Hydrargyrum Iodatum flavum, Iodidum seu Ioduretum Hydrargyrosum, Hydrargyrum Iodidulatum seu Subiodatum seu Iodatum, (in contradistinction to the Periodatum,) Iodidum seu Iodetum Hydrargyrosum, Proto-ioduretum mercurii, Protiodide, Proto-iodide, Proto-ioduret or Subiodide of Mercury.

French. Proto-iodure de Mercure.

German. Gelbes oder einfach Iodquecksilber, Gelbes Quecksilberiodid, Protoiodür des Quecksilbers, Quecksilberiodidul, Quecksilberiodür, Iodquecksilber in minimum des Iods.

METHOD OF PREPARING.

According to Tünnermann, the best method of preparing the iodide is the following:—Take of *nitrate of protoxide of mercury* (not tinged yellow by the admixture of nitrate of peroxide,) 28.25 parts; *iodide of potassium*, 16.5 parts; rub them together for some minutes in the dry state, and afterwards with a little *distilled water*, gradually adding the water so as to dissolve the saltpetre formed. The mixture is then passed through the filter, and the yellowish-green precipitate of iodide of mercury is well washed, and dried by a gentle heat. The objection to this process is the difficulty of obtaining the mercurial salt at a minimum of oxidation, and the consequent liability of the resulting compound to contain uncertain quantities of the red iodide. M. Boutigny,[1] to avoid these disadvantages, recommends the following form:—Take of *mild chloride of mercury*, three ounces and five drams; *iodide of potassium*, two ounces and four drams: pulverize the iodide in a glass mortar, and add the calomel; place the mixture in a porcelain capsule, and pour over it ten or twelve ounces of *boiling distilled water*. After cooling, decant the fluid, collect the precipitate on a filter, and wash with *distilled water*. Dry in the shade, and keep in a well-stopped bottle.

The iodide, thus prepared, may, according to M. Boutigny, sometimes contain a minute portion of free mercury or of the mild chloride, but the quantity of either is so small as to be of no moment.

In the London and United States Pharmacopœias, it is prepared by rubbing together an ounce of *mercury* and five drams of *iodine*, adding gradually as much alcohol as may be sufficient until globules are no longer visible. The powder is dried immediately by a gentle heat, access of light being excluded; and it is kept in a well-stopped vessel.[2]

Iodide of mercury, according to Thomson, consists of 250 parts

[1] Bulletin Général de Thérapeutique, cited in Amer. Journ. of Pharmacy, 2d vol. 2d series, p. 326. Philad. 1837.

[2] Pharm. of the United States, p. 119. Philad. 1842.

of mercury, and 156 parts of iodine. It has a greenish-yellow colour, and is a preparation holding the same relation to iodine and mercury, that the mild chloride holds to chlorine and mercury; it is more volatile, however, than the mild chloride, but like it is almost insoluble in water.

EFFECTS ON THE ECONOMY.

This preparation has been less used than the red iodide to be described next. Tünnermann remarks, as the results of his experience, that its action in respect to the mercury is analogous to that of the mild chloride, except that it appears to excite more the lymphatic and glandular systems. When given in conjunction with a generous animal diet, he found it very efficacious in a case of *scrophulosis*, where *colliquative sweats* had appeared; and in a second case, also, it rendered essential service. In one of the cases, he gave it internally in the dose of from one-twelfth to half a grain, three times a day; in the other, of from half a grain to a grain. He directed it also to be rubbed, in the form of ointment, on *tumefied glands of the neck*. Pelletan found it serviceable in the cure of *obstinate glandular swellings*, when used in the form of ointment in combination with morphia, as well as in *obstruction of the liver*. Biett recommends an ointment of the iodide in the treatment of *chronic venereal ulcers*, the cicatrization of which it expedited; Lugol[1] advises it in *phagedenic scrofulous ulcers*, which present a *syphilitic aspect;* and Poiret[2] recommends it strongly in cases of *psoriasis;* the patient using, at the same time, simple alkaline or water baths alternately. According to the experience of Ricord,[3] in the *syphilitic affections of children, especially of a cutaneous character*, it is to be preferred to other forms of mercurial, and is not apt to be followed by the bad effects, which, in adults, often supervene on the use of other preparations.[4]

MODE OF ADMINISTRATION.

On account of its insolubility it is given only in the form of powder or pill, to the extent of from a grain, gradually carried to three or four grains, twice or thrice a day. Externally, it is applied, for the same reasons, in the form of ointment only.

[1] Essays on the Effects of Iodine in Scrofulous Diseases, &c., by O'Shaughnessy, p. 170. Lond. 1831.

[2] Gazette des Hôpitaux, 20 Juillet, 1837; see, also, Bulletin Général de Thérapeutique, Juillet, 1837; and C. A. Porter, in Amer. Journ. of the Med. Sciences, Nov. 1839, p. 68.

[3] La Lancette Française, No. 65, 1834.

[4] Cogswell's Essay on Iodine, p. 158. Edinb. 1837. See, also, Ricord, Practical Treatise on Venereal Diseases, translated by Drummond, Philad. 1843, and Hocken's Comparative Value of the Different Preparations of Mercury and Iodine, &c. &c. in Edinb. Med. and Surg. Journ. April, 1844.

Pilulæ hydrargyri iodidi.

Pills of iodide of mercury.

℞. Hydrarg. iodidi ʒj.
Confect. rosæ caninæ ʒiij.
Zingiberis pulv. ʒj. M.

Dose.—From five to ten grains. *London Pharmac.*

Pilulæ hydrargyri iodidi compositæ.

Compound pills of iodide of mercury.

℞. Hydrarg. iodid. gr. vj.
Extract. opii gr. iv.
Lactucarii gr. xxiv.
Ext. guaiac. gr. xlviij.
M. Fiant pilulæ xlviij.

Dose.—For a child, half a year old, one pill; for older children, two, three, or four. In the *syphilis of children.* *Ricord.*

℞. Hydrarg. iodid. gr. j.
Ext. junip. gr. xij.
Glycyrrhiz. pulv. q. s.
Divide in pil. viij.

Dose.—At first, two, morning and evening: afterwards, three or four. *Magendie & Biett.*

℞. Hydrargyri iodid. ℈ij.
Guaiac. pulv. ʒj.
Thridac. ʒss. M. et divide in pil. xlviij.

Dose.—One a day in *scrofula, syphilis,* &c. *Biett.*[1]

Pulveres hydrargyri iodidi.

Powders of iodide of mercury.

℞. Hydrarg. iodid. gr. i. (iv., vj., vel viij.)
Magnes. ʒj.
M. et divide in pulv. xij.

Dose.—A powder, three times a day.

Unguentum hydrargyri iodidi.

Ointment of iodide of mercury.

℞. Hydrargyr. iodid. ℥j.
Ceræ albæ ℥ij.
Adipis ℥vj. M.

Lond. Pharm.

℞. Hydrarg. iodid. gr. vj.
Morphiæ acetat. gr. viij.
Adipis ℥j. M.

In *obstinate glandular swellings.* *Pelletan.*

℞. Hydrarg. iodid. ℈j.
Adipis ℥iss.[2] M.

In *old venereal ulcers.* *Magendie & Biett.*

[1] Duhamel, Amer. Journ. of Pharm. July, 1841, p. 105.
[2] Tünnermann uses only ℥ss.

℞. Hydrarg. iodid. ℈ij.; (vel iij. vel iv.)
Adipis ℥ij. M.

As a dressing to *phagedenic* and *scrofulous ulcers*. *Lugol.*

When this salve is first prepared, it is of a canary-yellow, sometimes of a greenish colour. By time, it becomes of an orange hue, when it must be thrown aside, as owing to the formation of the red iodide, it becomes as corrosive as the ointment of the corrosive chloride.

℞. Hydrarg. iodid. ʒj.
Adipis ℥j. M.

To be rubbed morning and evening on the parts affected.
Poiret.

℞. Hydrarg. iodid. ʒi.
Sapon. medicin. ʒss.
Aquæ rosæ ʒij.
Unguent. rosæ ʒvj. M.

This ointment is said not to turn rancid so rapidly as the common ointment. *Riecke.*[1]

CVII. HYDRAR'GYRI IO'DIDUM RUBRUM.

Synonymes. Hydrargyri Deuto-iodidum seu Deuto-Ioduretum seu Periodidum seu Biniodidum, Hydrargyrum Iodatum Rubrum seu Biiodatum seu Periodatum, Iodidum seu Iodetum Hydrargyricum, Deuto-ioduretum Mercurii, Red Iodide, Deutiodide, Biniodide or Periodide of Mercury.
French. Deuto-Iodure de Mercure, Periodure de Mercure.
German. Rothes Iodquecksilber, Iodquëcksilber in Maximum, Quecksilber-iodid, Deuto-Iodür des Quecksilbers, Doppelt Iodquecksilber, Quecksilberdeutiodür, Iodquecksilber in Maximum.

METHOD OF PREPARING.

The process of the Pharmacopœia of the United States consists in dissolving an ounce of *corrosive chloride of mercury* in a pint and a half of *distilled water;* and ten drams of *iodide of potassium*, in half a pint of *distilled water*. The solutions are then mixed, and the precipitate is collected on a filter, washed with distilled water, dried with a moderate heat, and kept in a well-stopped bottle.

The following is the process recommended in the London Pharmacopœia:—An ounce of *mercury* and ten drams of *iodine* are to be rubbed together, *alcohol* being gradually added until the globules are no longer visible. The powder is to be dried with a gentle heat, and kept in a well-stopped vessel.

[1] Bouchardat, Annuaire pour 1844, p. 140. Paris, 1844.

The Edinburgh Pharmacopœia triturates two ounces of *mercury* with two ounces and a half of *iodine*, adding occasionally a little *alcohol* till a uniform red powder is obtained. The product is reduced to fine powder, and dissolved in a concentrated solution—a gallon by measure—of *chloride of sodium*, with the aid of brisk ebullition. It is then filtered, if necessary, through calico, keeping the funnel hot. The crystals, which form on cooling, are then washed and dried.

Red iodide of mercury is a beautiful vermilion-coloured powder, which, when moderately heated, becomes yellow, but, when exposed to the air, is gradually restored to red, and is volatilized. When volatilized, it crystallizes in beautiful rhomboidal leaves, which, at a higher temperature, are of a golden-yellow hue; but at the ordinary temperature, of a shining red. It is insoluble in water; but soluble in alcohol and ether; and in solutions of iodide of potassium, and chloride of sodium. It contains 250 parts of mercury, and 312 of iodine.

EFFECTS ON THE ECONOMY.

This preparation, which was introduced into practice by the French physicians, has been particularly recommended in *syphilis complicated with scrofula*. Biett found it very efficacious in *scrofulo-venereal ulcers*, in *syphilitic swellings of the lymphatic glands*, and in *inveterate itch*. He administered it also internally, dissolved in alcohol or ether, in *scrofulous affections complicated with syphilis*, and with advantage. In its effects, it resembles the corrosive chloride, whilst the iodine resembles the mild chloride. Rayer,[1] indeed, considers the red iodide more active than the corrosive chloride. Paillard found it very efficacious in *chronic cutaneous eruptions*. He dipped a camel's hair pencil in a weak solution of it in ether, and pencilled the parts with it three or four times a day. In this way, he cured several squamous, tuberculous, and other eruptions. It scarcely excited any pain. As, however, this mode of applying it often failed, he employed ʒj. mixed with ℥j. of oil of almonds in the same manner. If the corrosive action was considerable, a sense of heat soon arose in the part, which gradually terminated in burning pain. The neighbouring parts were also hot, painful, and tumefied; and, in the course of an hour, an infusion of serum took place; but in four or five hours, the pain always disappeared. If applied on the cheeks or lips, salivation at times ensued suddenly. Scabs formed, which fell off in a few days, and exposed a red surface much disposed to cicatrize. When frequently applied, symptoms occurred, which

[1] Treatise on Skin Diseases, by Dr. Willis, p. 79. See, also, Puche, Journal des Connaissances Médicales, Oct. et Nov. 1838, and Janvier, 1839.

were probably the consequences of its being absorbed,—namely, fever, colic, diarrhœa, and dysentery. Breschet[1] applied it, in the form of ointment, with great success, in a case of *obstinate ulceration* at the angle of the eye, *presumed to be carcinomatous.* Blasius advises it internally and externally in *lupus*, and it has been recommended highly by Dr. J. W. Schmidt, Junr., of New York,[2] in cases of the same affection, and especially in the *dartre vénérienne.* Both the iodide and red iodide were given internally. These cases, as well as *syphilitic sore throat* of long standing, which had been previously treated by mercury without success, Dr. Schmidt found to yield invariably to a pill of a quarter of a grain of the iodide, and a grain of extractum conii, given night and morning, and afterwards three times daily. After using these pills for from four to eight weeks, he substitutes the solution of iodide of potassium,—changing, in the first place, the action of the parts by cauterizing the throat with the solid argenti nitras. Dr. Schmidt has not found it necessary to carry the iodide so far as to touch the mouth, but should it accidentally do so, he stops the mercury, and goes on with the iodide of potassium. Tünnermann used it with advantage, in the form of ointment, for the removal of *furuncular inflammation of the glands of the neck.* Riecke,[3] likewise, employed it, with great success, as a discutient, (gr. xvj. to ℥j. of *lard*,) in a case of *ganglion in the region of the knee*, from which violent pain proceeded along the nerves when it was pressed upon—and in two cases of *goitre.* Whenever it has to be applied over an extensive surface, as in the disease last mentioned, it has generally to be discontinued soon, in consequence of the supervention of inflammation of the cutaneous surface. In the form of a weak ointment—composed of red *iodide* gr. ij., *cerate* ℈ij., *almond oil* ℈j.—it has been used in *opacity of the cornea.*[4]

Kopp has published some favourable cases of the therapeutical application of the red iodide. The ointment, given below, he found very efficacious in *luxuriant, chronic, scrofulous, and syphilitic sores*, as well as in *condylomata*, and *venereal blotches.* No less useful did he find it in many other *skin diseases*, and particularly in *herpes.* In one case, in which he administered it in the last affection, he found a co-existent *goitre*, which had been there for several years, almost wholly disappear; and he, consequently, afterwards prescribed it frequently for the latter affection. He also used it, with excellent effect, in *ophthal-*

[1] Lugol's Essays on Iodine, by O'Shaughnessy, p. 204.
[2] American Journal of the Medical Sciences, Feb. 1840, p. 301.
[3] Die neuern Arzneimittel, u. s. w. S. 270.
[4] Gräfe und Walther's Journ. für Chirurg. Bd. xiii., cited by Pereira, Elements of Materia Medica, 2d edit. i. 762. Lond. 1842, or 2d Amer. edit. Phila. 1846.

mia tarsi, and, where there was a disposition to the formation of *hordeolum*, a little of the second ointment, the form for which is given hereafter, was applied at bed time to the edges of the eyelids. Lastly, he advises friction with the first ointment in *chronic rheumatic pains*, and in cases of *induration of the glands, especially of the liver*. After the friction has been continued for some time, an eruption occasionally appears.

Both the iodide and red iodide, in the form of ointment, have been found, by Dr. Moj'sisovics,[1] of Vienna, exceedingly useful in promoting absorption. The strength of the ointment of the iodide, recommended by him, is gr. x. to ʒij. of simple ointment, which quantity is to be daily rubbed into the part affected. The strength of the ointment of red iodide used by him is ʒj. to ℥j. of simple ointment. This ointment spread upon leather vesicates; and the cuticle separates in the form of a crust. Its efficacy has been great in *bronchocele:* according to M. Moj'sisovics, on the falling off of the dried cuticle, the size has been found to be sensibly diminished. No preparation of iodide, he thinks, is comparable in this disease to the red iodide. "It performs in one month what the other forms will scarcely do in three or four." He has treated goitres of enormous size with it, and at the first application all the threatenings of suffocation or apoplexy—where they existed—ceased. *Condylomata* about the anus and perineum, or even within the rectum and vagina, were cured by this ointment; and unless they were very extensive and indurated, a single application—which is very painful—combined with the internal use of iodine, has been found sufficient.

The author has frequently administered the red iodide in public and in private practice, in cases where an active modifier of the system of nutrition appeared to be needed, and where a combination of remedies so potent as mercury and iodine suggested itself. In *chronic glandular enlargements, especially of the liver and spleen*, and in habits where the use of mercury was not contra-indicated, both the red iodide and iodide have, in his hands, proved extremely serviceable. Perhaps there are no preparations, which, under the circumstances in question, merit more attention.

MODE OF ADMINISTRATION.

Red iodide of mercury is given internally in the form of powder or pill, or dissolved in alcohol or ether, in the dose of one-sixteenth to one one-fourth of a grain, gradually increased daily. Externally, it is applied in the form of ointment.

[1] Darstellung einer sicheren und schnellen Heilmethode der Syphilis durch Iodpräparate, Wien, 1845: noticed in Brit. and For. Med. Rev., April, 1845, p. 516.

Pilulæ hydrargyri iodidi rubri.

Pills of red iodide of mercury.

℞. Hydrarg. iodid. rubr. in syrup. commun. pauxill. terendo bene distribuend. gr. v.
Micæ panis alb.
Sacch. pulv. āā. q. s. ut fiant pilulæ lx.

Dose.—Two, morning and evening, drinking afterwards a cupful of oatmeal gruel. The dose to be raised gradually.

Blasius.

Tinctura hydrargyri iodidi rubri.

Tincture of red iodide of mercury.

℞. Hydrarg. iodid. rubr. ℈j.
Alcohol 36° (.837) f ℥iss. M.

Dose.—Ten to twenty drops, in a glass of distilled water.

Magendie & Biett.

Syrupus hydrargyri iodidi rubri compositus.

Compound syrup of red iodide of mercury.

℞. Hydrarg. iodid. rubr. *gram.* i. (gr. 15.44 Troy.)
Potass. iodid. *gram.* 50.
Aquæ, *gram.* 50.
Dissolve, filter through paper, and add
Syrup. (30° when cold,) *gram.* 2400.

A table-spoonful of this syrup is a dose. It represents, provided it holds 25 *grammes* of the syrup, a *centigramme* of red iodide of mercury, and 50 centigrammes of iodide of potassium.

Gibert.[1]

Æther sulphuricus cum hydrargyri iodido rubro.

Sulphuric ether with red iodide of mercury.

℞. Hydrarg. iodid. rubr. ℈j.
Æther. sulph. f ℥iss. M.

Administered like the last. *Magendie & Biett.*

Unguentum hydrargyri iodidi rubri.

Ointment of red iodide of mercury.

℞. Hydrarg. iodid. rubr. in pulv. subtiliss. gr. vj.
Adipis ℥vj. M.

Kopp.

℞. Hydrarg. iodid. rubr. in pulv. subtilissim. gr. $\frac{1}{8}$ to $\frac{1}{4}$.
Adipis ℈ij.
Ceræ albæ gr. ij.
M. fiat unguentum.

For an eye-salve. *Kopp.*

℞. Hydrargyri iodid. rubr. gr. xv.
Adipis ℥ss.
M. exactissime. Fiat ung.

As a dressing in *lupus*. *Blasius.*

[1] Journal de Pharmacie, Oct. 1841, p. 634.

℞. Hydrarg, iodid. rubr. gr. xv.
Adipis ℥ij.
Ol. bergamot. gtt. x. M.

To be rubbed on the parts in *chronic cutaneous affections.*
Biett.

℞. Hydrarg. iodid. rubr. ℈j.
Adipis ℥iss. M.

Biett.

To be spread on lint in *old venereal ulcerations.*

The *unguentum hydrargyri biniodidi* of the London College is prepared like the *ung. hydrarg. iodidi.*

CVIII. HYDRARGYRI NITRAS.

Synonymes. Hydrargyrum nitratum.
French. Nitrate de mercure.
German. Salpetersaures Quecksilber.

There are two nitrates of mercury employed in medicine:

I. HYDRARGYRI PROTONITRAS.

Synonymes. Hydrargyrum nitricum oxydulatum, Mercurius nitrosus frigore paratus, Nitras hydrargyrosus, Protronitrate of mercury, Neutral Nitrate of suboxide of mercury.
French. Protonitrate de mercure.
German. Salpetersaures Quecksilberoxydul, Kaltbereitetes Salpetersaures Quecksilber.

METHOD OF PREPARING.

This salt is formed by digesting excess of *mercury* in *cold dilute nitric acid,* until short prismatic crystals are formed. It is soluble without decomposition in a small quantity of water; but in much water its crystals are decomposed into a yellow powder—bibasic nitrate of suboxide of mercury, and an acid liquor, which contains a soluble supernitrate.

EFFECTS ON THE ECONOMY.

The effects of protonitrate of mercury, according to Dr. Pereira,[1] may be considered intermediate between those of calomel and corrosive sublimate; and he considers it probable, that after its ingestion it becomes converted into calomel by the action of the alkaline chlorides in the alimentary canal; and Mialhe[2] states, that if atmospheric oxygen and an excess of alkaline chloride be present, a portion of corrosive sublimate is formed. Sundelin[3] employs it in all cases in which the corrosive chloride is used, and

[1] Elements of Mat. Med. and Therap. 3d edit. i. 873. Lond. 1849.
[2] Traité de l'Art de Formuler, p. 72. Paris, 1845.
[3] Horn's Archiv., Jahrgang. 1827, St. 1, p. 164; cited in Dierbach, Die neuesten Entdeckungen in der Mat. Med. 3er Band, 1ste Abth. S. 302. Heidelb. und Leipz. 1845.

especially in the different forms of *chronic syphilis;* and Cazenave extols it as an excellent antisyphilitic. It is not often given, however, internally. Externally, it has been used by Biett and others in *chronic cutaneous diseases* in the form of ointment.

MODE OF ADMINISTRATION.

The dose of the protonitrate of mercury is from one-sixteenth to one-eighth of a grain in the form of pill, made with extract of liquorice. Sundelin gave it in the dose of from one-eighth of a grain to a grain.

Liquor hydrargyri protonitratis.

Solution of protonitrate of mercury.

(*Liq. Hydrargyri Nitrici*, Ph. Boruss. 1847.)

℞. Hydrargyri protonitrat. ℥j.
Aquæ destillat. ℥viij.
Acid. nitric. ℈iiiss.

Mix the acid and water before the protonitrate is added; filter, and add water, if necessary, to make the liquor of the sp. gr. 1.100. Preserve it carefully in a stopped vessel.

Dose, three drops.

Pilulæ hydrargyri protonitratis.

Pills of protonitrate of mercury.

℞. Hydrarg. protonitrat. gr. vj.
Solve in Aquæ destillat. pauxillo; et adde
Succ. glycyrrhiz. pulv.
Rad. Althææ pulv. sing. ʒj.
M. et fiant pilulæ xcvj.

Dose. Two pills twice a day. *Sundelin.*

Unguentum hydrargyri protonitratis.

Ointment of protonitrate of mercury.

℞. Hydrarg. protonitrat. gr. xv.
Adipis ℥j. M.

In *chronic cutaneous diseases.* *Biett & Cazenave.*

II. HYDRARGYRI DEUTONITRAS.

Synonymes. Hydrargyri Dipernitras seu Supernitras, Hydrargyrum Nitricum Oxydatum, Mercurius Nitrosus calide paratus, Nitras Hydrargyricus.

French. Deuto-nitrate seu Dipernitrate de Mercure.

German. Salpetersaures Quecksilberoxyd, Heissbereitetes Quecksilberoxyd.

METHOD OF PREPARING.

A solution of this salt is formed by boiling *mercury* in strong *nitric acid* until the liquid, when diluted with water, ceases to yield a white precipitate (calomel) on the addition of a solution of common salt. By evaporating, crystals are formed.

EFFECTS ON THE ECONOMY.

This salt is more acrid and caustic than the protonitrate. It is

considered to be converted into corrosive sublimate by the *alkaline* chlorides with which it comes in contact in the intestinal canal; and the action of the two substances may, therefore, be regarded as the same. It is scarcely ever administered internally; but when so, the dose may be one-sixteenth of a grain. It is often, however, used externally, and especially in the form of LIQUOR HYDRARGYRI SUPERNITRATIS seu PERNITRATIS, *Nitras Hydrargyricus Acido-Nitrico Solutus, Solution of Supernitrate of Mercury, Liquid Acid Deutonitrate of Mercury, Acid Nitrate of Mercury:* French, *Deutonitrate Acide de Mercure Liquide, Nitrate Acide de Mercure;* which is made, according to the Parisian Codex, by dissolving 100 parts by weight of *mercury* in 200 parts by weight of *nitric acid*, sp. gr. 1.321, and evaporating the solution to 225 parts.[1]

The following formula for the preparation of the *Hydrargyri Pernitratis Liquor* is given in the last Dublin Pharmacopœia.[2] Take of *pure mercury*, ℥ij. (avoirdupois;) *pure nitric acid*, ℥iss; *distilled water*, ℥iss. In the acid, first diluted with the water, dissolve the mercury, with the application of heat, and evaporate the solution to the bulk of two ounces and a half. It is chiefly as a caustic that this solution has been used, as by Biett, Petrequin,[3] and others, in *lupus;* and, by the French surgeons especially, for the purpose of cauterizing the *ulcerated cervix uteri.*[4] Biett applies it to the extent of a five-franc piece, by means of a camel's-hair pencil; and then applies lint dipped in the solution to the cauterized surface. The parts immediately become white, and a yellowish eschar forms, which apparently adheres strongly to them, but gradually separates.[5] By Chardon it has been employed successfully as an injection in *gonorrhœa*, a few drops being added to a glassful of water, and thrown up four times a day.[6] By Devergie it was applied beneficially in *tinea favosa;* and by Camus in *freckles.* Godard used it successfully in *herpes scrophulosus exedens;* and in various *obstinate cancerous ulcers*, and other *chronic cutaneous affections*, it has been prescribed with good results; and Godemer[7] has strongly advised it as a *cauterizing agent to the pharynx* in cases which require such applications. He employs a solution of one part of the acid nitrate to four or five of water, and applies it, by means of a camel's-hair pencil, passed once over the part, and gargling immediately afterwards.

[1] Traité de Thérapeutique et de Mat. Méd. 3e édit. i. 185. Paris, 1847.

[2] The Pharmacopœia of the King's and Queen's College of Physicians, 1850, p. 89. Dublin, 1850.

[3] Revue Médicale, Paris, 1848, cited in Brit. and For. Medico-Chirurg. Review, April, 1849, p. 538.

[4] J. H. Bennett, A Practical Treatise on Inflammation, Ulceration and Induration of the Neck of the Uterus, Amer. edition, p. 106. Philad. 1847.

[5] Dierbach, Op. cit. S. 304.

[6] Froriep's Notizen, B. 28, No. 3, p. 46, cited by Dierbach.

[7] Journal de Médecine de la Côte d'Or, Mai, 1847, cited in Bouchardat, Annuaire de Thérapeutique, pour 1848, p. 184.

Constitutional effects are said to have supervened on its local employment. Breschet saw salivation induced by a single application of it to the neck of the uterus.[1] To prevent this the part may be washed well after it has been touched.

The well-known Unguentum Hydrargyri Nitratis, Citrine Ointment, of the Pharmacopœia of the United States, is formed of the deutonitrate of mercury.

CIX. HYDRAR'GYRI ET ARSEN'ICI IO'DIDUM.

Synonymes. Arsenici et Hydrargyri Iodidum, Hydriodas Arsenici et Hydrargyri, Iodide or Hydriodate of Mercury and Arsenic, Double Iodide of Arsenic and Mercury, Iodo-arsenite of Mercury, Donovan's Solution.

Mr. Donovan[2] has proposed this new compound, which he regards as more efficacious than either the iodide of mercury or the iodide of arsenic.

METHOD OF PREPARING.

Triturate 6.08 grains of finely levigated *metallic arsenic;* 14.82 grains of *mercury*, and 49 of *iodine*, with one fluidram of *alcohol*, until the mass has become dry, and, from being deep brown, has become pale red. Pour on eight fluidounces of *distilled water;* and after trituration for a few moments, transfer the whole to a flask; add half a dram of *hydriodic acid*, prepared by the acidification of two grains of iodine, and boil for a few moments. When the solution is cold, if there be any deficiency of the original eight ounces, make it exactly that measure with distilled water. Finally filter.[3]

By the long continued trituration of arsenic, mercury, iodine, and alcohol, the metals are converted into iodides, which combine. The mass, by solution in water, is converted into a hydriodate of arsenic and mercury. The quantities of the two metals are so adjusted, that, when converted into protoxides by decomposition of a portion of the water in which they are dissolved, there will be eight grains of arsenious acid, and sixteen of protoxide of mercury. The quantity of water is such, that each dram by measure of the solution will contain exactly one-eighth of a grain of arsenious acid, and one-fourth of a grain of protoxide of mercury. Mr. Donovan conceives, that the quantity of mercury ought to be double that of the arsenic, in order to ensure a slow, and moderate, yet adequate mercurial action, along with the proper effect of the arsenic.

On repeating Mr. Donovan's process, M. Soubeiran[4] found, that a portion of arsenic remained undissolved, and he therefore pro-

[1] Op. cit. p. 191.
[2] Dublin Journal of Medical Science, Nov. 1839, p. 281.
[3] Donovan, Dublin Journal, Nov. 1842, p. 171.
[4] Journal de Pharmacie, xxvii. 744. Paris, 1841.

posed the following mode of preparation:—Take of *teriodide of arsenic*, gr. xxxv.; *biniodide of mercury*, gr. xxxv.; *boiling distilled water*, f ℥viij. Triturate until dissolved, and filter; and, if necessary, add sufficient water to make ℥viij. of the solution. A similar formula has been recommended by Mr. Procter,[1] of Philadelphia, who employs 36 grains of the *teriodide of arsenic*, and 34 grains of the *biniodide* to ℥viij. of *water*.

Of the preparation above described, which Mr. Donovan calls *liquor hydriodatis arsenici et hydrargyri*, (*liquor arsenici et hydrargyri iodidi* seu *hydrargyri iodo-arsenitis*,) each dram by measure consists of *water*, one dram; *arsenious acid*, one-eighth of a grain; *peroxide of mercury*, one-fourth of a grain; *iodine*, converted into hydriodic acid, about three-fourths of a grain. The colour of the solution is yellow, with a pale tinge of green: its taste is slightly styptic. It is incompatible with tincture of opium, or with sulphate, muriate, or acetate of morphia.

The test of the perfection of the preparation, according to Mr. Donovan,[2] is, that the whole of the iodine, arsenic and mercury shall disappear, and be dissolved during the process of preparing it. This cannot happen unless the three elements employed have been chemically pure, and unless the trituration has been sufficiently long continued.

EFFECTS ON THE ECONOMY.

Numerous trials have been made with this preparation in *cutaneous diseases*, especially in *psoriasis, lepra* and *lupus;* and the testimony of some of the most eminent of Mr. Donovan's countrymen has been brought forward in its favour. Mr. Carmichael has given it in five or six cases of *lupus*, and in one of *psoriasis*, with decided benefit.[3] Mr. Colles administered it in two extreme cases of *scrofulous ulceration* in the adult with some benefit: Dr. Croker gave it internally, and applied it externally, with complete success, in a case of *psoriasis guttata:* Dr. Graves treated with it a very inveterate case of *psoriasis* with decided advantage; Dr. Irvine completely cured by it a most virulent case of the same affection; Mr. Cusack found, that *venereal eruptions* yielded rapidly to half dram doses, three times a day; and Sir Henry Marsh had a case of *impetigo figurata*, of strumous origin, covering the face, chest, arms, and thighs, but particularly well marked at the flexures of all the joints, which was cured by the administration of fifteen minims, twice a day, gradually increased to one scruple, and finally to half a dram. The treatment was cautiously pursued for some-

[1] American Journal of Pharmacy, June, 1847, p. 93. A form for the preparation of the *Arsenici et Hydrargyri Hydriodatis Liquor* has been introduced into the last edition of the Dublin Pharmacopœia, 1850.

[2] Dublin Journal, Sept. 1840, p. 106.

[3] Dublin Medical Press, Jan. 18, 1840.

what less than a month, with a gradual amendment of the disease, which subsequently disappeared entirely.

Since those cases were published, Mr. Donovan has given numerous others from the practice of Dr. Charles O'Reilly, Sir Henry Marsh, Dr. Robert J. Hickson, Dr. J. D. White, Mr. Richard Jones, Dr. Bigger, Mr. O'Ferrall, Dr. Ferguson, Dr. Osbrey, Dr. W. T. Hamilton, Dr. Graves, Dr. Kirby, Mr. Gabriel Stokes, and Dr. C. P. Croker, which lead him to infer, that the diseases in which the preparation has been found of most service are the various forms of *psoriasis*, *impetigo*, *porrigo*, *lepra*, *venereal eruptions*—both papular and scaly, *pityriasis*, *sycosis*, *ephelis*, *lupus*, *sibbens*, and some *uterine diseases*.[1] In several of the cases, slight ptyalism was induced.

Dr. Isaac E. Taylor, of New York,[2] prescribed this preparation in a number of *cutaneous diseases;* and he testifies, that it produces a more marked and prompt effect than the various remedies usually resorted to in *lupus*, *rupia*, *psoriasis*, *secondary syphilis*, &c. It is also spoken of in high terms by Dr. Gerald Osbrey,[3] in inveterate *psoriasis*, *lichen urticatus*, and *scrofulous ophthalmia*.

MODE OF ADMINISTRATION.

The dose of the liquor arsenici et hydrargyri iodidi is from fifteen minims to half a fluidram, two or three times a day. Mr. Donovan[4] recommends the following form:—

Haustus liquoris arsenici et hydrargyri iodidi.
Draught of solution of iodide of arsenic and mercury.

℞. Liq. arsenic. et hydrarg. iodid. ʒij.
Aquæ destillat. f ℥iiiss.
Syrup. zingib. f ℥ss. M.
Divide in haustus iv.

Dose.—A draught, night and morning.

The division into draughts, Mr. Donovan considers necessary—*first*, to ensure accuracy of the dose; and *next*, to prevent injury to the ingredients by the use of a metallic spoon, as a measure;—the general way in which doses of medicine are administered. When applied externally in cutaneous affections, it may be diluted with an equal portion of water, or farther—should a weaker lotion be indicated. Mr. Donovan states, that the employment of this preparation was rapidly extending, as shown by the fact, that within two years and a half, about *three hundred pints* of it had been sent out of his establishment alone, which, as he properly remarks, is a vast quantity of an article prescribed in minim doses.[5]

[1] Dublin Journal of Medical Science, Nov. 1842. p. 199, and Erichsen, London Medical Gazette, May 12, 1843. p. 228, and May 19, 1843, p. 241.
[2] American Journal of the Medical Sciences. April, 1843, p. 319.
[3] Dublin Journal of Medical Science, July, 1842.
[4] Ibid. Nov. 1839, p. 282.
[5] Ibid. Nov. 1842, p. 199.

A DOUBLE IODIDE OF MERCURY AND MORPHIA, French, *Iodure double de mercure et de morphine*, has been recommended by M. Bouchardat.[1] It is obtained by treating in *boiling alcohol*, a mixture of equal parts of *red iodide of mercury*, and *iodhydrate* or *hydriodate of morphia*. On cooling, crystallized grains are deposited of a double compound, having a white, slightly yellowish colour. According to M. Bouchardat, it is almost as energetic as the red iodide of mercury, and ought to be employed with great caution. A quarter of a grain is a dose, which may be given once a day in the form of pill in *constitutional syphilis;* gradually increasing the dose, especially in *syphilitic pains of the bones*.

CX. IN'DIGUM.

SYNONYMES. Indicum, Indicus Color, Pigmentum Indicum, Indigo.
French. Indigo.
German. Indig.

This well-known colouring material is obtained from several species of the genus *Indigofera* (*I. tinctoria, I. anil, I. disperma, I. argentea*, and *I. hirsuta*,) belonging to the NATURAL FAMILY Leguminosæ, and, in the Linnæan System, to Diadelphia Decandria. As we receive it, it is in small, solid, brittle masses, of a deep azure colour, without smell or taste, and assuming a coppery lustre on being rubbed. It is entirely soluble in sulphuric acid, and is wholly consumed on burning coals. According to the analysis of Chevreul, 100 parts of Guatemala indigo of commerce contain only 45 parts of pure indigo, or *indigo-blue*—with which no therapeutical experiments have as yet been made: the greater part of the residue consists of a green matter soluble in spirit of wine (*indigo-green;*) and a red resin (*indigo-red;*) the rest is extractive matter, gum, and some carbonate of lime, oxide of iron, and argillaceous and siliceous earth. With hydrogen, pure indigo forms isatic acid, which has considerable resemblance to the hydrocyanic.

EFFECTS ON THE ECONOMY.

The natives of the countries where the different kinds of indigo grow, employ it occasionally as a therapeutical agent, especially in *diarrhœa* and *intermittent fever*. It is only within the last twenty years that attention has been paid to it in Europe. Prof. Von Stahly,[2] of Ofen, appears to have first employed it with success in *various spasmodic diseases*, especially in *epilepsy*. To these cases Lenhossek alludes, in detailing certain trials which he himself had made with it. In 1833, Grossheim[3] made known a

[1] Nouveau Formulaire Magistral, p. 303. Paris, 1845.
[2] Hecker's Neue Annalen, B. i. H. 1. Berlin, 1835.
[3] Medicinische Zeitung, No. 51, 1833.

case in which he found it extremely useful. A lady, twenty-eight years of age, had suffered for eleven years with violent *hysterical convulsive attacks*, for which she had employed almost every remedial agent. They began with a feeling of heaviness over the whole body, with slight convulsive twitchings of the limbs, which extended to the trunk; and were followed by total, or almost total, loss of consciousness: this, after an uncertain period, terminated in a comatose state, from which she was gradually restored—but in a languid condition—to perfect consciousness. Under the use of indigo for half a year, with pediluvia—which had been previously employed without advantage—she completely recovered.

These results gave occasion to the institution of experiments, touching the remedial properties of indigo, in the Charité at Berlin, the results of which have been given by Roth.[1] In most of the cases, it excited nausea, and even vomiting, preceded by a metallic taste on the tongue. At times, the vomiting was so violent and prolonged, that it was necessary to discontinue it; but generally on continuing its use, the vomiting ceased in three or four days, and diarrhœa took its place. All the patients did not vomit, and many escaped the diarrhœa. When once diarrhœa occurred, however, it commonly persisted as long as the indigo was used. The evacuations were seldom entirely fluid, but usually semifluid, and of a dark bluish-black colour. While the vomiting and purging continued, more or less uneasiness was experienced in the digestive apparatus. The vomiting and diarrhœa were frequently accompanied by pains in the stomach and bowels, which were commonly slight, but occasionally so violent that it had to be discontinued. In every patient at the Charité, the urine was of a dark violet hue. Von Stahly affirmed that the perspiration was coloured blue, but this Roth never observed. He remarked, moreover, that after its use for several weeks, certain patients were easily thrown into slight convulsions, similar to those caused by the use of nitrate of strychnia, and that they were affected with slight subsultus tendinum. Almost all the patients, indeed, who took it, were at first more frequently attacked with spasms than prior to the use of the remedy. In the beginning, the attacks of the disease were, in all cases, stronger, but of less duration, than previous to its employment. These changes continued for one, two, three, and even as long as eight weeks, whether the patients took small or large doses. At the expiration of this time, all the epileptic symptoms were diminished in intensity and duration, until the last attacks were mere premonitions.

The number of *epileptic cases*, treated by it, which Roth had an opportunity of observing in the Charité, was twenty-six; of these, nine were cured, eleven improved, and six remained.

[1] Hecker's Neue Annalen, B. i. Heft. 1. Berlin, 1835.

Dr. Ideler,[1] who instituted the experiments at the Charité, has also given publicity to the results; and his testimony accords with that of Roth. It is proper to observe, however, that, of the nine cases cured, three experienced relapses in from eight to twelve months; but from causes, according to Riecke,[2] which of themselves might have induced epilepsy.

Dr. Strahl,[3] of Berlin, likewise experimented with indigo, but his results were by no means favourable. In ten cases of old standing *epilepsy*, it was not of the slightest service, and the same may be said of two cases of *St. Vitus's dance*. In four cases of *hysteria*, it excited violent nephralgia, and in one of the cases, only after the affection of the kidney was removed, was the patient cured. It acted, however, markedly on the uterus; in two cases of *spasmodic affections, complicated with amenorrhœa*, the latter derangement was removed, whilst the spasms still continued, even after the recurrence of the catamenia. In the Charité, of Berlin, the purest Guatemala indigo of commerce was used, and it has been a question, whether Strahl did not employ one of feebler powers. It is worthy of remark, that he observed a dark green colour of the urine during its use, whilst in the cases in the Charité, a dark violet hue was constantly noticed.

Favourable cases are also detailed by Drs. Mankiewicz of Nackel,[4] and Hohnhorst, of Frankfort.[5] M. Podreca[6] found it especially efficacious when associated with asafœtida and castor.

Dr. Noble, of Versailles,[7] administered it in three cases, in which the disease had continued for four, twelve and twenty years respectively. At the time of making known the results, a month had elapsed in the first case, and two months in the second, since an attack had been experienced, and the last case he considered entirely cured. In the first patient, who was eighteen years old, four drams occasioned vertigo, slight depravation of vision, and convulsions similar to those produced by strychnia; and in both the other cases, diarrhœa was induced, which ceased, however, as soon as the indigo was discontinued, or the dose reduced one-half. He gave it in the dose of one dram gradually increased to four drams daily.

The observations of Rech, of Montpellier, were not as favourable to it. In none of the epileptics to whom he gave it was there any thing more than a slight amelioration. In the Hospice d'Hommes Incurables du Faubourg St. Martin, trials were made

[1] Medicinische Zeitung, No. vi. cited in Lancet, June 6, 1835.
[2] Op. cit. S. 276, and 2te Auflage, S. 389. Stuttgart, 1840.
[3] Hecker's Neue Wissenschaft. Annalen, 1836; cited in Edinb. Med. and Surg. Jour. 1837.
[4] Medicin. Zeitung, 31 Mai, 1837, S. 109.
[5] Ibid. S. 110, and Medicin. Zeitung des Vereins für Heilkunde in Preussen, 1837, No. 22.
[6] Bouchardat, Annuaire de Thérapeutique, pour 1843, p. 69. Paris, 1843.
[7] Bulletin Général de Thérapeutique, 1836.

with it by Dr. Blanche. Of ten cases, five were either cured or improved. One of these had existed for three years, and the paroxysms recurred every five or six days; but after the administration of the indigo, he had no return at the expiration of five months; in a second case, a youth, fifteen years old—who had been epileptic from birth, and had regularly one or two paroxysms a day, from the 19th of July, when its exhibition was begun with, until the middle of August, when the results were published—had only two insignificant attacks. The improvement in the other three cases was not as marked, yet it was unquestionable. The other five children experienced no improvement, yet no inconvenience was sustained, although the indigo was given in doses of four, six, and eight drams in the day. It was administered in water or in a tisane; and in one or two cases it excited vomiting, but after having been discontinued, it was borne subsequently. In all it induced tormina, and acted upon the bowels, but did not interfere with the appetite or any of the other functions.

Dr. Benjamin F. Hardy,[1] one of the senior resident physicians at the Philadelphia Hospital, published the results of some trials made with it, which, so far as they go, confirm its antiparoxysmal power. Two of the seven cases reported were apparently cured, two ameliorated, and three without any decisive results—the medicine not having been continued perhaps for a sufficient length of time. In these cases, it was commenced in the dose of ʒj., which was usually doubled daily until the patient took ℥ij$\frac{1}{4}$ daily, which quantity was persevered in for some weeks. In some of the cases, the fæces, urine, and perspiration were all coloured blue.

In other trials, instituted in the same charity, with indigo, the results were not as favourable.[2] It is obvious, indeed, that a wide difference must exist amongst cases of epilepsy, and that where the organic modifications are considerable, as indicated by concomitant mania, or idiocy, little can be expected from any remedy; but even in such hopeless cases, the number of paroxysms appear to have diminished under its use. Where the cerebral affection is slight, and more functional than organic, like artemisia and other remedies extolled in epilepsy, it may be useful. Its main efficacy, perhaps—as has been said of the *Ferri Subcarbonas* (p. 378,)—consists in the new impression which it makes, in adequate doses, upon the nerves of the stomach, and through them upon those of the whole system; but to effect the revulsion to the proper extent, it is necessary that the dose should be augmented day by day, and the remedy be continued in large doses for a sufficient length of time.

Dr. Pereira,[3] states that he has tried it in a considerable num-

[1] American Medical Intelligencer for July 15, 1839, p. 122.
[2] William H. M'Kee, in American Med. Intelligencer, Sept. 16, 1839, p. 177.
[3] Elements of Materia Medica, &c., 2d edit. p. 1620. Lond. 1842; or 2d Amer. edit. Philad. 1846.

ber of epileptic cases at the London Hospital, but without deriving the least benefit from it.

MODE OF ADMINISTRATION.

As indigo is extremely light, the powder is too bulky for administration; it is taken with disgust, and is apt to excite vomiting. On this account the form of electuary was selected in the Charité. It was generally combined with pulvis aromaticus, or pulvis ipecacuanhæ et opii. As to the dose, Roth advises that it should be commenced in grains, but be elevated to drams,—nay, even to one or more ounces in the day. In the Charité, the following formulæ were generally employed:—

Pulvis indigi.

Powder of indigo.

℞. Indig. in pulv. subtilissim. ʒss.
Pulv. aromat. gr. v. M. et fiat pulvis.

A powder to be given four times a day.

Pilulæ indigi compositæ.

Compound pills of indigo.

(*Antiepileptic Pills.*)

℞. Indig. gr. lxxv.
Asafœtid. gr. xv.
Castor. gr. vij. M.
et divide in pilulas xx.

One to be given every hour. *Podreca.*

Electuarium indigi.

Electuary of indigo.

℞. Indig. pulv. aquæ guttis nonnullis subact. ʒij.—ℨss.
Pulv. aromat. ʒss.
Syr. simpl. f ℨj.
M. et fiat electuarium.

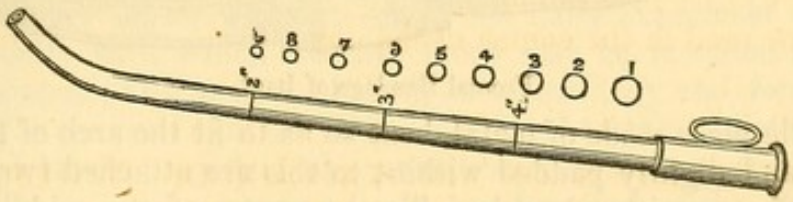
To be used in the course of the day. *Ideler.*

CXI. INJECTIONS OF AIR, VAPOUR OF ETHER, ETC., INTO THE EUSTACHIAN TUBE.

An important improvement in the understanding and treatment of diseases of the ear has resulted from the attention that has been paid to the pathological condition of the Eustachian tube, and the means, through it, of rectifying certain morbid states of the organ of hearing. A mystery has been thrown, or attempted to be thrown, over the diseases of the ear, and, as a consequence, they have furnished largely to empiricism; so that an exclusive aurist has been, too often, perhaps, esteemed synonymous with an exclusive empiric. Now that the physiology of the outer and middle ear is better understood, their pathological relations are no

longer environed with the same difficulties. The attention of the surgeon has to be first directed to the meatus externus, and if he discovers any obstacle,—as hardened cerumen,—which prevents the vibrations of a sonorous body from reaching the membrana tympani, such obstacle must be removed. Should no defect exist there, he inquires into the state of the Eustachian tube, to detect whether it be pervious, so as to permit a free passage for the air from the throat to the middle ear—any impediment to which is a common cause of deafness; and, lastly, if the tube be found in a state of integrity, his attention is turned to the condition of the nerve, to discover whether the defect—organic or functional—be seated there. Such are the main subjects of investigation in cases of *deafness;* although the condition of the membrana tympani, of the ossicles, and the mastoid cells, become interesting incidental objects of inquiry. *Chronic inflammation of the Eustachian tube* occasionally gives rise to stricture or narrowness of the tube; at others, to obstruction of the tube by means of mucus, or to accumulation of mucus in the tympanic cavities. In the former case, catheterism is demanded; in the latter, injections of air, in addition.

For the purpose of catheterism, various instruments have been employed. The catheter of Itard is a conical silver tube, curved at the extremity, with a slight enlargement to prevent laceration of the membrane. Kramer's instrument is a modification of that of Itard; the curve is more gradual, and the enlarged or button point is omitted. It is made of silver, six inches long, and is of a calibre varying from the size of a small crow-quill to that of a large goose-quill. The extremity is well rounded, and it is curved only to the distance of five lines from the point, exactly at an angle of 144°, so as to correspond to the lateral situation of the



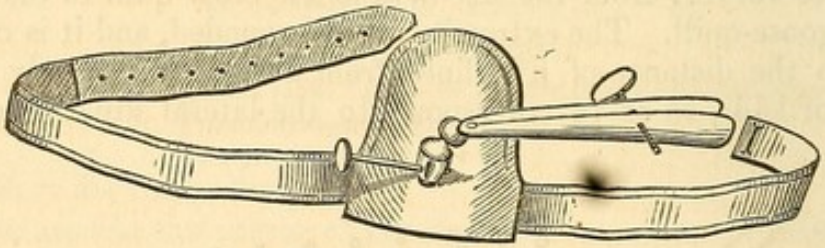
Catheter of Itard, (Reduced one-half.)

mouth of the Eustachian tube. It is nearly of the same calibre throughout its whole length, and provided with a funnel-shaped dilatation at the outer extremity, half an inch in length, to admit the pipe of the injecting syringe, &c. To this part is added a ring, on the same level with the beak of the catheter, by means of which the situation of the beak can be ascertained, when the instrument is introduced. The catheter is farther graduated in inches, which is convenient in repeated introductions.[1] When it

[1] Kramer, on Diseases of the Ear, chap. 2, Amer. Med. Library edit. Philad. 1838.

is requisite to sound the Eustachian tube, a piece of catgut may be passed through the instrument.

The catheter recommended by Mr. Pilcher[1] admits of being passed farther into the tube, and has a more gradual curve. Deleau[2] employs a flexible elastic gum catheter, which the patient learns readily to pass into the Eustachian tube, and by turning down the outer extremity, is able to inflate the tube with his own breath. This the author has seen repeatedly done. The silver instrument, slightly warmed and oiled, is introduced, with its convexity upwards, along the floor of the nostrils until the point reaches the pharynx; it is then gently turned, so that the point shall be outwards and a little upwards, the aperture of the Eustachian tube being above the level of the floor of the nose: in this way the tube enters, and is readily felt by the operator to have done so. The instrument is then carried onwards, until its farther progress is prevented by the narrowness of the tube. Mr. Pilcher's instrument is of such dimensions as to frequently occupy three-quarters of an inch of the tube; but if it be pushed beyond the fibro-cartilaginous portion—or that part of the tube which readily admits it—the mucous membrane may be lacerated, and pain will certainly be produced.[3] When Mr. Pilcher's catheter is fairly introduced, it will remain without support, an advantage it possesses—in the opinion of its proposer—over those of Itard and Kramer, which requires a frontal bandage to retain them in situ. Itard's bandage is represented in the next figure. It consists of



Frontal Bandage of Itard.

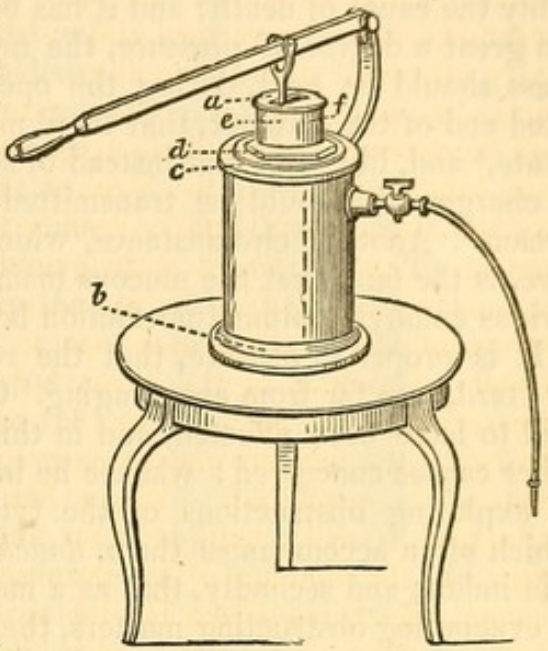
a middle piece made of metal, bent so as to fit the arch of the forehead, and slightly padded within; to this are attached two straps, which fasten with a buckle. To the centre of the middle piece, a pair of forceps are attached, which move in a ball and socket joint, and the blades of which are brought together by a screw. The bandage is applied before the catheterism is commenced; and when the instrument is introduced, the forceps are brought down, and screwed tight on the catheter, so as to retain it in position. Through the catheter, thus introduced, aurists were in the habit of sending lukewarm water through the Eustachian tube into the cavity of the tympanum;[4] but owing to certain objections

[1] A Treatise on the Structure, Economy and Diseases of the Ear, p. 304. London, 1838. [2] Op. cit. p. 305. [3] Op. cit. p. 305.

[4] See some cases of deafness relieved in this way, by John H. Dix, in Boston Medical and Surgical Journal, Sept. 25, 1839, p. 105.

that apply to the employment of fluids, Deleau[1] suggested the *air-douche*, or injections of air for the purpose of clearing the cavity; and this is regarded by Kramer[2] as a great improvement. With the view of increasing and regulating the force with which the air is sent into the cavity, both these gentlemen invented *air-presses* or condensers. The marginal figure represents that of Kramer.

c b is a cylinder, 10½ inches high, made of molten brass; the diameter of its calibre is 4½ inches, and it is fastened at *b* with strong screws, on a strong oaken stand of the height of an ordinary stool. Within the cylinder *c b* is a pump barrel of wrought brass screwed into it, which measures 10½ inches in height, and 2½ inches in diameter, rising, at *d a*, 3 inches out of the cylinder, so that the whole machine *a b* is about 13 inches high. In the piston of the pump barrel, there is a valve for the passage of the air, which besides passes in at the opening situate at *d*. There is a second valve in the bottom of the pump barrel, through which the air is forced into the interior of the cylinder.



Air-press of Kramer.

When air is injected into the tympanum, it may be heard to strike against the membrane, and to rush through the cavity into the mastoid cells, and thus may become a means of exploring the condition of the middle ear.

Mr. Pilcher[3] observes, that—from his daily experience of the great facility with which air and fluids may be introduced into the tympanum, and regulated, both as to quantity and force, by means of a common syringe accurately fitted to the catheter—he does not hesitate to declare his conviction, that the ceremony and inconvenience of the air-press may be dispensed with. He recommends that the operator should merely steady the instrument with his left hand, whilst he uses the syringe with his right. By this means, any fluid or gas injected through the catheter may be brought into contact with the mucous membrane, and thus stimulate the nerves of the cavity. Nor is the air-press entirely devoid of danger. Inflammation and even suppuration is sometimes caused by the air douche. This occurred, in seven cases, to M.

[1] Sur le Cathéterisme de la trompe d'Eustache, &c. Paris, 1828; Itard, in Mém. de l'Académ. Royale de Médecine, Tom. v. Fasc. 4. Paris, 1836; and translation in Medical and Surgical Monographs, vol. i. p. 75, of Amer. Med. Library, p. 86. Philad. 1838.

[2] Op. citat. p. 164.

[3] Op. cit. p. 307.

Itard; and Mr. Henry Savage[1] refers to five cases, which came under his cognizance, where perfect deliquium was caused, which continued for several hours. A case, too, has been detailed, in which, after "pumping air" four times through the nostrils into the Eustachian tube, immediately on removing the instrument from the nostril, the patient fell back in the chair and never spoke afterwards.[2] The sudden shock to the nervous system was probably the cause of death; and it has been suggested that, to avoid too great a degree of pressure, the nozzle of the tube of the air-press should be held, during the operation, so loosely in the dilated end of the catheter, that there may be room for air to regurgitate,[3] and, likewise, that instead of sending in the air by *douches* or charges—it should be transmitted in a gentle and continued stream. Another circumstance, which shows the importance of care, is the fact, that the mucous membrane may be ruptured, and serious emphysematous tumefaction be occasioned.

It is proper to observe, that the results of 258 cases, treated by Itard,[4] are far from encouraging. Of these, but two of cure are said to have been effected, and in this result, according to Itard, other causes concurred; whence he infers,—first, that as a means of exploring obstructions of the tympanum by the crepitation which often accompanies them, *douches* of air can afford no certain index; and secondly, that as a mechanical agent for deterging or evacuating obstructing matters, they can only dislodge and force them together; and, consequently, that both in the second and first point of view, douches of air do not deserve the confidence of the profession.

The VAPOUR of ACETIC ETHER has been injected into the middle ear in cases of *nervous deafness*, of which Kramer[5] makes two varieties; noise in the ear constituting the essential point of difference between them. This noise belongs, without exception, to the *erethitic* form; whilst it is foreign to the *torpid*. In cases of nervous deafness, Itard proposes to introduce ethereous vapour through the catheter, and to generate this vapour in an apparatus in which the ether is dropped on a saucer of red hot iron, by the heat of which it is vaporized. The ether is, however, decomposed in this manner, so that it is not ethereous vapour which enters the tympanum, but an acrid, very irritating kind of gas, which, according to Kramer, is well suited to the torpid form of nervous deafness, but is positively injurious in the erethitic variety. He considers the attempt to vaporize acetic ether in a flask,

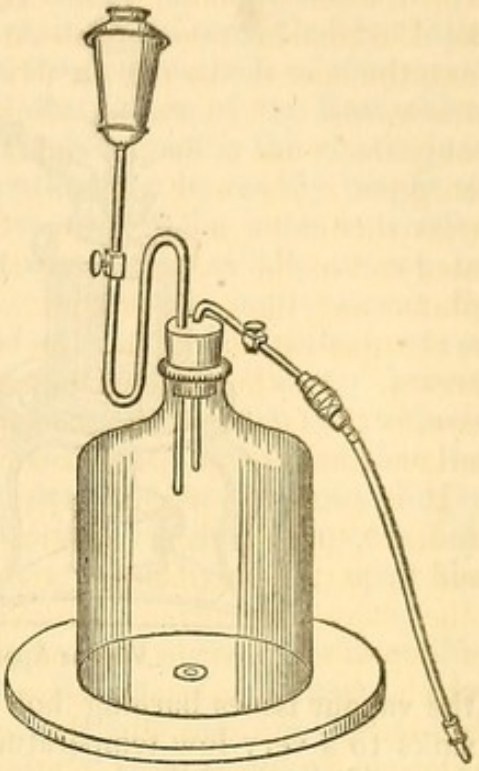
[1] Lond. Med. Gaz. for July 20, 1839, p. 616. M. Lynch, in Lancet, Aug. 3, 1839, p. 683, and ibid. p. 690; and Joseph Williams, Treatise on the Ear; including its Anatomy, Physiology and Pathology, &c., p. 242. Lond. 1840.

[2] Lond. Med. Gazette, July 6, 1839, p. 538.

[3] British and Foreign Medical Review, July, 1839, p. 95. [4] Op. citat.

[5] See, on this subject, T. Wharton Jones, in Lond. Med. Gaz., Aug. 3, 10, 17, and 24: 1839.

placed in warm water, and connected by means of a tube with the cavity of the tympanum, to belong to the same class of methods which act in too irritating and injurious a manner, owing to the vapour being given off far too rapidly. This inconvenience he proposes to remedy in the erethitic form of nervous deafness, in the following way: —A large glass flask—represented in the accompanying figure—holding about ten quarts, is firmly and closely stopped with a cork through which are passed two brass tubes, each provided with a cock; one of these tubes is connected above with a funnel for dropping in the fluid, and the other with an air-tight tube to conduct the vapour, generated and enclosed within the flask, into the cavity of the tympanum. When the apparatus is to be used, the cork is to be firmly fixed into the neck of the flask, with two tubes attached, and the cocks closed; the proper quantity of ether is then to be poured into the funnel, and forced into the flask by a gentle expiration, where it is converted into thin vapour at the ordinary temperature of the room. This vapour fills the interior of the flask equably, and is, indeed, in a state of slight condensation, so that when the metallic tip of the tube is connected with the catheter, and the cock is opened, the vapour issues with a whizzing sound.

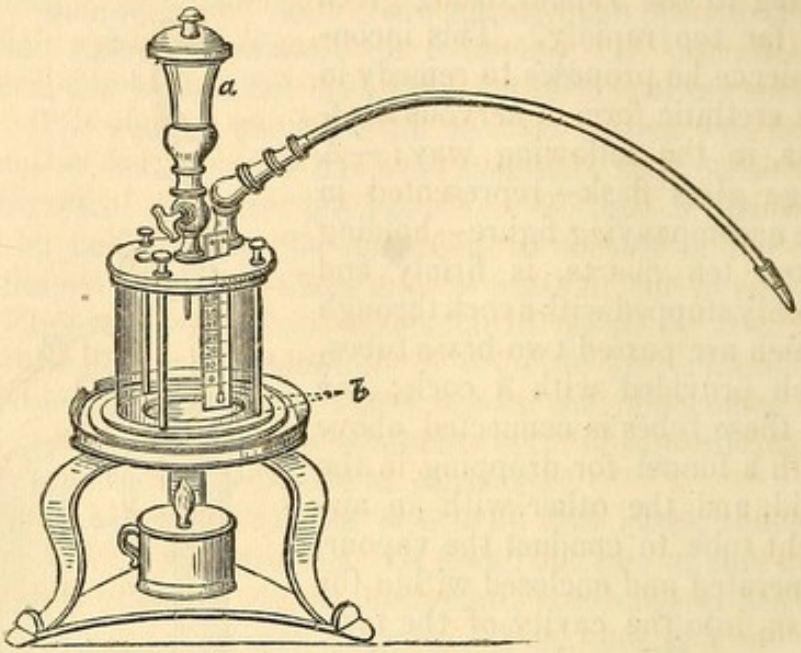


Vapour Apparatus of Itard.

Having previously introduced the catheter through the nose into the mouth of the Eustachian tube, and placed it in connexion with the tube of the vapour apparatus, the patient is to sit near a table, leaning his arm upon it, and with the corresponding hand he is to hold the tube of the apparatus, in such manner that it may remain in close connexion with the catheter. Each sitting occupies a quarter of an hour, and is repeated daily, applying the vapour alternately to the right and to the left ear. It is unnecessary to make use of warm water to pour into the flask, as the ordinary temperature of the room is sufficient to vaporize the ether.

In the *torpid form of nervous deafness*, this method of procedure does not answer, owing to the necessity for greater excitation than it is capable of effecting. In such a case, a modification of the apparatus of Itard has been proposed by Kramer. Owing to the metallic saucer in Itard's becoming cool more than once during a single sitting, and requiring to be exchanged for a hot

one, as a necessary consequence the temperature of the vapour generated never remains for a moment the same, but varies extremely; immediately after the insertion of the red-hot saucer,



Vapour Apparatus of Kramer.

the vapour issues burning hot into the ear, and in a few minutes sinks to a very low temperature. These evils Kramer proposes to rectify in the following manner.—For the floor on which the bell-glass of the apparatus rests, a thin metal plate is substituted, which is warmed at pleasure by an oil lamp placed beneath, so that the ethereous fluid falling on it is thus conducted through the catheter into the middle ear. Through the cover of the apparatus, a thermometer, with a metallic scale, passes down almost to the bottom, and indicates the temperature at which the ethereous vapour passes into the ear. After a sitting or two—if the individual is to be benefited by the plan in either form of deafness—an improvement ought to be perceptible.

This course of treatment, aided, occasionally, by attention to the state of the system, has, in Kramer's hands, been attended with satisfactory results, and has been adopted with advantage by others, with a more or less modified apparatus.[1] In a more recent work, however,[2] he states, that his mode of treating *nervous deafness* is essentially the same as that previously described by him—the introduction of stimulating vapours into the cavity of the tympanum; but, instead of the vapour of acetic ether, which he formerly recommended, but which, of late years, he had found too stimulating, and therefore not so well borne, he now advises

[1] Pilcher, op. cit. p. 318. See some observations on this subject, with two, by no means satisfactory, cases, by T. Wharton Jones, in Lond. Med. Gaz. for Aug. 31, and Sept. 7, 1839.

[2] Beiträge zur Ohrenheilkunde, Berlin, 1845; cited in Brit. and For. Med. Review, July, 1847, p. 39.

the vapour of *Aqua assafetidæ simplex*, of musk, of *Aqua amygdal. amar. sine spiritu parata*, and the like; and, as elsewhere remarked, after all the revival that had taken place in regard to aural medicine and surgery, chiefly through the writings of Deleau, Itard, Kramer and others, it would seem that but little permanent benefit has resulted from the new methods of treatment; unless where there has been partial obstruction of the Eustachian tube; and then perhaps the most valuable agent is the elastic gum catheter of M. Deleau, which the patient can be readily taught to pass into the tube through the nose, and if the outer extremity be bent down and inserted into the mouth, the middle ear can be inflated by the patient's breath. Temporary improvement in hearing follows the insufflation, and as a palliative method, where nervous deafness exists, it may be serviceable. "Every honest surgeon must, however, express his disappointment in the methods that were so strongly urged some years ago; and admit that the benefit derived from them in nervous deafness has been exceedingly limited; yet the mercenary and unprincipled have reaped a rich harvest, from the noise which they created, by acting upon the credulity of the public."[1]

A case of the successful application of the acetic ether in erethitic deafness was published by Dr. Bolton, of Richmond, Virginia.[2] The hearing distance was amazingly improved by it, and the success far exceeded the operator's most sanguine expectations. The vapour certainly proves at times, too irritating, or occasions results by no means to be desired. The author was applied to in one case in consequence of inflammation having supervened in the mucous membrane, which subsequently extended, in the erysipelatous form, over the cutaneous surface. It yielded to appropriate treatment.

On the whole, then, the treatment of deafness by injection is by no means so effective as was at one time supposed.

CXII. IO'DINUM.

Synonymes. Iodinium, Iodium, Iodum, Iodina, Iodine.
French. Iode.
German. Iod.

Iodine was accidentally discovered, in the year 1812, by Courtois, a manufacturer of saltpetre at Paris, but it was chiefly through the labours of Gay-Lussac and Sir Humphrey Davy,[3] that the chemical relations of this elementary body were appreciated. The discoverer first detected it in the mother waters of soda obtained from

[1] The author's Practice of Medicine, 3d edit., ii. 345. Philad. 1848.
[2] American Medical Intelligencer, April 1, 1839, p. 1.
[3] Annales de Chimie, lxxxviii. xc. and tom. xci., and Philos. Transact. 1814 and 1815.

sea-weed, (*kelp;*) and as it was found to exist chiefly in several of the sea-weeds, and especially in the sponges, it struck Coindet,[1] that experiments might be made with it in goître: from these he obtained such striking results, that its reputation soon spread abroad, and it was employed in various other diseases,—often with the most marked advantage. By experience, too, the injurious effects which it is considered by many capable of inducing were appreciated, so that it could be administered more satisfactorily than at an earlier period.

By the continued investigations of the chemist, iodine was found to be more largely distributed than was at first imagined. It was discovered in many of the marine mollusca, in sea-water, and in several mineral waters.

METHOD OF PREPARING.

Iodine is obtained from the mother waters of the soda derived from sea-plants, in which it exists—it is believed—in the form of iodide of sodium. The waters are procured by burning different kinds of weeds which grow on the sea-shore, lixiviating the ashes, and concentrating the liquor. To obtain iodine from this liquor, an excess of concentrated sulphuric acid is added to it, and the whole is boiled gently in a glass retort furnished with a receiver. The sulphuric acid lays hold of the base of the hydriodic salt, and of the hydrogen of the hydriodic acid; whence result sulphate of soda, water, sulphurous acid and iodine; the last passing over into the receiver in violet fumes with a little acid, and there becoming condensed. To purify the iodine, it may be washed with water containing a little potassa, and be redistilled.[2] It is manufactured in large quantity, in Scotland, from the kelp of the Hebrides and Orkney Islands.[3] According to Dr. Traill, the greatest quantity is produced by kelp made from *driftweed*, which is in a great measure composed of *Laminaria digitata*, and *Himanthalia lorea;* —*cutweed*, which consists of *F. vesiculosus* and *F. serratus*, yielding much less of it. One hundred tons of Caithness kelp afford, according to the experience of one manufacturer, one thousand pounds of iodine, or about a 224th part.[4] It is always prepared on the large scale, and hence is placed in the Materia Medica list of the Pharmacopœia of the United States.

Iodine is solid at the ordinary temperature; of a foliated appearance, and metallic lustre; of a grayish or bluish-black colour similar to that of plumbago; and friable. It is soluble in 7000 parts of water, and the solution has an orange-yellow colour. Its specific gravity is 4.946 at 62° of Fahrenheit. Its smell is similar to that

[1] Bibliothèque Universelle, Juillet, 1820, p. 190.

[2] For the method employed by Soubeiran, see Journal de Pharmacie, Janvier, 1837; and for that by Barruel, see Bussy, ibid.

[3] Christison, Dispensatory, Amer. edit. p. 591. Philad. 1848.

[4] Christison, loc. cit.

of chlorine, with which it accords in its property of destroying vegetable colours. It possesses, in a high degree, electro-negative properties. It colours the skin yellow, which colour gradually disappears. It fuses at 220° Fahrenheit. The vapour is of a beautiful violet colour, whence its name (ἰωδης, 'blue.') It is soluble in ether and in alcohol; forms an acid both with oxygen and hydrogen, and enters into numerous chemical combinations.[1]

In consequence of its high price, iodine is very liable to adulteration; and it is said, that coal, black lead, oxide of manganese, and charcoal have been added to it; but neither Dr. Christison[2] nor Dr. Pereira[3] has met with any of these impurities, which would remain behind when heat was applied, and admit, therefore, of easy detection. Water is the chief adulterant, and its unusual presence may be suspected if the iodine adheres to the sides of the bottle in which it is kept. Dr. Christison states, that until within the eighteen months before he wrote, he had not met with any British iodine that did not contain between 15 and 20 *per cent.* of water.

EFFECTS ON THE ECONOMY IN HEALTH.

Soon after the discovery of iodine, and the accurate investigations of Gay-Lussac, Magendie[4] instituted a series of experiments in order to appreciate its action on the animal organism. It was injected into the veins without any apparent effect. Several dogs were made to swallow it; they vomited, but it exerted no farther influence. He himself swallowed a coffee-spoonful of the tincture, and perceived no other result than a disagreeable taste, which continued for several hours, but gradually disappeared. In larger doses, however, the effects were markedly injurious. Orfila,[5] likewise instituted several experiments on dogs, from which he concludes:—that, introduced into the stomach in moderate quantity, it acts as a gentle stimulant, but may excite vomiting:—that in the dose of a dram, it almost always killed the animal in four or five days, when the œsophagus had been tied to prevent vomiting, and that in the part of the mucous membrane with which it came in contact, ulcers were gradually formed;—that when administered in the dose of from two to three drams, the œsophagus not being tied, it excited vomiting for several hours, even when a part of the poison had been evacuated by the bowels;—that it seldom caused death when given in the dose of one or two drams, the animal rejecting it by repeated vomiting; that it does not destroy life when applied externally, and that it must be classed

[1] See, on Iodine and its Combinations, Duhamel, in Philad. Journal of Pharmacy, vi. 101. Philad. 1823-4.

[2] Dispensatory, p. 553. Edinb. 1842.

[3] Elements of Mat. Med. and Therap. i. 235. Lond. 1842; or 2d Amer. edit., by Carson. Philad. 1846.

[4] Formulaire pour la préparation, &c., de plusieurs nouveaux Médicamens.

[5] Toxicologie, i. 556.

amongst the irritant poisons. Dr. Cogswell,[1]—in repeating one of Orfila's experiments, in which seventy-two grains of iodine were introduced into a wound on the back of a dog without much effect on the health of the animal,—did not attain exactly the same results. He introduced a scruple of iodine into the areolar tissue of the thigh of an adult rabbit, through a small opening made in the skin. The animal manifested no symptom of pain, and was able to make use of the limb as freely as before the operation, but, in the course of a fortnight, it gradually lost flesh, exhibiting an emaciated look, and the hair dropped off from many parts of the head. At the end of this time, thick, adhesive pus was found distending the cavity of the wound, from which the iodine had entirely disappeared. Dr. Cogswell properly suggests, however, the possibility, that the irritation of a large abscess might have been the sole origin of the animal's unhealthy appearance.

To discover the effects which it induces on man, Orfila took two grains fasting. An extremely disagreeable taste, with some nausea was the only consequence. On the next day, early, he took four grains, when he immediately experienced a sense of constriction and heat in the throat, which continued for a quarter of an hour, and soon afterwards he vomited a liquid yellowish matter, in which iodine was easily perceptible. Except a slight degree of oppression felt during the day, he observed no change in any of the functions. On the second day thereafter, he took six grains fasting, after which he soon experienced a sense of heat, constriction of the throat, nausea, eructation, increased flow of saliva, and pain at the pit of the stomach: ten minutes afterwards he was attacked with copious bilious vomiting, and slight colic pains, which continued for an hour, and were removed by two emollient glysters. The pulse, which, prior to the experiments, beat sixty times in the minute, became more frequent, beating from eighty three to ninety, and was much stronger. The breathing was tolerably free; but from time to time, there appeared to be a great obstacle to the dilatation of the chest on inspiration. The urine was higher coloured. All the symptoms were removed by the copious use of gum water as drink, and of emollient glysters.

Dr. Gully, on the other hand, says, that he has given as much as three drams of the tincture daily, and did not observe any effect. Dr. Kennedy,[2] of Glasgow, exhibited, within eighty days, nine hundred and fifty-three grains of iodine in the form of tincture, the doses having been so proportioned, that, towards the last, the patient—a girl—did not seem to be in any way particularly af-

[1] Experimental Essay on Iodine and its Compounds, page 21. Edinb. 1837.
[2] Lond. Med. Repository for 1822.

fected; and Dr. Buchanan[1] gave half an ounce of iodide of potassium within twelve hours, without any unpleasant result, diluents being largely taken at the same time. See Potassii Iodidum.

It has been conceived that, when iodine proves mischievous, it is owing to its being in a free state, and that it then operates as a corrosive poison. The tincture and the iodurettted iodides are esteemed objectionable on this account.[2] It does not appear, that the vapours of iodine exert any injurious effect on the workmen concerned in its preparation.[3]

From experiments, instituted by Jörg[4] on himself and on other healthy individuals, it seemed to him, that iodine, first of all, acts as a stimulant on the intestinal canal; soon afterwards it excites, also, the different glands in the cavity of the mouth and stomach, the pancreas, the liver, and the urinary and genital organs. An afflux of blood to the respiratory organs likewise ensues, which extends even as far as the Schneiderian membrane.

There is no doubt whatever, that it enters into the blood, and, in this way, doubtless produces its modifications on the system of nutrition. Two drams of iodide of starch, according to Dr. Buchanan,[5] were given to a young man labouring under gonorrhœa, and, as soon as the medicine made its appearance in the urine, blood was drawn from the arm. On examining it, both the serum and the crassamentum were found deeply impregnated with iodine. The same dose was given to a boy affected with dropsy of the knee-joint. About five hours after the dose had been taken, a very small puncture was made in the joint, and upwards of twelve ounces of synovia were drawn off by a cupping-glass. The synovia contained iodine in abundance. To an old man, who had a very large hydrocele, two drams of iodide of potassium were given over night, and the same quantity the following morning; on tapping him some hours after he had taken the last dose, more than thirty ounces of serum were drawn off, containing a large quantity of iodine.[6]

Dr. Gairdner[7] observed the action of iodine on the human body when administered in particular doses, and pointed out the disadvantages attendant upon its improvident use. The most striking inconveniences were induced in the digestive organs: it excited diarrhœa, and, at times, obstinate constipation; gastrodynia and violent vomiting, especially when food was received into the stomach. The emaciation occasioned by it is, according to some,

[1] Lond. Med. Gazette, July, 1836. See, also, Fuster, in Bullet. Général de Thérap. Fév. 1837, and Sept. 1837.

[2] Brande's Dictionary of the Materia Medica, p. 323. Lond. 1839.

[3] A. Chevallier, Annales d'Hygiène Publiq. &c., Avril, 1842.

[4] Materialen zu einer künft. Heilmittellehre, u. s. w. i. 473. 1824. [5] Op. cit.

[6] Brande, op. citat. p. 321. Lond. 1839. See, also, Cantu, in Journal de Chimie Médicale, ii. 291 and 394; and Bennerscheidt, ibid. iv. 383.

[7] Essay on the Effects of Iodine, &c. Lond. 1824.

a striking phenomenon, and may attain an incredible extent; yet it is proper to remark, that Lugol[1] in his frequent employment of it in scrofula, never observed this result: he affirms, indeed, that emaciated patients became stronger under its use; that the stout did not grow leaner, and that they who held the medium position in these respects acquired strength under its employment,—results which have been confirmed by others,[2] and which would, therefore, seem to show that this, as well as some of the other unpleasant effects ascribed to iodine, may have been owing to an incautious use of the article.

In addition to the above phenomena, Dr. Gairdner noticed anxiety, depression of spirits, and other symptoms similar to those of hypochondriasis; obscurity of vision; hardness of hearing; palpitations; and tremors of the limbs, particularly of the hands, which last symptom indicated the full effect of iodine on the constitution. He found, however, that the remedy was extremely variable in its effects; and that it might frequently be given in large doses, for a long time, without disadvantage; whilst, at other times, the unpleasant symptoms supervened rapidly, indicating that much must depend upon the peculiar impressibility of the individual. Coindet,[3] who, as already remarked, first used iodine as a therapeutical agent, speaks of many of the above-mentioned phenomena as resulting from its administration: these he considers evidences of the saturation of the organism, as the effect on the mouth is an index of the same thing in the case of mercury. It appears, however, to be never necessary, in the administration of iodine, to induce saturation of the organism, in order that the full sanative influence of the remedy shall be elicited. On the contrary, it seems to be advisable to avoid such saturation: and, accordingly, whenever there are the slightest indications of it, the dose should be diminished, or it should be discontinued for a time; after which —according to the results of numerous cases—its curative agency, when it is resumed, is exerted afresh, and more decidedly. Several physicians, indeed, advise that frequent intermissions should be made in the use of the agent, in order that its action may be more certain.

According to the observations of Coindet and Formey,[4] iodine, administered internally, occasions increase of appetite; but no influence is perceptible on the condition of the bowels and urinary organs, or on the perspiratory apparatus. On the other hand, when breathed for a few instants, the vapours of iodine caused twice in M. Chevallier[5] violent colic, which readily yielded to

[1] Mémoire sur l'emploi de l'iode dans les Maladies Scrofuleuses. Paris, 1829; and Observations on the Effects of Iodine, p. 17, Johnson's translation. Lond. 1824.

[2] B. Phillips, Lond. Med. Gazette, January 10, 1840; and Scrofula, its Nature, Causes, &c., Amer. edit. Philad. 1846.

[3] Bibliothèque Universelle, Mars, Avril, Mai, et Septembre, 1821.

[4] See, also, Ricord, op. cit.

[5] Journ. Génér. de Méd. ciii. 336.

gum water and laudanum. Raspail, however, under analogous circumstances, experienced no other inconvenience than a disagreeable taste in the back part of the mouth. According to Lugol, the vapour, disengaged from tincture of iodine poured into the water of a bath, is liable to induce a state of "*iodic intoxication*," and even of cerebral congestion. He affirms, that it exerted a powerful diuretic influence on all his patients, the urinary secretion being so much augmented, that many of them, contrary to their usual habit, were compelled to rise from bed several times in the night to discharge their urine. In upwards of a third, it had a cathartic effect, producing six or seven evacuations in the day, and occasionally tormina. In several, ptyalism ensued. Others, and especially females, complained of gastrodynia, which was always removed by the wine of cinchona, of which two or three ounces were taken shortly after the iodine. Iodide of potassium would seem to act more powerfully on the kidneys. A patient of M. Ricord,[1] at the Hôpital des Vénériens, Paris, whilst under its influence, passed daily from forty to fifty *litres* or quarts of urine, drinking, however, in an equivalent ratio. This enormous secretion always ceased whenever the use of the iodide was suspended. In its character the fluid differed little from ordinary urine, except in containing evident traces of the salt.

Dr. Manson,[2] who used the tincture of iodine, found it occasionally produce sickness of the stomach, and M. Delisser affirms, that, in two months, he gave one thousand and nineteen grains of the iodide to a female affected with cancer of the mamma,—the doses, at certain periods, amounting to thirty grains in the twenty-four hours. The consequences were anorexia, quick pulse, ulceration of the mouth, and fœtor of the breath—of a different kind, however, from that which arises from mercury.

M. Ricord[3] affirms, that of all the tissues of the body, the skin is decidedly the most susceptible of the action of iodine, and that there is scarcely a variety of cutaneous disease, which, in different idiosyncrasies, may not be excited by iodide of potassium, although they may mostly be made to disappear under the discontinuance of the medicine. The author has not often observed such results from it.

It would appear that the effects of the remedy vary according to the form in which it is administered, and it is proper to observe, in viewing the different results obtained by Lugol and Coindet, that the latter commonly gave the tincture, whilst the former prescribed the solution in water, with a little chloride of sodium. Lugol observes, that the appetite of his patients was very much increased by it. Eager, who likewise administered the watery solution, rarely observed diarrhœa and emaciation; in general, in-

[1] Bulletin de Thérap. Sept. 1842: cited at length in Provincial Med. Journ. March 18, 1843. [2] Medical Researches on the Effects of Iodine. Lond. 1825. [3] Op. cit.

deed, the appetite and nutrition improved under it. At times, ulceration took place in the mouth, whereby the breath assumed a mercurial fœtor; and salivation has been observed from it, according to Manson,[1] Winslow,[2] Ely,[3] Mackall,[4] Sir F. W. Smith,[5] and others; but Riecke[6] suggests, that this, perhaps, only occurred in those who, along with the use of iodine internally, had employed iodide of mercury externally. Ricord, however,[7] affirms that salivation is a common effect; and that, at times, the quantity of saliva secreted is equal to that in the highest degree of mercurial ptyalism; but it would appear to be of a different character. He says it resembles greatly the ptyalism of pregnant women. The saliva is not viscous, and it seems not only to emanate directly from the mouth, but to be regurgitated. The mucous membrane of the mouth may be a little œdematous and irritable; but no inflammation or ulceration is perceptible as in mercurial ptyalism; neither, according to him, is the health tainted, nor are the salivary glands the seat of any tumefaction.

On the genital organs, Eager found iodine act as an excitant; it augmented the activity of the uterus, and rendered the catamenia more abundant; it is asserted, too, to have increased the sexual appetite, but this is questionable: during its use, indeed, the testes in men, and the mammæ in women, have been observed to disappear:[8] but this, as will be seen hereafter, is certainly not a common occurrence.[9] It has been imagined, also, to cause sterility. Two cases are detailed by Dr. Robert H. Rivers,[10] in which barrenness succeeded its administration. Magendie, on giving it as an emmenagogue to a young lady of unsuspected virtue, brought on abortion.[11] Krimer several times observed, even when the tincture was given in small doses, considerable metrorrhagia, epistaxis, hæmoptysis, obstinate diarrhœa, leucorrhœa, &c., supervene under its use. Dr. J. B. Biddle[12] exhibited five grains of the iodide of potassium, four times a day, to a female patient, aged 35. After thirty-five grains had been taken, he was suddenly called, and found her suffering from intense cephalalgia, considerable nervous disturbance, nausea, and remarkable tumefaction of the whole face. Jahn[13] found, in the bodies of two persons who had long made use

[1] Op. citat. p. 61. [2] Lond. Med. Gaz. for 1836, p. 401. [3] Ibid. p. 480.
[4] Medico-Chirurg. Rev. Jan. 1836.
[5] Dublin Journal of Med. Science, July, 1840, and Jan. 1841.
[6] Die neuern Arzneimittel, u. s. w. S. 282. [7] Op. cit.
[8] Christison, Treatise on Poisons, p. 180; Cogswell on Iodine, p. 47. Edinb. 1837.
[9] Pereira, in Lond. Med. Gaz. vol. xvii.; or Dict. de Mat. Méd. par Mérat and De Lens, art. Iode. [10] American Journal of the Medical Sciences, Aug. 1831, p. 546.
[11] Formulary, Gully's edit. p. 105.
[12] Philad. Med. Examiner, Jan. 29, 1842, p. 65. See, also, R. Coates, Ibid.; J. C. L. Carson, New York Med. Gaz. Dec. 1, 1841, p. 333, and the Report of a Conversation on the Occasional Injurious Effects of Iodine, at the London University College Med. Society, in Med. Examiner, Jan. 15, 1842, p. 48.
[13] Archiv. für Medicin. Erfahrung, i. 342, 1829; and Journal Complément. du Dict. des Sciences Medicales, xxxv. 362.

of it, wasting of the fat; softness and laxity of all the organs and tissues; diminution and disappearance of the glands, and glandiform bodies,—the mesenteric glands, suprarenal capsules, &c.—and the areolar tissue appeared to exist in smaller quantity. In the case of a female, who died from the excessive use of the tincture, Zinck[1] found the bowels inflated with gas; in some parts, highly inflamed; in others, exhibiting an approach to sphacelation, both within and without: the inner membrane of the stomach displayed redness, growing deeper from the cardiac towards the pyloric orifice, where the organ looked as if it had undergone corrosion; the liver was large and reddened; and there was ecchymosis of the spleen. Dr. Christison[2] is of opinion, that iodine is capable of inflaming the latter organ.

Professor J. K. Mitchell[3] affirms, that he has not unfrequently witnessed very distressing effects not only from an extravagant quantity, but from the too prolonged use of even moderate portions of iodine. As regards iodide of potassium—he properly remarks—large doses have been given so often and so long as to show, that while there is hazard and injury, the danger has been greatly overrated.

The author has administered iodine very freely, but he has seldom seen unpleasant phenomena ensue, which he was disposed to refer to it; with the exception of such as so nauseous an article was likely to cause in the stomach; yet, from the testimony of many observers it can scarcely be doubted that *iodine disease*, *iodosis*, *iodinia* or *iodism*, as it has been termed, may become dangerous to life: generally, it is not really so much so as it appears—and is considered—to be, and the evil consequences may be readily avoided by proper foresight. Cases, however, are related in which its use seemed to have been followed by fatal results;[4] hence the necessity of circumspection in the employment of so energetic a therapeutical agent. The author has never witnessed the vascular injection and tumefaction of the conjunctiva, with œdema and infiltration of the adjacent subcutaneous areolar tissue, described by M. Ricord.[5] In this inflammation, he says, there is little or no tendency to suppuration, and it is a phenomenon which most usually appears only at the commencement of a course of iodide of potassium, and rarely recurs; but it is important to avoid mistaking it for a venereal or gonorrhœal ophthalmia, to which it appears to bear some analogy. A somewhat similar affection, under the use of the iodine, he observes, sometimes extends to the mucous membrane of the nose, producing coryza, but unattended with sneezing, and without any disposition to pass into a suppurative stage.

[1] Journ. Complém. du Dict. des Sciences Médicales, xviii. 231.
[2] Treatise on Poisons.
[3] Medical Examiner, Aug. 1846, p. 460.
[4] Sir B. Brodie, Lancet, March 30, 1839.
[5] Op. cit.

Under the idea, that the unpleasant symptoms which the iodides of potassium and iron "are sometimes said to produce," are owing to the presence of free iodine in them, Dr. C. J. B. Williams[1] recommends that the patient should eat a piece of bread or biscuit after each dose: "the starch of this, combining with the free iodine, removes its injurious property."

To avoid evil consequences, Wutzer advises that iodine should be immediately discontinued, whenever a feeling of increased heat in the pharynx and stomach is experienced immediately after it is swallowed; but as this evidence cannot be available in small children, attention should be paid to observe, whether, after the medicine has been taken, the temperature of the skin becomes more elevated; the pulse quicker, and whether there is any evidence of pain when pressure is made on the epigastric region. He, moreover, advises, that it should not be given internally to children at the breast.

It has been affirmed, that if iodine be combined with small doses of opium, all the disadvantages, immediate and remote, may be avoided; and it is generally considered more advisable to give it in small doses for a longer, than in large doses for a shorter period. At times, it will happen, that in chronic affections—in which it is chiefly used—its beneficial agency may not be decidedly manifested until after the lapse of four or five months; and it is important to bear this in mind, as both practitioner and patient are apt to become dissatisfied, unless the remedy exhibits its action more speedily. When it acts beneficially, the appetite is augmented, or is not deteriorated; digestion improves, so that the patient is able to take more food, and experiences less inconvenience therefrom: the secretion of the bile is increased, and the evacuations are more copious and of a yellower hue; the peristaltic action goes on more energetically, and the patient gains strength. Such, at least, are the signs that are considered by many to indicate that iodine agrees; but the absence of all disagreeable consequences is a sufficient index.

To remove the symptoms of iodine disease, general or local, blood-letting has been employed; with warm bathing; the use of milk; emulsions of gum Arabic, and the like; rigid diet and rest. The preparations of hydrocyanic acid have also been given with advantage in the palpitation, tremors, and other nervous symptoms that sometimes follow its use.

Precaution is requisite in the case of impressible, and also,—it has been conceived—of robust persons,[2] to avoid the supervention of hyperæmia. It is advisable, too, during its administration, to let the diet be sparing, and devoid of all heating qualities. Kol-

[1] The Library of Practical Medicine, arranged and edited by Alexander Tweedie.—Practical Medicine, vol. iii. p. 124, art. Pleurisy, by Williams. Lond. 1840.

[2] Riecke, op. cit. S. 284.

ley[1] remarks, that it occasionally exerts a most unfavourable influence on the nervous system, so that, in those who are easily excitable, unusual pains may be brought on by the use of even three or four drops of the tincture; these pains, at times, ending in violent spasms. Such persons exhibit the impressibility, even under very minute doses, by fidgetiness or restlessness of the limbs, so that they can scarcely be kept quiet: after a time, numbness and heaviness in all the limbs; heaviness of the head, and a species of inebriation[2] succeed, with violent cephalalgia, spasms, tremors of the limbs, paralysis,[3] prostration, spasms, depravation of vision, and disposition to lamentation and distress. Some of these nervous symptoms the author has occasionally noticed, when the dose of iodine has been rapidly augmented. Where the person is liable to gastric uneasiness, caution is requisite in the use of the remedy, as it not unfrequently occasions dyspepsia and violent gastrodynia. All febrile and purely inflammatory diseases, according to Kolley, forbid its use.

Dr. Andrew Buchanan[4] affirms, that he has never witnessed any of the unpleasant symptoms that have been ascribed to iodine. He asserts, that he has never seen its use "followed by wasting of the testicles or mammæ, by palpitations, faintness, excessive debility, hurried, anxious breathing, dinginess of the surface, copious clammy sweats, increased menstrual discharge, or an oily appearance of the urine, which are enumerated amongst the symptoms characterizing the supposed affection, termed iodism." As regards the wasting of the mammæ and testicles, Dr. Pereira suspects it to be very rare. He has seen iodine administered, he remarks, in some hundreds of cases, and never met with one in which atrophy of either organ occurred. Magendie, also, states, that he has never witnessed these effects, although they are said to be frequent in Switzerland.[5] The author's own experience accords with that of those gentlemen. He has prescribed, and seen it prescribed, largely, both in public and in private; yet no such results have ever supervened. In the Philadelphia Hospital, great attention was paid to the condition of the testes, in several cases in which it was administered, yet no case of atrophy occurred.[6] M. Cul-

[1] Journal Complémentaire, xvii. 307.

[2] Giddiness was observed by Manson, (Researches on the Effects of Iodine, p. 61. Lond. 1825;) Ashwell, (Guy's Hospital Reports, i. 136;) and Lugol, (Essays on the Effects of Iodine in Scrofulous Diseases, O'Shaughnessy's translation, p. 73. Lond. 1831.)

[3] Sir B. Brodie, Lancet, 1832; Manson, op. citat.; and Sir A. Cooper, Lancet, ii. 147.

[4] Lond. Med. Gaz. July 2, 1836.

[5] Pereira, Elements of Mat. Med. and Therapeutics, i. 238. Lond. 1842; or 2d Amer. edit. Philad. 1846.

[6] A. M. Vedder, in American Medical Intelligencer, for Sept. 1, 1838. See, also, J. Davies, Practical Remarks on the Use of Iodine locally applied in various Surgical Diseases and External Injuries, &c., Lond., 1839. Reprinted in American Med. Library, 1839-40.

lerier,[1] however, who has had much experience with iodine and its various preparations, lays down the proposition, that it seems to exert a more direct action on the mammæ and testes when it is given to an individual in health, than when the constitution is deteriorated.

Dr. J. Adair Lawrie,[2] of Glasgow, has advanced the opinion, that the iodides of potassium and starch exert a poisonous influence on the mucous membrane of the air passages, not as direct irritants, but indirectly through the circulation, in the form of acute inflammation. He admits, however, that he has never seen them act as irritants to the gastro-intestinal mucous membrane, nor has he ever known them induce emaciation, atrophy of the mammæ and testes, hectic and the other symptoms described under the term *iodosis*.

EFFECTS ON THE ECONOMY IN DISEASE.

Iodine exhibits itself as a most efficacious remedy in a variety of diseases, in which it is desirable to modify the condition of the function of nutrition. It doubtless has often had effects ascribed to it to which it was in no way entitled; and not the least singular has been recorded lately. M. Delfraysse,[3] at a recent sitting of the Académie des Sciences of Paris, reported cases, both in animals and in the human female, in which "ioduretted preparations, administered in the latter period of gestation, arrested the development of the fœtus," and hence, that they must be valuable agents when narrowness of the pelvis would render the expulsion of a fœtus of the ordinary size dangerous or impracticable!

In referring to the use of iodine in the following diseases, the remarks apply not only to pure iodine, but to the iodides of the metals of the alkalies, especially the iodide and ioduretted iodide of potassium; the medical properties of which accord with those of iodine.

Bronchocele.—The very first experiments made with iodine were on *goître*. Coindet recommended it strongly in that affection, and Formey[4] first introduced it into Germany. Coindet, gave, in the first instance, the tincture internally; and he remarked, that about a week after the commencement of its use, the skin over the goître generally became less tense, the substance of the tumour felt softer, without the tumefaction having abated; the particular portions of the gland became more distinct, separated from each other, and less and less hard, until gradually a diminution was perceptible. Frequently, the goître disappeared completely,

[1] Mémoires de la Société de Chirurgie de Paris, Tom. i. Fascic. 1 and 2, Paris, 1847; cited in British and Foreign Medico-Chirurgical Review, Jan. 1848, p. 129.

[2] London Medical Gazette, July 3, 1840, p. 590.

[3] Archives Générales de Médecine. Juin, 1850, p. 232.

[4] Bemerk. über den Kropf, u. s. w. Berlin, 1820; and Hufeland's Journal, B. li. St. 4, S. 91.

in the space of from six to ten weeks, under the continued use of the remedy. At an after period, he employed iodine externally, in which form of administration the evil consequences sometimes induced by it are less to be apprehended; and often combined its internal and external administration.

The efficacy of iodine in bronchocele has received the most ample confirmation. Cases have been published by Hufeland, Gräfe, Baup, Helling, Ziegler, Vollmer, Reiss, Paulitsky, Hirsch, Ulrich, Jäger, Barchewitz, Meissner, Vogel, Wutzer, Seiler, Ficinus, Nieństädt, Hoffman, De Carro, J. Reid, Manson, Elliotson, Lugol, Bardsley,[1] Copland,[2] and numerous others.[3] Mr. Bramley, whilst in Nepal, amongst the Himalaya mountains, and under unfavourable circumstances, cured 57 out of 116 cases, and brought 34 more into a fair way towards ultimate recovery.[4] The author has administered it in a great many cases of *soft goître*, and in every one the disease was removed. In two it recurred, but the hypertrophy was again dispersed under the use of the remedy.[5] It has been recommended by some, that its exhibition should be preceded by bleeding; and as the abstraction of blood facilitates absorption, bleeding may be advisable; and more especially where but little, if any, effect seems to be induced by it, after it has been administered for some time. Reid advises, that we should commence with its external administration; and, at a later period, conjoin this with the internal.

Although cases have been published, in which iodine has not answered the purpose of the prescriber, there can be no question that it is the most efficacious agent in goître in the lists of the Materia Medica; but when the tumour has acquired a cartilaginous hardness, although it may be diminished under the use of the remedy, it can rarely, or never, be wholly removed. Under such circumstances, however, every other remedy would be found equally fruitless.

It is worthy of recollection, that burnt sponge, which contains iodine was long celebrated for its powers over goître, before iodine was discovered; and the same was the fact in regard to certain brine springs, as that of Salzhausen, which also contain iodine.

Glandular affections.—Besides the affections of the thyroid gland, there are others of different glandular bodies, in which iodine exhibits itself efficacious. Jahn used friction with it with advantage, in *induration of the liver*. Wutzer gave it in two cases of *induration of the spleen*, but no precise deductions could

[1] Hospital Facts and Observations, p. 121. Lond. 1830.
[2] Dict. of Pract. Medicine.
[3] Richter's Specielle Therapie. Berlin, 1828, S. 214; Dictionnaire de Matière Médicale, &c., par MM. Mérat and De Lens, art. Iode; and Osann, art. Iod, in Encyclopäd. Wörterb. der Med. Wissensch. Bd. xix. S. 17. Berlin, 1838.
[4] Christison, Dispensatory, p. 556. Edinb. 1842.
[5] See the author's Practice of Medicine, 3d edit. ii. 455. Philad. 1848.

be made as to individual efficacy, owing to its having been combined with other remedies. Milligan[1] relates three cases of *enlargement of the liver* or *spleen* in children, in which he gave the tincture with success, after mercurials had been used ineffectually. In several cases of *chronic disease of the liver attended with jaundice*, Dr. Abercrombie[2] found an ointment composed of 3ss. of *iodine*, and an ounce of *lard*, of great benefit. M. Eusèbe de Salle[3] and Jahn employed it with success in *enlargement of the testes;* Riecke,[4] too, found it of essential service in a case of great *induration and enlargement of the testicle*, which, in the opinion of several physicians, would require an operation; and Jahn, in a case of *strumous induration of the submaxillary gland*, and in one of *tumefaction of the prostate*, the consequence of mismanaged gonorrhœa. Krimer employed it beneficially in cases of *tumefaction and induration of the mesenteric glands:* and Cerchari[5] found an ointment, composed of a scruple of iodine and an ounce of unguentum rosatum, very efficacious in the cure of *enlarged tonsils*. He applied it to the tonsils, morning and evening, by means of a small brush; and he asserts, that under its use the tonsils will, in two months, be restored to their natural dimensions. Inflammation must be subdued before the ointment can be had recourse to. Sir. B. Brodie[6] has used it successfully in similar cases; the enlarged tonsils being touched every day with a camel's hair pencil dipped in the tincture. Delfiz[7] details a case of *hypertrophy of the mammæ*, which resulted favourably; and in *hypertrophy of the thymus gland*, iodine baths have been advised by Dr. Fingerhuth. In *induration of the female mammæ*, not of a malignant nature, Riecke[8] found it frequently of essential service; and Dr. Pereira[9] states, that in the *chronic mammary tumour*, described by Sir Astley Cooper, he has seen it afford great relief, allaying pain, and keeping the disease in check. In *Bubo*, painting over the surface with the tincture of iodine, or with a solution composed of a scruple of iodine, two scruples of iodide of potassium, and a fluidounce of water, has been of great service. The effect of the latter application, according to Mr. Langston Parker,[10] is "almost magical." Mr. Stafford,[11] affirms, that he has em-

[1] Cogswell, op. cit. p. 83; see, also, Casey, New York Journal of Medicine, Oct. 1840, p. 324; and Christison, Dispensatory, p. 557. Edinb. 1842.
[2] On the Stomach, Edinb. 1828; or Amer. edit. Philad. 1830.
[3] Journal Complément. xix. 193, and Journal Universel, xi. 346.
[4] Die neuern Arzneimittel, u. s. w. S. 286.
[5] American Journal of Pharmacy, 2d series, ii. 83. Philad. 1837.
[7] Lancet, March 30, 1839, p. 38.
[6] Froriep's Notizen, B. xiii. H. 5, S. 33. [8] Op. cit. S. 292.
[9] Elements of Mat. Med. and Therap. 2d edit. i. 224. London, 1842; or 2d Amer. edit. Philad. 1846.
[10] Provincial Med. and Surg. Journ., April 1, 1843.
[11] Essay on the Prostate Gland, noticed in Brit. and For. Med. Review, Oct., 1840, p. 529.

ployed it in nearly all cases of *enlargement of glands*, excepting those from malignant diseases, and has found it of the greatest service: "indeed, its use, in some instances, has been attended by almost a miraculous effect, so rapidly has the swelling been reduced." In active *scrofulous swellings* of the *lymphatic glands of the neck*, Dr. Wm. B. Diver[1] has applied a plaster made of *Iodin.* p. i.; *Balsam Canadens.* p. iij.; *Picis abietis*, p. iij. The iodine is triturated with the balsam; the pitch is melted with a gentle heat, and when about to cool, the whole is mixed, and spread upon kid for immediate use. He prefers this plaster whenever the extreme sensitiveness of the parts precludes the employment of inunction.

Scrofula.—Soon after the introduction of iodine, it was used externally in scrofulous affections; and at an early period was prescribed by Gordon, Sir A. Halliday,[2] and others, especially combined with mercury. Their observations were confirmed by Magendie, Baup,[3] Sablairoles,[4] Baron, Brera, Manson, and others. Wutzer used it in many cases of scrofula, and found it especially useful in the lympathic (pastösen) form. In irritable cases, he was cautious of employing it, as well as in hyperæmic conditions; and he found, that when aggravation of the symptoms occurred, some concealed inflammatory disposition was the cause. Lugol[5] has contributed to the more extensive employment of it in scrofula, and has especially recommended the watery solution internally, and baths externally. The fortunate results of his trials, in the Hôpital St. Louis, were corroborated by a committee appointed for the purpose by the Royal Academy of Sciences. It afforded eminent service in the different forms of scrofula; but in *scrofulous caries* it merely induced improvement, never entire cicatrization. Lugol regards it as the most efficacious remedy we possess in scrofula. Eager,[6] in speaking of Lugol's method of managing scrofula, properly lays great stress on the accompanying regimen—nutritious diet, cleanliness, bathing and exercise in the open air—which he regards as indispensable to a fortunate issue. He prefers the watery solution internally to all other remedies. Lugol and Eager unite, with the internal use of iodine, the external in the form of ointment, or solution: for example, in fistulæ they employ it as an injection. To excite ulcers to cicatrization, after appropriate pressure and injections have failed, Eager recommends, that the skin, which has separated at the margins of the ulcers from the subjacent parts, should be destroyed by caustic or removed

[1] Med. Examiner, Sept., 1845, p. 529.
[2] Lond. Med. Repos. Sept. 1821.
[3] Bibliothèque Universelle, Dec. 1821.
[4] Bulletin des Sciences Médicales, Fév. 1824.
[5] Essay on the Effects of Iodine, &c., p. 48; and Researches on Scrofulous Diseases, translated by A. S. Doane. New York, 1844.
[6] Dublin Journal of Medical Science, July, 1834, p. 344.

by the knife, but that this should not be practised until the scrofulous tendency has been somewhat got under. As a caustic, he directs *calcis viv.* ʒvj., *potass.* ʒv., to be made into a paste with *alcohol*, and to be applied a few lines thick: it destroys the skin in about five minutes. According to the same observer, iodine has exhibited its efficacy in various cases of *periostitis*, *scrofulous swellings of the joints*, and *necrosis*. In *scrofulous ophthalmia*, it was less beneficial. It will be seen hereafter, however, that in the last affection, the application of the tincture to the eyelids has been beneficial. In *scrofulous discharges from the nose and ear*, iodine injections were commonly of service. Baudelocque[1] likewise extols the preparations of iodine in *scrofula;* but in *scrofulous affections of the bones*, and especially in *caries*, as well as in *scrofulous diseases of the skin*, it appeared to him to be inefficacious. Dr. Isaac Parrish[2] found the iodide of potassium serviceable in *certain diseases of the eye*, which had a constitutional origin, or were closely allied to a scrofulous or cachectic condition of the general system. The dose in which he gave it was from two to six grains three times a day in a table-spoonful of the compound syrup of sarsaparilla. The author has found excellent effects from it in such cases, when given in simple syrup. Many cases have been related by Zinck, Maunoir, Manson, Weihe, Benaben, Bayle, and others, in which *white swellings of the joints*, of a scrofulous character, were removed by its use. Wutzer has likewise offered favourable testimony in regard to it in affections of the bones, some of which were of a strumous nature. In several cases, so much disorganization had occurred, that the loss of the whole limb was to be apprehended, yet the iodine arrested the destructive process, and the limbs were preserved. In various scrofulous affections, the tincture was given by Dr. Kühne[3] with great success, and without any evil consequences. He made it, however, of half the usual strength, beginning with three drops, and gradually increasing the dose to fifteen. In *tumefaction of the joints*, iodine, administered externally, has afforded essential service. Wutzer was of opinion, that the tincture might frequently be applied externally with greater advantage than the ointment; the alcohol readily evaporating and leaving the iodine on the skin; for which reason he recommends, that the tincture should be applied repeatedly by means of a camel's hair pencil. Commonly, in every form of cachexia especially, it is necessary that iodine, or its preparations, should be given for a considerable time. The disease is often chronic, and a chronic system of medication is demanded. Occasionally, how-

[1] Etudes sur la Maladie Scrofuleuse. Paris, 1834; and London Lancet, May 25, 1839, p. 350: see, also, Cogswell on Iodine, p. 75; and Lisfranc, Annales de Thérap., cited in Med. Times, Jan. 11, 1845.

[2] Med Examiner, Ap. 16, 1842, p. 241.

[3] Medicinische Zeitung, No. 34, Aug. 24, 1836. Berlin.

ever, it would appear to have acted speedily. Professor J. K. Mitchell[1] relates the case of a man who had an enormous *tumefaction of the thyroid gland, and of the lymphatic glands of the neck*, accompanied by severe dyspnœa, and difficult deglutition, threatening dissolution. "We proposed then," says Dr. Mitchell, "to try iodine, a remedy in which neither of us," Dr. Mitchell and a skilful surgeon, "had much direct knowledge. Within a single day, the patient breathed better, and became thoroughly convinced of approaching recovery, and at the end of a week experienced very little inconvenience from, though still deformed by his malady. In a few months the thyroid no longer hung over his sternum; not an abnormal gland could be felt in his neck, and he recovered both his health and personal appearance entirely."

In combination with calomel, iodine appeared to Drs. Bennett, Willshire[2] and Malin[3] to have the power of controlling *scrofulous inflammation and its effects*.

Tubercles.—The reputed efficacy of iodine in scrofulous affections gave rise to the belief, that it might be serviceable in tubercles. Brera and Calloway administered it frequently in *mesenteric tubercles* with success, and the observations of Krimer, referred to above, correspond with theirs. It has also been given with advantage in cases of *pulmonary tubercles*. It was suggested, in such affections, by Dr. Baron, and a case is related by Mr. Haden of apparent tubercles in which it was markedly useful.[4] Similar examples are detailed by Jahn, Waldack, and others; and it has been recommended, in conjunction with decoction of cimicifuga, by Dr. C. C. Hildreth,[5] of Zanesville, Ohio; but the evidence adduced by him is not strong.

Berton affirms, that he found *inhalations of the vapour of iodine* of decided efficacy in *confirmed phthisis*, as well as in certain forms of *catarrh*. They have likewise been advised in *phthisical affections*, by Sir James Murray,[6] and Sir C. Scudamore.[7] The addition of a little tincture of conium was found by the latter gentleman to be beneficial in subduing the irritating qualities of the gas. His first formula was the following:—R. *Iodin.* gr. viiij., *Potass. iodid.*, gr. iij., *Alcohol.* ℥ss., *Aquæ destillat.* ℥vss. M. Of this solution, from one dram to six, and from twenty to thirty-five minims of a saturated tincture of conium, were used

[1] Med. Examiner, Aug. 1846, p. 46.
[2] Medical Times, July and August, 1847.
[3] Schmidt's Jahrbücher, u. s. w. No. 2, S. 164. Jahrgang 1849.
[4] Formulary—the author's edition, p. 37. Lond. 1824.
[5] American Journ. of the Med. Sciences, Oct. 1842, p. 280.
[6] On Temperature, Aliment, &c., 1829.
[7] Cases Illustrative of the Efficacy of various Medicines administered by Inhalation in Pulmonary Consumption, 2d edit. London; and Lond. Med. Gaz. Feb. 17, 1838, p. 804.

in each inhalation, which was continued from half an hour to forty minutes. Sir Charles considered it better to add the conium at the time of employing the inhalation. At the temperature of 90°, the volatile properties of iodine are given off very sensibly, but conium requires more heat, and that of 120° is not too much for the iodine. Subsequently, Sir Charles published the results of his farther observation with this remedy, of which he has as high an opinion as ever. He has somewhat modified his formula, however.[1] He now recommends the following:—R. *Iodin. pur.*, *Potass. iodid.* āā. gr. vj., *Aquæ destillat.* ℥v. ℥vj., *Alcoholis*, ℥ij. M. He prefers to add the conium at the time of mixing the iodine solution with the water, and recommends that it should be a *saturated* tincture, prepared with genuine dried leaves. In the commencement of the treatment, he advises very small proportions of the iodine mixture;—for example, from half a dram to a dram for an inhalation of eight or ten minutes' duration, and this to be repeated two or three times a day. Of the tincture, to which Sir Charles gives the epithet "*soothing*," he directs half a dram, which he usually finds to be sufficient; but it may be increased, if the cough be very troublesome. He soon augments the quantity of the iodine mixture, progressively from ℥j. to ℥iv.; and at the same time prolonging the period of inhaling, he divides the iodine dose, putting two-thirds at first, and the rest after the expiration of seven or eight minutes. Although the temperature of 120° is the most favourable for volatilizing the active principles of the iodine and conium mixed with some watery vapour, Sir Charles considers the approximation will be sufficient, if equal parts of boiling and cold water be used, with which the inhaler should not be quite half filled. Care should be taken, however, to prepare the inhaler for this temperature by first washing it out with tepid water. During the process, the inhaler should be kept immersed in a vessel containing water of a rather higher temperature than 120°. The feelings of the patient will be a great guide as to the strength of the inhaling mixture in any particular case. A reviewer in the *British and Foreign Medical Review*,[2] affirms, that his own experience leaves him no doubt as to the great value of this practice as a palliative in *phthisis*, and as an important remedy in *bronchitis*. It is true, however, he adds, that the relief has often been as great from the simple aqueous as from the medicated inhalation. The author's own experience has not been favourable to it,[3] and Dr. Pereira[4] says he has repeatedly tried it in *phthisis* as well as in other *chronic pulmo-*

[1] London Medical Gazette, Feb. 7, 1840, p. 750. See, also, E. J. Coxe, Practical Treatise on Medical Inhalation, pp. 51–85. Philad. 1841.

[2] April, 1838, p. 606.

[3] Practice of Medicine, 3d edit. i. 416. Philad. 1848.

[4] Elements of the Materia Medica, i. 245. Lond. 1842; or 2d Amer. edit. Philad. 1846.

nary complaints, but never with the least benefit. The inhalation may be practised in the method recommended under the head of CHLORINE (page 186.) It has been dreaded, because, in some instances, troublesome irritation of the larynx has followed its use; but Dr. Corrigan[1] considers, that this injurious effect has resulted from the defective means of inhalation hitherto employed. Used in the manner he has recommended under the article referred to above—gradual in its evaporation, and ultimately combined with a large portion of aqueous vapour—it is, he says, positively free from any injurious irritative effects. The vapour he found to diminish most remarkably the *profuse* and *wasting purulent expectoration of phthisis*. The effects of iodine, thus used, on the digestive function were also very gratifying. In all the cases in which he employed it, the appetite and state of the intestinal canal were improved. It acted as a useful tonic to the digestive organs, without any of the irritation which its internal use, in the ordinary form, at times produces. It likewise greatly alleviated the cough, so that the patient was enabled to obtain hours of sound and refreshing sleep; and he, consequently, considers, that even should its use be of little avail against the destructive scrofulous ulceration, which constitutes phthisis, the palliative good which is derived from it renders it a valuable addition to our list of remedies. Dr. Corrigan has had his apparatus at work from eight to twelve hours in the twenty-four; and his mode of managing it is as follows:—At night, when the patient is settling to sleep, the apparatus is suspended from the roof of the bed; and, when once arranged, it continues its work quietly and silently for four or five hours, while the patient, asleep, is all this time inhaling the medicated air. In the morning, for three or four hours before the patient rises, it is again at work; and, if necessary, in the mid-day, while the patient reclines on the bed, with the curtains drawn round three of the sides. The rate of evaporation, which generally gives a sufficiently strong impregnation to the air, is when the tincture of iodine drops from the cotton wick at the rate of from six to eight drops per minute. At this rate, about six drams of the tincture will be evaporated in an hour, and as every particle of iodine is diffused in watery vapour through the air, there are thus diffused, in the minutest state of division through the air, in every hour, about thirty grains. "If we suppose the patient to inhale only one-twentieth of the iodine evaporated, he will inhale in each hour, and apply to the diseased surfaces, one grain and a half of iodine in a state of the most minute division or solution." "This quantity, we know,"—adds Dr. Corrigan—"is quite sufficient to exert a decided action upon scrofulous ulceration; for we find, on reference to Lugol's valuable work on the employment

[1] Dublin Journal of Medical Science, for March, 1839, p. 103.

of iodine in scrofula, that in external scrofulous ulceration, the preparation of iodine, which is found beneficial, is a solution which contains only about three grains of iodine in each pint of fluid." The duration of the inhalation can, of course, be extended at pleasure.

Fontana affirms, that he has observed decided benefit from iodine in a case of *phthisis mucosa;* when given in the form of syrup, and combined with the external application of the ointment of tartarized antimony. Duverney has communicated some cases, which appeared favourable to the prophylactic agency of iodine in *incipient* or *threatened phthisis*, but he himself considers, that his observations have not been sufficiently numerous to effect the demonstration. The author has frequently administered it, in various forms, in pulmonary tubercles, but, it must be confessed, not with that decided advantage, which the well known eutrophic virtues of the remedy, and the recorded observations of others, might seem to promise. He has never witnessed, on the other hand, the evil, which Riecke[1] mentions,—that it may, under particular circumstances, occasion the speedy development of phthisis, where tubercles exist in the lungs. Riecke refers to a case by Häser as corroborative of his opinion. A woman, fifty years old, was affected with *anchylosis spuria*, for which an ointment of iodine was recommended; but it had not been employed more than three weeks, and not more than a dram of iodide of potassium had been rubbed in, when symptoms of tubercular phthisis rapidly supervened, which, in half a year, terminated in death. There does not appear, however, in this case, to have been any thing more than a coincidence.

Mr. Leigh[2] directs the patient to apply a sufficient quantity of iodine ointment on the ribs and under the axillæ, and to cover the head with the bed-clothes, in order to breathe the iodine volatilized by the heat of the body. The ointment produces counter-irritation on the skin where it is placed, and must be repeated according to circumstances. This method, Mr. Leigh thinks, has arrested the progress of phthisis.

Pneumonia.—In the advanced stage of pneumonia, iodide of potassium has been strongly recommended by Dr. George L. Upshur,[3] of Norfolk, Va., on the strength of several observed cases. The indications for its use he has found to be the following:—*First*, In cases of pneumonia occurring in anæmic individuals, where the disease is characterized in its early stages by adynamic symptoms. *Secondly*, In cases where inflammatory action, in the commencement high, has been reduced by antiphlogistic treatment,

[1] Die neuern Arzneimittel. u. s. w. S. 289; see, also, Günther, in Harless's Neue Jahrb. B. xii. St. 3. S. 161.

[2] London Medical Gazette, May, 1841.

[3] Med. Examiner, June 29, 1844, p. 145: and June, 1845, p. 323.

and the suppurative stage is just beginning. "This stage is easily recognised by a sudden depression of the vital powers, by a soft but irritable pulse, and by the bronchial respiration being accompanied by a harsh mucous rhonchus." *Lastly*, In cases grafted upon long continued intermittents, "which have left the blood in a degree impoverished." The iodide was given in the dose of a scruple in the twenty-four hours. In *spasmodic asthma*, it has also been found very beneficial by Dr. W. S. Oke,[1] Dr. Casey,[2] and others. Dr. Casey gave it in upwards of five and twenty cases, and in no instance, where a fair trial was made, did it fail "to afford unequivocal and decided relief." The dose varies from two to five grains three times a day. Dr. W. A. M'Murry[3] has used iodide of potassium, with great advantage, in *hooping-cough*. He employs, however, a compound formula.

℞. Potass. iodid. gr. vj.; Mucilag. acac. ℥vij.
Syrup. Senegæ, ℥ij.; Tinct. lobel. ʒj. M.

Dose.—For a child two years old, a tea-spoonful four times a day.

In *chronic engorgements of the larynx*, iodine was used in two cases by Trousseau and Belloq;[4] once without success, but the second time with marked advantage; and in *tubercles of the liver* it has been regarded worthy of special consideration.[5]

Dropsy.—Owing to its powerful eutrophic agency, many trials have been made with iodine in cases of dropsy.[6] Drs. Bradfield and Bardsley exhibited it frequently with success in *hydrothorax* and *ascites;* and Dr. Kissam, in a case of *dropsy, dependent probably upon induration of the liver*. Dr. Coster[7] says he has removed many dropsies by giving internally from six to fifteen drops for a dose of a mixture composed of *iodin.* gr. iii., *potass. iodid.* gr. vi., *aquæ* f ℥j.; aided by an ointment composed of fifteen grains of *iodine*, with double the quantity of *iodide of potassium*, to an ounce of *lard*. This is to be placed inside the thighs after removing the cuticle by a blister. The arm-pits and soles of the feet were also rubbed with the ointment. The same plan is recommended by Dr. Osborne.[8] Jahn, also, regards iodine as an extremely valuable antihydropic.[9] He first used it in a case of *hydrocele*, in which it was doubtful whether degeneration of the

[1] Provincial Med. Journ. April and May, 1844.
[2] Boston Med. and Surg. Journal, 1845.
[3] Saint Louis Medical and Surgical Journal, March and April, 1848.
[4] Traité Pratique de la Phthisie Laryngée, p. 371. Paris, 1837; and translation by Warder, Amer. Med. Library edit. p. 145. Philad. 1839.
[5] Riecke, op. cit. S. 290.
[6] Wm. Stokes, in Amer. Journal of Medical Sciences, May, 1834, p. 543, cited from Lond. Med. and Surg. Journal. [7] Journal de Pharmacie, 1834.
[8] On the Nature and Treatment of Dropsical Diseases, 2d edit. p. 48. Lond. 1837; or Amer. Med. Library edit. Philad. 1838.
[9] Elliotson, in Lancet, 1830–31. See, also, P. Spalding, in Boston Med. and Surg. Journal, Dec. 25, 1839, p. 314.

testicle had not been a precursor. The effect of the ointment of *iodide of potassium* left nothing to be desired; and, accordingly, he afterwards employed it in all cases of *hydrocele of the tunica vaginalis*, which he met with,—even in the new-born,—united with mercury or extract of conium; and in every case which was not of too chronic a character, it exhibited its sanative powers. The only unfavourable effects induced by it were a temporary disappearance of the testicle, in some cases; and a humid cutaneous eruption of the scrotum. He also found iodine extremely useful in *hydrothorax* and *ascites;* and especially in cases of *dropsy that succeeded to exanthematous diseases*,—and it acted more speedily and powerfully when combined with some diuretic. He found, farther, that it was followed by the most beneficial results in the *hydrocephalus of children*—as well *chronic* as *acute*—especially when the latter form had attained its full development,—that is, when the inflammatory stage was over, and the accumulation of fluid was the prominent condition. In these cases, he commonly used iodine in the form of iodide of potassium made into an ointment, and rubbed on the head. Frequently, however, he gave iodine also internally, in combination with calomel and digitalis; but it may be objected to this combination, that iodine with calomel forms corrosive chloride, iodide and red iodide of mercury; so that, in very small doses, it might affect the stomach too violently.[1] Dr. Röser,[2] of Wurtemberg, likewise advocates the use of iodide of potassium, in large doses, in cases of *acute hydrocephalus* or *tubercular meningitis*, where the ordinary remedies have failed, paralysis has occurred, and death appears to be impending; and three successful cases have been recorded by Mr. C. Fluder.[3] The ordinary means had been employed in vain, when he suggested a trial of iodide of potassium in half grain doses, every two or three hours. In all the cases, there was speedy diuresis, and dribbling of the saliva. A similar successful case has been recorded by Dr. John Christie.[4] The child was eight years old, and before Dr. Christie saw him had been ill a week. He had experienced an attack of convulsions the evening before. He lay with the eyes half closed, moaning frequently, and now and then uttering a loud scream; the pupils were fixed; the urine was passed involuntarily; there were frequent automatic movements of the left arm and leg, and the pulse was rapid and weak. Dr. Christie determined to make a trial of iodine in a mode mentioned by Drs. Evanson and Maunsell,[5] and prescribed a mix-

[1] Riecke, op. cit. S. 291.

[2] Hufeland's Journal, for April, 1841, S. 84; cited in Lond. and Edinb. Monthly Journ. of Med. Science. See, also, Dr. Fluder, in Lond. Med. Gaz. Sept. 30, 1842, and K. G. Zimmermann, Zeitschrift für die gesammte Medicin., Aug. 1842, S. 418.

[3] Lond. Med. Gaz. Sept. 30, 1842.

[4] Lond. and Edinb. Monthly Journal, March, 1843.

[5] On Diseases of Children.

ture consisting of *iodide of potassium*, sixteen grains; *iodine*, four grains; and *water*, one ounce; of which a teaspoonful was ordered every four hours. The head was also directed to be rubbed with a weak ointment of red iodide of mercury. Good effects, in a similar case, resulted from the internal use of iodide of potassium in the practice of Dr. Barbour, of St. Louis;[1] and Dr. Malin[2] prescribed a combination of iodine and calomel in *œdema meningum* and *hydrocephalus acutus* with advantage.

M. Ricord[3] employed iodine with success in five cases of *hydrocele;*—the tincture being diluted with distilled water, and applied by means of compresses wetted with it, in which the scrotum was enveloped. He used it of four different strengths—ʒj., ʒij., ʒiij., and ʒvj. of the *tincture*, to f ʒiij. of *water*.

In *hygroma* or *dropsy of the bursæ mucosæ* of the joints, an ointment of iodide of potassium (ʒij., ad *adipis* ℥j.) has been successfully used by M. Reynaud.[4] The limb is kept at rest, and morning and evening, or three times a day, friction is made with this quantity of ointment; after which the knee—the joint commonly affected—is covered with a large flaxseed poultice. From some trials made with iodide of lead, there was reason to believe it more efficacious than iodide of potassium. The treatment was generally successful in about a fortnight.

Intermittent Fever. In obstinate intermittents, which had resisted quinia and other antiperiodics, M. Séguin[5] found the tincture of iodine a very valuable and effective remedy. He prescribed it in doses of thirty drops in a little sweetened water, gradually increasing the quantity to forty, fifty, and even sixty drops. Three doses were given in the apyrexia. He did not find it equally effectual in recent cases.

Typhus and Typhoid Fever. Dr. Morrison[6] states, that there is a condition in typhus fever, which is materially benefited by iodide of potassium. It is marked by a dry, parched, brown or black tongue; by dark sordes on the teeth and gums; by a disposition to dark fetid discharges from the bowels; by a weak and compressible pulse; and by the ordinary signs of depraved secretions, vitiated fluids, and debility. The dose which he is in the habit of administering is three grains every four or five hours, dissolved in water, or mixed with wine, &c. A case of typhoid fever is reported by Dr. C. B. Voigt,[7] in which iodide of potassium was apparently beneficial.

[1] Boston Medical and Surgical Journal, Jan. 1846.
[2] Schmidt's Jahrbücher, u. s. w. No. 2, S. 164. Jahrgang 1849.
[3] Journ. des Connaissances Méd. Chirurg., Janvier, 1833.
[4] Cabissol, in Bulletin Général de Thérapeutique, Fév. 1838.
[5] Journal des Connaissances Médicales Pratiques, Dec. 1846, cited in Amer. Journ. of the Medical Sciences, July, 1847, p. 223.
[6] Dublin Medical Press, Oct. 21, 1840.
[7] Medical Examiner, Dec. 1845, p. 715.

Variola. Iodine has been successfully employed in *variola* to prevent pitting. Dr. Crawford,[1] of Montreal, tried the comparative merits of tincture of iodine and nitrate of silver, and gives the preference to the former. He found the application "very manageable and very bearable." Dr. Jackson,[2] formerly of Northumberland, Pa., now of Philadelphia, informs the author, that he was led to make an experiment of aborting small-pox by the tincture of iodine, from having contemplated its wonderful influence over erysipelas. He applied it in April, 1845, to one arm of a child eleven months old, in confluent small-pox, on the third day of the eruption, and to the arm which appeared the worst, rubbing it freely on with a sponge three times that day and twice the next. On the 11th day, when the pocks over the whole body were at their height, elevated, with hard bases, those on the arm to which the iodine had been applied were entirely flat, with thin purulent matter under the dead cuticle without any swelling of the part. The abortion at the time was considered to be complete. There were, however, some very slight pits to be seen afterwards, but they were very inconsiderable compared with those on the other arm. Dr. Sargent stated to Dr. Jackson, that he had subsequently used iodine on one side of the face in 25 cases: the swelling, soreness and tenderness were very much less than on the side not covered: each pock remained flattened, but he could not say that pitting was prevented. Dr. Goddard tried it in five cases; "not one of the patients showed the least pit or mark; none of them had been vaccinated, and the disease was confluent in most of them." Dr. Jackson considers, that no fair trial of its ectrotic powers in variola can be had without applying it on the first day of the eruption, and continuing it for several days,—say five or six. More recently, Dr. Sargent[3] instituted other experiments with it. It was painted over one half the face only, in order that the appearance of the surface, thus protected, might be fairly compared with that of the other side. Having been tested in this manner in a great many cases, of which thirty were carefully noted, the effects were found to be as follows:—The side of the face which was covered with the tincture was comparatively little swollen; the eruption was flattened, so as to be scarcely higher than the surface, whilst on the other side the vesicles first, and subsequently the pustules, were full and swollen; there was much less heat and soreness in the protected side than in the other, and much less tenderness when this side was touched. When pits were left on the unprotected side of the face after the disengagement of the scabs, and the healing of the little ulcers thus exposed, those on the protected side were found to be less numerous and perhaps less deep; but in no instance could Dr. Sargent certainly

[1] Montreal Medical Gazette, April 1, 1844.
[2] Medical Examiner, August, 1846, p. 464.
[3] American Journal of the Medical Sciences, April, 1849, p. 373.

affirm that pitting was entirely prevented by the iodine, in cases in which there were pits on the opposite surface.

Dr. Schreiber[1] states, that he has found the administration of iodine useful in preventing the family of a person labouring under variola from being infected.[?] The formula employed by him was as follows:

R. Potass. iodid. gr. viij.
Tinct. iodin. gtt. xvi.
Aquæ f ℥ij. M.

A teaspoonful of this was given night and morning. Dr. Schreiber invites practitioners to a farther investigation of the anti-variolous power of iodine.

Measles and Scarlatina. It has been already remarked, that M. Ricord considers that iodine determines diseased action to the skin; and it has been affirmed[2] that in cases of suppressed measles and scarlatina, it will frequently induce a healthy reaction under the most desperate circumstances. One or two grains of iodide of potassium—according to the age of the patient—when under twelve, may be dissolved in sugared water, and be administered repeatedly as an ordinary drink, the whole quantity being taken in the 24 hours for three or four days. In measles, a small plaster to the chest is said to assist the peculiar action of the iodine. In scarlatina, the compound tincture of iodine, diluted with three or four parts of water, may be frequently applied, by means of a camel's hair brush, to the front and sides of the throat and neck.

Nervous Diseases.—As to the efficacy of iodine in these diseases, testimony is somewhat discordant. Drs. Manson[3] and Elliotson[4] found it useful in *paralysis*, but Dr. Bardsley failed with it. *Chorea* was removed by Gibney,[5] Bardsley, Manson, Oke,[6] and Müller;[7] and Franklin,[8] by very large doses, relieved a case of *epilepsy*. Dr. Bennett[9] found the iodide of potassium of great use in cases of *nervous headache*, when the circulation was not affected; and the local use of the tincture of iodine has been beneficial in *neuralgia*.[10] In a patient, whose life had been imbittered for five years with *neuropathic maladies*, and who suffered at the time from a very painful affection of the head and neck, with occasional and frequent pain of the arms and legs, Prof. J. K. Mitchell[11] gave seven grains of iodide of potassium three times a day, which speedily relieved, and within six weeks completely cured the patient, after arsenic,

[1] Northern Journ. of Med., July 1844, cited in Braithwaite's Retrospect, x. 187. New York, 1845. [2] London Lancet, Jan. 21, 1843, p. 632.
[3] Op. cit. [4] Lancet, 1830–31. [5] Ibid. 1827–8, p. 54.
[6] Provincial Med. and Surg. Journal, April and May, 1844.
[7] Gazette Méd. de Paris, No. 19, cited by Gorup-Besanez, in Canstatt und Eisenmann's Jahresbericht über die Fortschritte in der Heilkunde im Jahre 1848, S. 135.
[8] Lancet, 1836, and Cogswell, op. cit. p. 24. See, also, Scott, Provincial Med. and Surg. Journ., April 3, 1844, p. 9. [9] London Lancet, Dec. 21, 1839.
[10] Crawford, Montreal Med. Gaz. April 1, 1844.
[11] Medical Examiner, Aug. 1846, p. 460.

mercury, and most of the narcotics had been prescribed in vain. An equally beneficial and speedy effect was produced in a case of protracted *erratic pains*.

Recently, like many other agents, iodide of potassium has been proposed as a prophylactic in *cholera*. In this relation, it has been recommended by M. Marchandier. M. Bouchardat,[1] however, knew a case of cholera supervene in a person who was at the time under its use.

The intimate affinity between iodine and the urinary organs has given occasion to its employment in

Incontinence of Urine, of which Corter cured two cases by the tincture.

Chronic Diseases.— Cases of *dry, scaly tetter* were treated by Tünnermann with an ointment of iodide of potassium, applied to the affected parts three or four times a day. For the most part, an increase of the evil was at first a pretty sure harbinger of a radical cure; when this attained a certain degree, a change in the organic actions of the skin succeeded; the remedy was then pretermitted, and the parts were washed a few times with soap, when the eruption faded and gradually disappeared. In *moist tetter*, Tünnermann applies only a very weak salve, with which the parts are touched daily, two or three times: in the intervals, he envelops them in a dry linen rag. The pain, which is always induced by the application, soon passes away. Magendie, Gimelle, and Jeffray[2] have likewise applied it successfully in tetter. In *chronic cutaneous diseases* in general, the various preparations of iodine are valuable remedies. They enter, as we have seen, the mass of blood, modify the condition of that fluid, and, in this manner, exert a new impression upon the morbid tissues. The author has often employed them in these cases with success; and like testimony has been afforded by MM. Biett, Gimelle, Kolley, Locher-Balber, Kennedy,[3] and others. Brehme succeeded in removing, rapidly and completely, a case of inveterate *porrigo favosa*, and *ophthalmia* thereon dependent, by an ointment of iodine. Dr. G. Billingslea, of Alabama, asserts,[4] that for twelve years he had used the tincture with the happiest effect, as a local application in the troublesome cases of *herpes circinatus* or ring-worm that are so common in the southern part of this country. He adds, that he does not recollect a case in which it had been employed, which was not radically cured; and in *porrigo of the scalp* it is highly extolled by Drs. Graves, and J. J. Ross.[5] Dr. Graves advises that it should be strongly rubbed into each spot by means of a small piece of sponge covered with fine linen,

[1] Annuaire de Thérapeutique, pour 1850, p. 196.
[2] Cogswell, op. cit. p. 80. [3] London Med. Gazette, May 8, 1840, p. 260.
[4] American Medical Intelligencer, May, 1839, p. 34.
[5] London and Edinb. Monthly Journ. of Med. Science, Sept. 1842, p. 292.

and tied to the end of a quill or slender stick. When effectually done the application must not be repeated oftener than once a week; and immediately after the application the scald must be covered with a spermaceti dressing, which must be renewed at least four times daily, so as to keep the head constantly moistened with it. The head is not washed for three days after the application of the tincture, when it may be well to wash it gently with yellow soap and water twice a day, taking care to cover it as before with spermaceti dressing after each washing. Dr. Barosch[1] cured an inveterate *dartrous eruption*, affecting the perinæum and scrotum, by a lotion consisting of fifteen grains of iodine, and two scruples of iodide of potassium dissolved in five fluidounces of distilled water, and one fluidounce of alcohol. In *lupus*, the tincture applied locally has proved highly beneficial. Under its use, the process of ulceration has stopped, and cicatrization taken place. It is recommended to be applied not only to the ulcerated portion, but to the parts around.[2] Some inveterate cases yielded to the use of iodide of potassium, given in large doses, by M. Maisonneuve.[3]

A case of *elephantiasis*, or enormous enlargement of the leg, has been recorded by M. Cazenave,[4] which was cured by iodine, associated with other remedies. The patient—a woman—was ordered a strong decoction of guaiac and mezereon; the leg was carefully bandaged from the toes, and every other day the bandages were removed, and an ointment of iodide of potassium rubbed on. She was put on generous diet and wine, and kept in bed. This treatment was continued for a little more than three months, by which time the leg was reduced to its former dimensions. M. Cazenave states, that he has met with several similar cases, which have been all more or less benefited, and some even cured by this plan of treatment.

M. Ogier Ward[5] cures *itch* by a simple lotion of iodide of potassium, a single washing with which, in some instances, completely eradicated the disease. To ensure complete success he applies sulphur ointment at night, and the lotion during the day. It usually effects a cure in seven days. The lotion consists of one dram of the iodide to eight or sixteen fluidounces of fluid, according to the delicacy of the cutaneous surface.

Amenorrhœa.— According to Coindet, iodine is a powerful emmenagogue, and the possession of this property has likewise

[1] Œsterreich, Medicinisch. Wochensch. cited in Provincial Med. and Surg. Journal, April 29, 1843, p. 99.

[2] Pereira, Elements of Mat. Med. and Therap. i. 246. Lond. 1842, or 2d Amer. edit. Philad. 1846.

[3] Bulletin de Thérapeutique, Jan. 1849; cited in Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre 1849, V. 159. Erlangen, 1850.

[4] L'Experience, Oct. 19, 1843, cited in Edinb. Med. and Surg. Journal, April, 1844.

[5] Lond. Med. Gazette, April 3, 1846, p. 608.

been ascribed to it by Brera[1] who frequently administered it successfully in amenorrhœa; and Formey, Nieustädt, and Ashwell[2] confirm their observations. Sablairoles cured three cases by frictions with iodine ointment on the breast, conjoined with the internal use of iodine. It was necessary, however, to give it in large doses, and for a long time. Dr. Aldridge,[3] of Dublin, states, that benefit may be expected from its use, when the absence of the catamenia is dependent upon uterine irritation, whether from exposure to cold, mental emotion or other causes, and accompanied by pain in the loins, headache, palpitation, &c. Locher-Balber[4] and Gölis found iodine of value, at times, in those troublesome cases which occasionally precede the establishment of menstruation; the latter was, however, often deterred from its use, in such cases, by the evil consequences it produced on the respiratory organs,—such as dry cough, or cough accompanied by bloody sputa.

Degeneration of the Ovaries.—Röchling observed a marked effect from the use of iodine in *induration of the ovary.* Jahn cured, by an ointment of iodine and mercury, an enormous degeneration of the ovaries, which gave rise to two tumours, each the size of the head; and Messrs. Thetford,[5] Klaproth,[6] Jewel,[7] and Ashwell[8] were equally successful. Baron employed it beneficially in a case of *dropsy of the ovarium.*

In *hypertrophy of the ventricles of the heart,* Magendie recommended it long ago.

In *scirrhus of the uterus, mammæ,* &c., it has been advised by Heun, Klaproth, Hennemann, Von dem Busch,[9] Ullmann, Hill, Benaben, Magendie, Hammer, Elwert, Wagner,[10] Copland,[11] Zimmermann ;[12] and from their recorded observations, it would seem, that great efficacy ought to be ascribed to it, both when internally and externally administered. A case is published by Dr. Thetford[13] in which the *uterus* was *of bony hardness,* and so large as nearly to fill the pelvis; yet it gave way in six weeks to the use of iodine. Seven cases of *hard tumours of the uterus* are likewise reported by Dr. Ashwell,[14] which were removed by it, with occasional depletion, and regulated diet. It was given internally, and at the same time applied externally in the form of ointment, (*Iodin.* gr. xv., *Potass. iodid.* ℈ij., *Ung. cetacei* ℥ss.,) of which a piece of the size of a nutmeg was introduced into the vagina

[1] Saggio Clinico sull' Iodio.
[2] Guy's Hospital Reports, No. 1. Lond. 1836, and Cogswell, op. cit., p. 43.
[3] Dublin Hospital Gazette, Oct. 1, 1845.
[4] Hecker's Litter. Annal. i. 275; and Cogswell on Iodine, p. 77.
[5] Transactions of the Dublin College of Physicians, v. 510. Dublin, 1828.
[6] Revue Médicale, Mars, 1824.
[7] Op. cit.
[8] Guy's Hospital Reports, vol. i.
[9] Hufeland's Jour. B. lx. St. 2, S. 81.
[10] Revue Médicale, Juin, 1833.
[11] Dict. of Pract. Med., art. Cancer.
[12] Journal de Pharmacie, Juin, 1842, p. 598.
[13] Trans. of the King and Queen's College of Physicians of Ireland, vol. v.
[14] Op. cit

and rubbed into the cervix uteri for ten or twelve minutes every night. The average time required for the removal of these tumours was from eight to sixteen weeks. In *congestion, erosion* or *ulceration of the cervix uteri*, Dr. Churchill[1] found iodine, used according to the formula given hereafter, the best application of all that he has tried. He usually commences with a single application of nitric acid, or the acid nitrate of mercury, and then, after a few days, paints the entire cervix with iodine, which he repeats once or twice a week. The application occasions no pain unless the orifice of the vagina should be touched. Jahn extols it much in *incipient scirrhus of the stomach*, when combined with the application of leeches. Riecke asserts, that his father found an ointment of iodine extraordinarily useful in a case of *induration of the pancreas;* and, also, in one of *scirrhus of the pylorus*. Magendie extols it in *cancer of the tongue;* and Benaben and Trüstedt employed it successfully in *stricture of the urethra*, supervening on badly managed gonorrhœa. In a case of *scirrhous tumour*, of large size, seated in the neck, and protruding into the isthmus faucium, which was attended by a prolonged ceaseless pain of an aching and depressing character, Professor J. K. Mitchell[2] found the most marked relief follow the administration of eight grain doses of iodide of potassium. "After the second dose the pain ceased for some days, although the tumour continued to enlarge. The pain returned at irregular intervals, but was always, as speedily as at first, relieved by iodide of potassium."

Leucorrhœa and *gonorrhœa*.—A Parisian physician made the observation, that during the employment of iodine in goître, obstinate and protracted leucorrhœa disappeared: this induced him to try the remedy in the latter disease, and he found it efficacious. Göden and Broglio, likewise, observed it useful in *malignant fluor albus;* and Benaben, Richond,[3] De Salle, Caswall,[4] and Broglio, in *gonorrhœa*. The last two individuals gave it especially in those cases, in which, without any marked inflammation, a deeply rooted gonorrhœa existed, with ulcers in the urethra and prepuce, not apparently of a syphilitic character. In *chronic fluor albus*, it was used by Müller[5] with marked success. A young female had long suffered under this affection, which had reduced her strength, and did not yield to any of the means that had been employed, when the ointment of iodide of potassium was rubbed —morning and evening—on the inner surface of the thighs. After this plan had been continued for four weeks, the disease entirely ceased. MM. Gimelle and Jewell are also advocates for it.[6] M.

[1] Medical Times, May 19, 1849. [2] Medical Examiner, Aug. 1846, p. 462.
[3] Archives Générales de Médecine, vol. iv. [4] Lond. Med. Gazette, for 1834.
[5] Wochenschrift. für die gesammte Heilkunde, No. 40, S. 633, Oct. 1836.
[6] Revue Médicale, vii. 249; and Practical Observations on Leucorrhœa, &c., by Geo. Jewell, p. 80. Lond. 1830. See, also, Solon, in Nouv. Dict. de Méd. et Chirurg., art. Iode.

Ricord,[1] however—who considers that the genito-urinary organs are amongst those that are most susceptible of the action of iodide of potassium—says, that he has been able to trace the fresh access of *blennorrhœas* ineffectually got rid of previously, or the exasperation of those actually existing, so frequently to its use, that he regards the existence or recent presence of a blennorrhœa as its temporary contra-indication. "Perhaps, however," he adds, (on the principle *similia similibus* probably,) "advantage may be derived from the iodide of potassium in some cases of blennorrhœa." A dilute tincture of iodine has been used by M. Steenkiste with great success in cases of obstinate *chronic leucorrhœa*. He dissolves a dram of iodine in twelve fluidounces of alcohol; and adds about forty fluidounces of water. About a fluidounce of this is thrown into the vagina as an injection; which is repeated every day, or every other day, according to the excitement it occasions.

In *discharges from the nose*, iodine, in the form of iodide of potassium, has been used with advantage by Dr. Elliotson[2] and by Mr. George Fayrer,[3]—given internally, as well as employed in the form of injection (℈j. ad *aquæ* f ℥iv.)

In *secondary syphilis*, iodine has been recommended by Tyrrel, Saville, De Salle, Schlesier,[4] Dietrich,[5] A. Cade,[6] Acton,[7] and numerous others;—especially when the disease is complicated with scrofula, and the effects of mercurials. Wallace[8] has likewise communicated some fortunate results from the administration of iodide of potassium in secondary syphilis, and Ebers,[9] Ricord,[10] Von Haselberg,[11] Cullerier and others have confirmed his observations. Benecke[12] has employed iodide of potassium, with the best effects, in every form of syphilis—primary, secondary and tertiary. Mr. Bullock[13] has reported the particulars of eleven cases of secondary syphilitic diseases, of a formidable character, relieved by iodide of potassium given internally, in doses of eight grains three times a day, in camphor mixture. The symptoms were:—destruction of the vulva and soft palate; or nodes, with nocturnal

[1] L'Experience, cited in Lancet, Jan. 28, 1843.
[2] Lancet, Feb. 10, 1838, p. 725.
[3] Ibid. Feb. 24, p. 786.
[4] Casper's Wochenschrift. Feb. 4, 1837, S. 78.
[5] Journ. des Chirurg. und Augenheilkunde, von Gräfe und Walther, cited in Encyclog. des Sciences Méd. Jan. 1841, p. 165.
[6] Bull. Gén. de Thérap. Mai, 1841, and Encycl. des Sciences Méd. Aôut, 1841, p. 319.
[7] London Lancet, Jan. 31, 1846.
[8] Treatise on the Venereal Disease. Lond. 1833.
[9] Medicinische Zeitung, Oct. 5, 1836, S. 201 and 207.
[10] J. J. L. Rattier, La Lancette Française, No. 34, 19 Mars, 1839. Gazette des Hôpitaux, Mars, 1839, and Langston Parker's Modern Treatment of Syphilitic Diseases, &c., &c. Amer. Med. Library edit. p. 77. Philad. 1840.
[11] Medicinische Zeitung, No. 48 and 49. Berlin, 1837.
[12] Cited in Schmidt's Jahrbücher der in-und-auslandischen gesammten Medicin, Jahrgang 1848, No. 8, S. 185.
[13] Edinb. Med. and Surg. Journal, Jan. 2, 1837. See, also, Cogswell on Iodine, p. 80; Laycock, Lond. Med. Gaz. March 2, 1839, p. 821; and Lisfranc, cited in Med. Times, Jan. 11, 1845.

pains in the tibia, ulna, frontal and malar bones, and affection of the bones of the nose, or rupia, and other tubercular eruptions. The period of cure was from one to two months. Mr. Mayo[1] has described it as efficacious in certain disorders, which are the *consequences of syphilis*, as emaciation, with ulcers of the skin; ulcerated throat, affections of the bones, &c., occurring in those to whom mercury had been given; and M. Michel[2] gave it with great advantage for the removal of tertiary symptoms, in the dose of four grains in the day, dissolved in an ounce of tar water.

Iodide of potassium has been used with much success by M. Ricord,[3] in deep-seated *syphilitic tubercles*. Before the tubercles have become inflamed or softened, whilst they are still indurated, he has constantly succeeded in dispersing them by iodide of potassium, with small doses of iodide of mercury. Very commonly, however, he employs iodide of potassium alone; and when the tubercles have become ulcerated, he still relies upon it as his principal remedy. M. Ricord[4] considers its results to be most happy in the *tertiary forms of syphilis*, in which he regards it as the great remedy. He employs it in gradually increasing doses, commencing with ten grains dissolved in three fluidounces of distilled water, given at intervals during the day in any convenient vehicle. When the remedy agrees, which it most commonly does, if the stomach be healthy, the dose is increased ten grains every two or three days, till it is carried to a dram, a dram and a half, or even more, in the course of the day. In the great number of patients who have been treated by M. Ricord, the beneficial effects of the iodide were constantly exhibited, but not always with the same degree of rapidity. By the same plan Jägerschmits[5] treated successfully two cases of constitutional syphilis, after the mercurial treatment had failed. In one of the cases, the iodide of potassium was given with the iodide of quicksilver; in the other, the iodide of potassium alone.

From an examination into the comparative value of the different preparations of mercury and iodine, and the best modes of administering them, Dr. Hocken[6] concludes, that iodine is inert in almost all the symptoms of primary syphilis, with the exception of some forms of *phagedæna*, attended with great debility and derangement of the health;—that in constitutional syphilis it is

[1] Lond. Med. Gaz., xi. 249. See, also, a Treatise on Syphilis, by Herbert Mayo, F. R. S. Lond. 1840.

[2] Bouchardat, Annuaire de Thérapeutique pour 1848, p. 193. .Paris, 1848.

[3] Langston Parker, op. cit. p. 77.

[4] Traité Pratique des Maladies Vénériennes, &c. Paris, 1838; also, Acton, Complete Treatise on Venereal Diseases, &c. Lond. 1841; or Amer. edit., New York, 1846; M. Lafargue, Encycl. des Sciences Méd. Fevrier, 1841, p. 359, and M. Séguin, Bull. Gén. de Thérap. Dec. 1841.

[5] Bulletin de Thérapeutique, Janv. 1849; cited in Canstatt und Eisenman's Jahresbericht u. s. w. im Jahre 1849, v. 159. Erlangen, 1850.

[6] Edinb. Med. and Surg. Journal, April, 1844, p. 325.

a less valuable remedy, in the majority of secondary symptoms, than mercury, with the exception of some severe cases of *pustular eruptions*, *phagedenic sore throat*, *rupia*, and *secondary ulcerations* of a bad character, all of them marked by a cachectic and debilitated constitution; whilst in tertiary symptoms iodine is far more valuable than mercury, and its effects more certain and decided than in any other set of symptoms;—that mercury and iodine are most advantageously combined, in cases presenting both secondary and tertiary symptoms; and that the only form of iodine, safely applicable to the treatment of syphilis, is the iodide of potassium, which should never be carried beyond moderate doses; and hence, that however valuable the iodide of potassium may be in some forms of syphilis, it cannot be substituted with advantage for mercury in the great majority.

Nocturnal pains in the bones, and diseases of the bones and periosteum have likewise been particularly benefited by the iodide:[1] the latter, when localized for a longer or shorter period, have yielded sooner when blisters have been applied over the affected parts. Mr. A. Ure[2] reports a case of *periostitis* of the left ulna, of two months' standing, which, after leeching, blistering, &c., had been employed, was cured by two grains of iodide of potassium given twice a day in a compound infusion of gentian, with a grain of opium at bed-time for a fortnight;—bran poultices being applied to the arm.

An iodine suppository appeared to Mr. Keate[3] to be beneficial in *enlarged prostate;* and iodide of potassium was administered successfully in the same disease by Dr. Casey.[4] In *enlargements of the third lobe of the prostate*, Mr. R. A. Stafford,[5] has recommended it to be applied, by charging a bougie at its point with iodine, or iodide of potassium, and then dipping it into melted tallow, so that a coating may be formed upon it. The bougie having been passed so as to reach the desired spot, its point is allowed to rest upon the diseased part, when the tallow gradually melts, and brings the iodine or iodide of potassium into contact with it, and, by drawing the bougie gently backwards and forwards, the necessary friction is produced. He has found it advisable to be very cautious as to the strength of the application, as the prostate will not bear a strong preparation either of iodine or iodide of potassium at first. He has found it necessary to

[1] Wm. B. Casey, in New York Journal of Medicine and Surgery, October, 1840, p. 320; and J. M. Ferrall, Lond. Med. Gazette, April 18, 1840, W. S. Oke, Provincial Med. and Surg. Journ. April 24, 1844; and Henry Hartshorne, Amer. Journ. of the Medical Sciences, Jan. 1849, p. 47.

[2] London Medical Gazette, March 21, 1845, p. 785.

[3] Lancet, for 1832–3, p. 672.

[4] New York Journal of Medicine, Oct. 1840, p. 324.

[5] Brit. and For. Med. Rev. Oct. 1840, p. 529, being a notice of Mr. Stafford's Essay on the Prostate Gland.

employ belladonna, opium, hyoscyamus, &c., to quiet irritation and pain. When these have subsided, he begins carefully by introducing iodide of potassium in the proportion of one grain to a dram of unguentum cetacei, and increasing it as the patient can bear it. He then goes on with two, three, four, five, and even as far as ten grains or a scruple to the dram, according as the case requires it. After this, he adds iodine to it;—half a grain, one, two, three, four, or even more grains in the same manner.

In different forms of *rheumatism*, iodine has been given with success by Dr. Clendinning,[1] in the Mary-le-bone Hospital, and a series of cases in which it was employed has been published by him. Sir B. Brodie[2] twice relieved rheumatism by the tincture, although, in one of the cases, only temporarily. Cases of *acute rheumatism*, treated successfully by iodide of potassium, used internally and externally, have been published by Dr. Mackey,[3] Mr. Wardleworth[4] and M. Bouyer.[5] Dr. Cowan[6] gave the iodide of potassium in fifty-two cases, in average doses of five grains three times a day. In no instance was either bleeding or leeching prescribed. Its action in rheumatism he considers to be, on the whole, satisfactory: in many cases it may be regarded as heroic, while in others, not *à priori* distinguishable, almost negative. In *chronic rheumatism* its success appears to have been equally decided; given alone in full doses—six grains, for example, three times a day—or associated with sarsaparilla. This combination has been highly extolled by Dr. Graves in *sciatica* and *lumbago*;[7] and by Dr. Heygate[8] in *chronic rheumatism*, *secondary syphilis*; &c.[9] When rheumatism assumes the chronic form, or if there should exist a strumous or syphilitic taint, no remedy, according to Dr. George L. Upshur,[10] will be found equal to the iodide of potassium, of which he usually prescribes five grains four times a day in hop tea, the bowels, in the mean time, being opened every day by the black draught or other cathartic. He has rarely seen the most obstinate cases resist this treatment. In *gout*, too, it has been prescribed. Jahn found it extremely effective in dispersing *gouty tophi*. Valentin observed, that when iodine was given in a case of *goître complicated with gout*, the tumefaction of the joints and the depositions gradually disappeared. Adopting the

[1] London Med. Gazette, May, 1835.
[2] Lancet, for 1832–3.
[3] Ibid. March 2, 1839, p. 830.
[4] Ibid. March 30, 1839.
[5] Gazette Méd. de Paris, No. 32, 1840; see, also, Davies, op. cit. p. 317, and Crawford, Montreal Medical Gazette, April 1, 1844.
[6] Provincial Med. and Surg. Journ. May 27, 1843.
[7] Dublin Journal of Med. Science, Nov. 1840, and M. Ebrard, Journ. de Méd. et Chirurgie Pratiques, Nov. 1845, cited in Amer. Journ. of the Medical Sciences, July, 1846, p. 225.
[8] London Lancet, Mar. 6, 1841; see, also, E. D. Connor, American Medical Intelligencer, Dec. 1, 1840, p. 257.
[9] See, also, W. S. Oke, Provincial Med. and Surg. Journ. May 1, 1844, p. 54.
[10] Medical Examiner, Oct. 1850, p. 581.

hint, he gave it in several cases of gout, with the effect of always mitigating the disease, and, at times, of completely curing it. Gendrin used iodine not only in *chronic gouty swellings* with success, but also in *acute cases*. Ebers likewise confirms the efficacy of iodine in gout. In *coxalgia*, Buchanan recommends the tincture of iodine to be applied by means of a small brush, as well as in cases of *false joint*, of which he has detailed a successful instance. A similar case has also been given by Treusen. Painting the affected surface with it, even in *acute rheumatism*, has been found useful.[1] In various *rheumatic affections of the joints*, especially of the chronic kind, Dr. R. B. Todd[2] has employed "with unquestionable benefit," the local application of iodine to the affected joints,—both in the form of the tincture, and of a stronger compound, used at the King's College Hospital, London, under the name of "*Iodine Paint;*" the formula for which is given hereafter, (see POTASSII IODIDUM.) The mode of application is to paint the part freely by means of a camel's hair pencil. More or less smarting is produced, and frequently vesication, or an herpetic eruption may ensue. The painting may be repeated as often as circumstances demand. Dr. Todd considers it to be extremely useful, when an effusion has taken place into synovial membranes or sheaths; yet Dr. Gros, of Wesserling,[3] affirms, that before he recently recommended the tincture of iodine, it had never been employed in *chronic rheumatic affections of the joints!* In *adiposis*, Von Grafe[4] prescribed it, and not without advantage. The case was accompanied by great voracity and sense of suffocation. Bleeding and cathartics were premised. In *stomacace* or a *scorbutic state of the gums*, the use of iodine has been recommended by Friedrich; as well as in *mercurial salivation*, by Kluge, Knod,[5] Klose,[6] Graves,[7] Asmus,[8] and others; yet its efficacy appears to be somewhat doubtful in the last affection. Heyfelder found it of no value in three cases. Dr. H. D. Holt[9] found, that every case of *nurses' sore mouth*, which he treated with five grain doses of iodide of potassium three times a day, yielded within forty-eight hours. In a case of *stricture of the œsophagus*, it was given with much benefit by Dr. Cumming, of New York.[10] A bougie had been previously used, but without advantage. An adventitious

[1] Cowan, Provincial Med. and Surg. Journal, May 27, 1843.
[2] Lond. and Edinb. Monthly Journal of Med. Science, Dec. 1843, p. 1084; and Crawford, Montreal Med. Gazette, April 1, 1844.
[3] Thèse de Strasbourg, cited in Archives Générales de Médecine, Févr. 1850, p. 214.
[4] Walther und Gräfe's Journal für Chirurgie, B. ix. St. 3, S. 367.
[5] Gazette des Hôpitaux, July, 1837.
[6] Medicinische Zeitung, No. 34, 1836. See. also, Amer. Journal Med. Sciences, Feb. 1834, p. 533.
[7] Dublin Journ. Med. Science, Jan. 1834.
[8] Casper's Wochenschrift. für die gesammte Heilkunde, No. 45, 1838, and Encyclographie des Sciences Médicales. Juillet, 1839.
[9] New York Journal of Medicine, May, 1848.
[10] New York Journal of Medicine and Surgery, No. 2, Oct. 1839, p. 451.

membrane was brought up in scales soon after commencing the iodine. For two or three weeks, the medicine was laid aside, but it was necessary to resume it. In *affections of the mucous membrane of the middle ear*, it has been used by Dr. Manson, and also by Mr. T. Wharton Jones;[1] by the former with advantage; by the latter without any marked effect. Dr. Manson likewise succeeded in curing *chronic dacryocystitis* by it.

In cases of *hydrocele*, Velpeau[2] prefers a solution of iodine to wine as an injection. He employs the tincture in the proportion of from one to two, and even four, drams to an ounce of water.[3] Mr. J. R. Martin,[4] of India, appears, however, to have anticipated him in this application of the remedy. Up to the time of the presentation of his paper to the Medical and Physical Society of Calcutta, (January, 1835,) he had used it successfully in upwards of ninety cases, and subsequently, he communicated to the Medical and Physical Society of Calcutta the results of his after experience. The number treated since March, 1832, at the Native Hospital, was seven hundred and seventy-seven: of these, seven hundred and sixty-six had a solution of tincture of iodine injected.

In order to ascertain whether it was by mere stimulation that the cure by the tincture was obtained, Mr. Martin treated ten cases with a common urethra-syringeful of undiluted port wine, and one with diluted tinctura lyttæ, in the same proportion as that of iodine,—℥ij. to water ℥vj. Of this, two drams were injected and retained; the pain during twenty-four hours was excessive, and the inflammation, although not proportionate to the pain, was much longer in subsiding than when the tincture of iodine solution was used: this was also remarkably apparent in the cases treated with undiluted port wine. Of seven hundred and sixty-six cases it does not appear that more than four failed.[5]

For hydroceles containing from six to thirty ounces of fluid, two drams of the solution of tincture of iodine are sufficient; for those containing from thirty to sixty ounces, three drams; and for those of a larger size, four to five drams. When the hydrocele contains less than three ounces, a dram of the injection is sufficient.[6] The cure is effected much sooner by iodine; and if any infiltration takes place it is readily absorbed. Highly favourable results have also been obtained by MM. Oppenheim[7] and Fricke,[8] and by Mr.

[1] Lond. Med. Gaz. Aug. 17, 1839, p. 754, and Amer. Med. Intel. Nov. 1, 1839, p. 233.

[2] Archives Générales de Médecine, Jan. 1837; La Presse Médicale, Mai, 1837. See, also, Amer. Med. Intelligencer, July 15, 1837, p. 138; and Oct. 16, p. 263.

[3] Bouchardat, Annuaire de Thérapeutique pour 1844, p. 338. Paris, 1844.

[4] Amer. Journal of the Medical Sciences, Nov. 1837, p. 238.

[5] Quarterly Journal of the Calcutta Med. and Physical Society, for Jan. 1837; cited in American Journal of the Medical Sciences, for Feb. 1839, p. 485.

[6] Dujat, in Gazette Médicale de Paris, Sept. 1838.

[7] Zeitschrift für die gesammte Medicin. Aug. 1838, S. 389.

[8] Ibid. S. 405.

Bransby Cooper,[1] and the method has been largely employed in this country with equal advantage.[2] Two successful cases are reported by Dr. Stewart.[3]

Encouraged by the success which attended the use of iodine injections in hydrocele, M. Velpeau[4] has adopted a similar mode of treatment for various kinds of *serous cysts*, *enlarged bursæ*, &c., about the knee, in the axilla, breast, neck and other parts. He punctures the cyst with a trocar proportioned to its size; emptying it in this manner, and then injects through the cannula a mixture of one part of tincture of iodine and two parts of water. In a few seconds this is drawn off. In a day or two, the cyst inflames, though never greatly, and it ultimately shrivels and disappears. Since then he has used the injection successfully in five cases of *goître*, which is often formed of cysts filled with a thin serous or a blackish fluid. In *hydrarthrosis*, the operation appeared to him to be more formidable. He practised it in two cases; one recovered; the other did not.[5] The plan has been employed by M. Bonnet,[6] of Lyons, in one case of hydrarthrosis. He prefers for the injection a watery solution, consisting of one part of iodine, two parts of iodide of potassium, and eight of water, in order to avoid the possible coagulation of the effused fluid by the alcohol of the tincture. He only withdraws through the trocar a portion of the fluid; and the quantity of injection thrown in is nearly the same as that of the fluid which has been withdrawn. In all M. Bonnet's cases, the acute arthritis which supervened subsided within a few days, and was never followed by suppuration. Recently, M. Velpeau[7] has expressed himself more decidedly in regard to the beneficial effects of this plan; and he states that at least fifty cases treated by different surgeons, are now on record, in none of which were any alarming symptoms developed. Dangerous and fatal consequences had resulted, according to him, in M. Boyer's cases, from the joint having been laid widely open, and irritating fluids several times thrown in, whilst in the modern operation the smallest possible trocar is employed, and in the majority of cases a single injection is sufficient. He is now of opinion, that there is not more danger in injecting a joint than the tunica vaginalis.

M. Velpeau likewise tried the effect of iodine injections into the

[1] Medico-Chirurg. Rev. Apl. 1841, p. 541.

[2] A. C. Post, New York Journal of Medicine, April, 1840, p. 369, and G. W. Norris, Amer. Journ. of the Med. Sciences, Feb. 1839, p. 299.

[3] India Journal of Medicine, May, 1836.

[4] Bulletin Général de Thérapeutique, Nov. 1841.

[5] Recherches sur les Cavités closes, &c., pp. 112—165, and Bourchardat, Annuaire de Thérapeutique pour 1843, p. 256. Paris, 1843.

[6] Braithwaite's Retrospect, vii. 231; cited from Medico-Chirurgical Review, Apl. 1843; also, Traité des Maladies des Articulations, &c. Paris, 1845; reviewed in Brit. and For. Med. Rev. July, 1846, p. 71. This Review, by the way, contains a condensed account of the different cases in which the injection had until then been employed in hydrarthrosis.

[7] Gazette des Hôpitaux, cited in Brit. and For. Med. Chirurg. Rev. July, 1850, p. 268.

sac of a *reducible hernia*, and repeated the experiment on two other cases; but the difficulty of reaching the sac with certainty, and the unsatisfactory results obtained in these three cases, have been regarded as serious objections to the practice. The plan has been adopted by Prof. Pancoast, who has, likewise, used the tincture of cantharides for the material of the injection.

M. Velpeau[1] was disposed to go even farther, and, as he considered it to be proved by his experiments, that the tincture of iodine does not induce either suppuration or gangrene when thrown into serous cavities; he suggested whether we might not hope that certain varieties of *spina bifida*, *hydropericardium*, *hydrothorax* and *ascites* may respectively find an efficacious remedy in this kind of medication? "It would, doubtless," he remarks, "be rash to reply affirmatively to this question, before having invoked experience and direct observation; but the facts which I possess, and analogy, are sufficient, I think, to justify fresh trials in this direction. I may add, that the iodine injection has succeeded with me in purely liquid *hæmatocele* as well as in hydrocele." A case of *spina bifida* has, indeed, been treated successfully by Dr. Brainard,[2] with injections of iodine. The patient, a girl, thirteen years of age, had a tumour at the top of the sacrum, nine inches in circumference and about three in length, with thin walls. She had been paralytic in the lower limbs, but within three years had acquired a partial use of them. Through a small puncture, a solution of a grain of iodide of potassium with half a grain of iodine in a fluidram of water, was thrown into the sac; compresses and a bandage were applied to prevent the escape of the fluid; and methodical compression by a bandage was exerted on the tumour. A month afterwards the injection was repeated, of half the strength of the first, and in about a fortnight the fluid in the sac was in great part absorbed. A spring truss was now applied, and the fluid became entirely absorbed.

Since then, Dr. Brainard[3] has treated three cases, all associated with hydrocephalus, and therefore incurable. He is of opinion that the disease is generally curable by this plan of treatment, and that, compared with every known method, it is "safe and efficient." He advises that, at the commencement, not more than the thirty-second part of a grain of iodine, and three times as much iodide of potassium, dissolved in distilled water, should be used. As long as it produces moderate inflammation, the quantity should not be increased. Collodion is subsequently applied and reapplied as long as the tumour continues to decrease; and when it ceases to decrease, or increases, the injection is repeated.

A case of *ovarian dropsy* has been published by Dr. Benjamin

[1] Bouchardat, Annuaire de Thérapeutique pour 1844, p. 132. Paris, 1844.
[2] Illinois and Indiana Med. and Surg. Journal, Jan. 1848.
[3] North-Western Med. and Surg. Journal, July, 1850.

A. Allison,[1] of Indiana, in which a solution of iodine—the strength is not mentioned—was injected into the dropsical sac. "The symptoms that followed were truly alarming, and could not be entirely controlled.[2] They subsided, however, in a few days, and she continued improving. The discharge rapidly increased until it almost entirely ceased." A similar plan has been used successfully in some cases of ascites.[3]

In a case of *empyema* after paracentesis, Dr. Suytgaerens, of Puers, repeatedly injected the pleura with an iodine solution, and the patient recovered. In a case of *ascites*, M. Dieulafoy, of Toulouse, threw a quantity of iodine injection into the peritoneum, and after diffusing it over the entire cavity drew off about half the quantity injected. About a month after, half the cavity seemed obliterated; but the fluid having again collected, the injection was repeated with similar consequences. A third injection was employed about six weeks afterwards: after this the ascites disappeared.[4] Another case is related[5] in which a cure was effected in the same manner. The patient—a child, seven years of age,—had been tapped several times, but the abdomen had always become filled again, and he was in an almost hopeless state when this course was resorted to. The case was one of *asthenic dropsy*, without any apparent complication of disease of the heart or other viscus; and M. Leriche, of Lyons, has published two cases in which a single injection, after the complete evacuation of the fluid, was sufficient for the cure. M. Boinet presented a memoir before the *Société de Chirurgie*, in which he enumerated eighteen cases, from various sources, wherein different substances, as gases, water, iodine, &c., were injected. Fifteen of these were successful, and only one died; iodine seeming to be the preferable material for the injection. "M. Morel, reporting upon this paper, pronounced an almost unqualified opinion in favour of the practice; but MM. Vidal, Gosselin, Robert and others, protested against drawing any such hasty conclusions from cases the history of which had been imperfectly given, and have to be confronted with others in which a fatal termination has resulted, an example of which has recently occurred in Paris."[6]

Dr. Brainard states,[7] that in December, 1845, he threw into

[1] Medical Examiner, June, 1846, p. 336; and August, 1847, p. 459.

[2] Gazette des Hôpitaux, Fév. 1845. See, also, on this case and subject, Proceedings of the Royal Academy of Medicine of Paris, Jan. 27, 1846, in Medical Times, Feb. 7, 1846, p. 363.

[3] Rul-Oges, of Antwerp, cited by Thirion, in Gazette Médicale de Paris, 10, 1849; and in Schmidt's Jahrbücher, u. s. w. No. 11, S. 169. Jahrgang 1849.

[4] British and Foreign Medical Review, July, 1846, p. 78.

[5] Gazette Médicale de Paris, 4 Mars, 1848.

[6] British and Foreign Medico-Chirurgical Review, July, 1850, p. 270, cited from L'Union Médicale, Nos. 17, 18, 19, and 20.

[7] North-Western Medical and Surgical Journal, July, 1850, cited in Amer. Journal of the Med. Sciences, Oct. 1850, p. 560, and in the Ohio Medical and Surgical Journal, January, 1851, p. 249.

the peritoneal cavity fifteen grains of iodide of potassium dissolved in one fluidounce of distilled water, after he had evacuated the fluid of ascites by tapping. Acute smarting pain followed, which subsided in a few minutes without any subsequent evidence of inflammation. The patient returned home, and Dr. Brainard lost sight of him. In another case, Dr. Hagemann injected the cavity twice without the supervention of inflammation. In the winter of 1850, Dr. Brainard injected the abdomen of a patient affected with anasarca, as well as ascites, from cardiac disease, with four grains of iodine, and eight of iodide of potassium in solution, without drawing off the fluid. The injection was followed by no signs of inflammation, but the fluid in the peritoneum was absorbed, and a great amelioration of the symptoms followed. Dr. Brainard refers to cases treated in a similar manner by Dr. M'Clure, of Dundee, Illinois, and by Professor Mussey, with similar results; whence he concludes, it may be considered an established fact, that injections of this kind may be made, with suitable care, without danger of producing inflammation.

Iodine is said by Coindet and Formey to have been efficacious in cases of *impotence;* and Mr. Key[1] regards it as one of the most efficacious remedies we possess in checking or controlling the *ulcerative process*—the most active *phagedenic ulcers* often yielding in a surprising manner to its influence, and assuming a healthy, granulating appearance. M. Lisfranc[2] employed iodide of potassium with success in *atonic ulcers* of long standing, which had resisted other modes of treatment. The only topical application used by him was simple cerate and charpie. The iodide was prescribed in doses of a scruple daily, which was subsequently increased to six grains every six hours.

Dr. John Davies[3] has published at length the results of his experience with the local application of iodine—especially the tincture—in various diseases. In *erysipelas*, no matter where present or of what description, he found the tincture, "painted" over the part with a camel's hair brush, preferable to leeches, lotions, incisions, scarifications, or caustic.[4] Mr. Wm. Reeves[5] uses in these cases the compound iodine ointment. In *phlegmon*, where pain and throbbing only exist, one application of the tincture of the full strength cut short the disease; and where suppuration had commenced, its repeated use not only checked its progress, but caused the deposited matter to be absorbed. Not a single case of failure occurred, where the tincture was applied in superficial

[1] Medico-Chirurgical Transactions, vol. xix.

[2] Cited in London Lancet, Jan. 7, 1843.

[3] Practical Remarks on the Use of Iodine Locally Applied, &c. &c. London, 1839; or Amer. Med. Library, 1839-40.

[4] See, also, Burns, in Philad. Med. Examiner, Nov. 6, 1841; and Crawford, Montreal Medical Gazette, April 1, 1844.

[5] London Lancet, Oct. 22, 1842, p. 119.

phlegmon before suppuration took place, and even then the pus was much less in quantity than where poultices were used. In *extensive sloughing of the areolar membrane*, after phlegmonous erysipelas of the lower extremities, the tincture proved to be a most valuable application. Whilst the usual remedies had no effect in checking the inflammatory process, the iodine arrested it at once, and gave the living parts a chance of casting off the dead slough.

In *acute inflammation of the joints* it was more efficacious than any of the ordinary local applications. Over the knee—if the skin be delicate—it may be applied at first about half strength, and be increased gradually as required. When the hip is affected, the strong tincture must be painted all round the upper part of the thigh and groin. In these cases, Dr. Davies prefers leeching the joint, and then using the iodine as the bleeding ceases. Mr. William Reeves[1] employs the compound iodine ointment in these cases. In *mastitis* or *inflammation of the mamma*, the tincture, of full strength, must be laid extensively over the part, as soon as the disease is discovered; and if an abscess should form, its extent will be limited. In *gout*, its application cuts short the attack; and in *anomalous pains of the joints*, supposed to be *gouty* or *rheumatic*, its effect has been marked. In these cases, Dr. Davies dilutes the tincture to about two-thirds of its full strength. In *chronic inflammation and enlargement of the joints*, such as of the hip and knee, leeches are first employed, and then the diluted tincture is laid extensively over the part, and the application is repeated every two or three days according to its effects on the skin. In the ankle or wrist, where the enlargement is of old standing, an iodine lotion—composed of 32 grains of *iodide of potassium*, dissolved in a fluidounce of *distilled water*, to which eight grains of *iodine* are added—is preferred to the tincture by Dr. Davies;—a rag being wetted in it three or four times a day, and laid round the joint, and the strength of the lotion being determined by the discretion of the attendant. In *inflammation of the absorbents*, the strong tincture, applied along the track of the vessels, is generally sufficient to subdue the affection. Employed in *anthrax*, before or after incisions, it dispels the inflammation, and enables the parts to cast off the dead areolar tissue, and form granulations. It is equally applicable to *boils* and *buboes*,—cutting short the progress of the latter; or, if used after suppuration, limiting the extent of the abscess. The suppurative process in cases of *abscesses* being well established, and the acute inflammation of surrounding parts repressed by cataplasms, M. Borelli,[2] of Turin, after opening the abscess in its most depend-

[1] Op. cit.

[2] Omodei, Annali, cxxviii. 79—154, cited in British and Foreign Med. Chir. Rev. July, 1850, p. 269.

ing part, and evacuating the contents as far as practicable, introduces the nozzle of a small syringe through the aperture, and throws in pure tincture of iodine with some force, allowing it to remain in, when the pain is not too great, about half a minute. He now waits three or four days, to see whether the plastic effusion into the cavity will effect its occlusion, which is rarely the case, unless the abscess is very small, and the engorgement of the surrounding tissues slight. The injection will require, therefore, repetition every two or three days, according to the amount of reaction produced, and, when this is in excess, emollient cataplasms are required. M. Borelli has never seen any ill effect, local or general, from this mode of using the iodine. He reports, also, a case of *ranula*, which yielded to the iodine injection, after simple puncture had repeatedly failed.

In *lupus* or *noli me tangere*, the strong tincture laid upon the ulcerated surface has cured the disease without the use of internal remedies. In *malignant ulcers of the tongue* and *tonsils*, the tincture, of full strength, brushed all over the parts, arrested the affection, no matter how threatening. The only internal remedy was the iodurettted solution,—in doses of ten drops twice a day, in water. In *scrofulous swellings of the glands*, it either resolved the inflammation and caused absorption of the morbid deposits, or limited the formation of matter and assisted in the cicatrization of the sore. In *whitlow*, the strong tincture must be immediately painted over the whole finger or thumb, and the application be repeated in twelve hours, unless the morbid sensation has ceased. Where this has been done prior to suppuration, it never fails, according to Dr. Davies, to subdue the disease. Should matter have been formed, a free incision must be made, and the tincture be applied over the finger or hand, if swollen. In *chilblains*, the tincture, of full strength, is to be applied over the part affected, and beyond the boundary of the surrounding inflammation. This must be repeated daily for some time, and the affected parts should be immersed every night in water as hot as can be borne. When the ulceration looks healthy, and the skin around has lost its livid colour, the strength of the tincture may be reduced. After each application, the sore, if any, should be dressed with some stimulating ointment. In cases where the inflammation spreads along the foot or leg, the affected parts must be painted with the strong tincture. Mr. James Henderson[1] has likewise found a compound preparation of iodine useful in chilblains. The form is given hereafter. Three applications have generally been sufficient.

In *lacerated*, *contused*, and *punctured wounds*, the tincture was found by Dr. Davies to be preferable to every plan of local treatment. When the accident was one of simple laceration—after

[1] London Lancet, April 18, 1840.

the blood or dirt had been wiped away, every point of the surface of the wound was touched over with the tincture, generally of the full strength, and the application was extended a little distance beyond. After allowing it to dry, the edges of the wound were brought together with adhesive plaster, which was not renewed for three or four days. At the end of this time, part of the wound was found to be united, and the rest granulating. The granulations with the surrounding skin were washed over and then dressed with common wax ointment. The cure was generally rapid. Where *contusion* only exists, the tincture is applied by Dr. Davies every day or two to the surface: this quickly occasions the absorption of the extravasated blood. Where there is a combination of laceration and contusion, the treatment is compound. The surface of the wound and contusion is brushed over, and the edges of the former are approximated, and kept together by a plaster or a roller. In *punctured wounds*, from whatever cause, the tincture, liberally applied, is used with the same success it exerts in local diseases, and injuries attended with inflammation. In such cases, it should be allowed to insinuate itself freely into the wound, and be thickly painted upon the surrounding skin. In *burns and scalds*, it appears to act as in erysipelas. When the integuments are not destroyed, although the cuticle may be in blisters, one or two applications of the tincture, of moderate strength, subdue the pain and redness, after which the parts only require to be kept free from injury. Lastly:—the remedy is said by Dr. Davies to be eminently successful in *ulcers*. Several cases of *chancre* yielded sooner than to the ordinary treatment; and in *malignant ulcerations* about the lips, tongue or tonsils, no topical remedy would seem to be equal to it. In all cases of *irritable* or *sloughing sores*, the tincture, of full strength, must be applied to the surface and surrounding skin. After being allowed to remain some time, the ulcer must be covered with simple ointment in preference to a poultice. The application must be repeated daily till the sore becomes clean and healthy, when the *granulations* may be touched with the diluted tincture every two or three days. Under this plan, the cavity of the ulcer fills up rapidly. Mr. Ferguson[1] has published a most obstinate case of *old ulcers*, which were cured by the use of the corrosive chloride of mercury internally, and the tincture of iodine externally. M. Ricord[2] considers the tincture to be the very best topical application in *phagedenic chancres*, and Dr. Samuel Jackson, of Philadelphia, (formerly of Northumberland, Pa.,) has found it an admirable remedy in the *irritable ulcer with inflamed surface and erysipelatoid margins*. It soon fills the surface, and with this the whole inflammation disappears. A little lunar caustic then disposes the ulcers to granulate.

[1] London Lancet, Nov. 13, 1841. See, also, Lisfranc, cited in Med. Times, Jan. 11, 1845. [2] Bulletin Générale de Thérapeutique, 15 et 18 Février, 1841.

In *snake bites*, as in those of the rattlesnake, viper, and copperhead, in both man and animals, the tincture of iodine has been successfully used by Dr. Whitmire[1] with the effect of putting an entire stop to the swelling and pain in from twelve to sixteen hours. He paints the bitten part and the whole swelling with three or four coats of the tincture twice daily, and should the swelling extend, which it almost always does after the first application if made soon after the infliction of the wound, he repeats it.

Besides these affections, the tincture has been employed with good effect in *gouty* and *rheumatic swellings* of the small joints from thickening of their ligaments, *fistulous openings*, *malignant warts* or *adventitious excrescences*, *ganglions*, *the stinging of wasps*, *diseases of the spine*, *ununited fractures*, *orchitis*, *inflamed urethra* and *chordee*, *inflammation of the bursæ*, *chronic ophthalmia*, *granulations of the eyelids*,[2] and *opacities of the cornea*,[3] (being much diluted,) in *strumous ophthalmia*, when applied to the outside of the eyelids,[4] in *ulcerations of the tonsils and fauces*, specific or non-specific,[5] and in *dissection wounds*. The strength of the remedy, in the several cases, must depend upon the judgment of the practitioner.[6] It has also been used as a counter-irritant in many internal affections. Painting the trachea and larynx with a strong tincture of iodine has been found beneficial by Mr. E. Copeman[7] in *inflammation of the air passages*. Dr. Willige[8] extols it highly in cases of *croup;* and in *bowel complaints*, an iodide liniment, in the proportion of a scruple to the ounce of olive oil, has been employed most advantageously by Mr. M'Diarmid.[9] He directed the entire surface of the abdomen to be smeared over with it, and the operation to be repeated as soon as the liniment is absorbed, and the skin has again become dry and colourless, or almost so. In the acute form of *diarrhœa of infants*, in which the surface of the abdomen feels hot and dry, somewhat tender and full, with great irritability of the bowels, and frequent watery evacuations, changeable in colour, and offensive, with general febrile phenomena, an almost magical effect was produced by the liniment in a few hours.

Iodine has been employed by M. Reiniger[10] to remove *sparks of iron from the cornea*. A small particle of steel struck the eye

[1] North-western Medical and Surgical Journal, Jan. 1849.
[2] Fromont, cited in Wahu, Annuaire de Médecine, &c. pour 1849, p. 246.
[3] See, also, Lohsse, Medicinisch. Zeitung, Mar. 3, 1841; cited in Brit. and For. Med. Rev. July, 1841, p. 258; also, W. S. Helmuth, Med. Examiner, Sept. 11, 1841, p. 583.
[4] Furnivall, Lancet, Dec. 10, 1842, p. 405.
[5] J. J. Loss, Lond. and Edinb. Monthly Journ. of Med. Science, Sept. 1842, p. 792.
[6] Provincial Medical and Surgical Journal, August 12, 1843.
[7] British and Foreign Medical Review, Oct. 1839, p. 523. See, also, Langan, London Lancet, June 27, 1840, p. 484.
[8] Schmidt's Jahrbücher, No. 7, 1847; and Lond. Med. Gaz. Jan. 1848.
[9] British Amer. Journal of Med. Sciences, Nov. 1846.
[10] Journal de Pharmacie et de Chimie, Juin, 1845.

of a cutler whilst at work, and fixed itself in the substance of the cornea, from which it was found impossible to remove it either by the forceps or the needle. It soon excited inflammation, and after eight days, the eye was still red, hot and painful, and the patient complained of a pricking sensation on moving it. The fragment of steel could be distinctly seen retaining its polish. As a strong magnet also failed to remove it, it was resolved to have recourse to a chemical solvent, but one which would not injure the eye. A weak solution of iodine and iodide of potassium was therefore used as a collyrium, and its very first application sensibly deadened the lustre of the spark of steel. By its continued use, the steel was rendered soluble, and gradually removed.

With regard to the relative value of the preparations of iodine, Dr. A. Buchanan[1] is inclined to place them in the following order:—Iodide of starch, hydriodic acid, (iodine,) and iodide of potassium; although he admits that the superiority he ascribes to the first is perhaps owing to his having prescribed it most frequently. The operation of all of these is, however, similar. The only mode, he thinks, of explaining the similarity of action on the body of substances so dissimilar in nature, is by considering the hydriodic acid as the active principle—free iodine being immediately converted in the stomach into hydriodic acid.

Mr. B. Phillips[2] prefers the iodide of iron in all cases.

M. Moj'sissovics, of Vienna,[3] considers iodide of potassium and the iodides of mercury to be decidedly the most valuable preparations, when pure: but they are often, he affirms, given in prescriptions with matters that decompose them.

In the Glasgow Infirmary, they are in the habit of preparing a LIQUID HYDRIODIC ACID, by dissolving three hundred and thirty grains of *iodide of potassium* in f ℥iss. of *distilled water;* and two hundred and sixty-four grains of *tartaric acid* in a like quantity; the solutions are then mixed, and when the bitartrate of potassa has subsided, the fluid is filtered. Water enough is then added to make ℥vj. and ʒij.[4] Each dram of this liquid acid contains five grains of iodine. The acid, thus prepared, is, however, very liable to change, and is necessarily variable in its effects.[5]

Lastly; from his researches on the effects of the various preparations of iodine, Dr. Cogswell[6] infers, 1. That iodine and iodide of potassium act very much in the same way, but that there is still a difference, not merely in point of power, but of specific properties. 2. That, whatever be the proper action of the iodide of sul-

[1] Medical Gazette, July 2, 1836.
[2] London Medical Gazette, Jan. 10, 1840.
[3] Oesterreich, Med. Jahrbuch., cited in Encyclog. des Sciences Méd. Avril, 1841, p. 8.
[4] Buchanan, op. cit.
[5] Guibourt, in Revue Médicale, Août, 1837; and Bull. Gén. de Thérap. Sept. 1837.
[6] Essay on Iodine, p. 106. Edinb. 1837.

phur, its facility of decomposition gives it a resemblance to iodine. 3. That the iodides of carbon, so far as examined, have an action peculiar to themselves; and, 4. That in those metallic iodides which were submitted to examination, the preponderance of power is on the side of the metals.

MODE OF ADMINISTRATION.

Iodine is not easily given internally in substance—in the form of pill or powder; neither are these forms to be recommended. Coindet preferred it in the form of tincture; and this is one of the most common modes in which it is administered. When, however, the tincture is taken with water, a great part of the iodine is thrown down, and, it has been conceived, it may thus exert a noxious influence on the stomach; but in the small doses in which it is taken, such an effect can scarcely be anticipated. It would seem, however, that, in the generality of cases, when iodine has disagreed, it has been in the form of tincture. For this reason, it has been given more, of late years, in watery solution; and, to promote the solution, iodide of potassium is added; or a little chloride of sodium, according to Lugol's prescription. An ethereal solution is also prescribed. Externally, it is applied in the form of tincture, ointment, or watery solution, or in baths, or fumigations. Frictions with iodine readily occasion considerable irritation of the skin, which commonly soon passes away when the friction is suspended for a time. After bathing a part, painful rubefaction of the skin often ensues, which is usually followed by perspiration and sleep. Iodine is given internally in the dose of one-eighth of a grain to a grain, twice or thrice a day.

In Dr. Pereira's opinion,[1] the most effectual method of employing iodine externally is the endermic, in the form of an iodureted ointment to the cutis vera after the epidermis has been removed by a blister. The plan is not, however, often used.

Under the idea that the virtues of cod liver oil might be owing to the small quantity of iodine it contains, rather than to the fatty matter, which—as has been elsewhere shown—is probably not the case: iodine has been added to olive or almond oil, and the results have not appeared to the author to be less favourable than when cod liver oil has been given. Such a preparation—*iodized oil*—has superseded—it seems—the other forms of iodine at the Val-de-Grace, in Paris. M. Marchal (de Calvi[2]) found, that in this way far larger doses of iodine can be administered without irritating the stomach. The trials made by him with the iodized oil have been very satisfactory in their results, the progress of the cure of buboes and other glandular enlargements having been much expedited. M. Ricord, too, exhibited it with benefit in *tertiary*

[1] Elements of Mat. Med. and Therap. 2d edit. p. 242. Lond. 1842, or 2d Amer. edit. Philad. 1846.

[2] Gazette des Hôpitaux, Févr. 1848.

syphilis, *caries syphilitica*, and M. Marchal directs the iodine, as wanted, to be dissolved in fresh almond oil, in the proportion of one part to fifteen. The minimum dose is a grain of the iodine.

The following are some of the forms in which pure iodine is administered internally and externally:—

Tinctura iodini.

Tincture of iodine.

Tinctura seu Alcohol Iodii.

R. Iodini gr. xlviij.
Solve in
Alcohol. 35° (s. g. .842) ℥j.

Dose.—Ten drops in some mucilaginous or saccharine fluid, or in wine and water. *Coindet & Magendie.*

The *tinctura iodini* of the Pharmacopœia of the United States consists of an ounce of *iodine* to a pint of *alcohol*.

Mr. Durand, an able *pharmacien* of Philadelphia, finds, that forty grains of *iodine*, and ʒx. of *alcohol* form a saturated solution. Based on this fact, the following formula has been given, which does not seem, however, to possess any advantages over the simple tincture.

R. Iodin. ℈ij.
Alcohol. ℥j.
Spirit. lavand. comp. ʒij.

Dose.—Five to ten drops, twice a day, gradually increasing it.[1]

Tinctura ætherea iodini.

Ethereal tincture of iodine.

Tinctura iodii ætherea.—French. *Ether ioduré.*

R. Æther. sulphuric. f ʒi.
Iodini gr. iv. M.

Dose.—Eight or ten drops, two or three times a day. *Magendie.*

Pulvis iodini cum hydrargyri chlorido mite.

Powder of Iodine and Calomel.

R. Hydrarg. chlorid. mit. gr. viij.
Iodin. gr. j.
Sacchari albi gr. lxxx. M.
et divide in partes xij.

One to be taken every four hours, to control *scrofulous inflammation* and its effects. *Bennett & Wilshire.*

Decoctum cinchonæ cum tinctura iodini.

Decoction of cinchona with tincture of iodine.

R. Decoct. cinchon. f ℥x.
Tinct. iodin. gtt. xc. M.

Dose.—Two spoonfuls, three times a day. In *scrofulous ulcers.* *Rey.*

[1] Ellis's Medical Formulary, 8th edit. p. 113. Philad. 1846.

Mistura iodini.

Mixture of iodine.

R. Iodin. gr. v.
Alcohol. f ʒij.
Solve et adde
Aq. cinnam. f ℥iiss.
Syrup. simpl. f ℥iss. M.

To be taken in twenty-four hours, in dram doses.

Syrupus iodini.

Syrup of iodine.

R. Tinctur. iodin. gr. vj.
Syrup. simpl. f ℥ij. M.

Henry.

Liquor iodini. (Lugol's.)

Solution of iodine.

(1. For internal use.)
French. *Boisson iodée.*

		A.	B.	C.
R.	Iodin.	gr. ½.	gr. ¾.	gr. j.
	Sodii chlorid.	gr. xij.	gr. xij.	gr. xij.
	Aquæ destill.	Oj.	Oj.	Oj.
				Solve.

(2. For external use.)

		A.	B.	C.
R.	Iodin.	gr. ij.	gr. iij.	gr. iv.
	Aq. destillat.	Oj.	Oj.	Oj.
				Solve.

Lugol gives formulæ for the solution of the three different strengths above.

Lotio iodini.

Lotion of iodine.

R. Tinct. iodin. f ℥ss.
Ferri iodid. gr. xij.
Antim. chlorid. ℥ss. M.

Used for *corns*. To be applied by means of a camel's hair pencil, after the corns have been well pared. *James Henderson.*

R. Iodin. ʒj.
Potass. iodid. ʒij.
Aq. destillat.
Alcohol. āā. ℥ij. M.

As a local application in *congestion* and *ulceration of the os uteri*. *Churchill.*

Gargarisma iodini.

Gargle of iodine.

R. Tinct. iodin. f ʒj.—ʒij.
—— opii f ʒi.
Aquæ f ℥vj. M.

To be used three or four times a day. *J. J. Ross.*

Unguentum iodini.

Ointment of iodine.

Unguentum Iodatum.—French, *Pommade d'Iode.*—German, *Iodsalbe.*

R. Iodin. gr. iij,
Adipis ʒij. M.

The Unguentum Iodini of the Pharmacopœia of the United States, (1842,) is made as follows:—

R. Iodini gr. xx.
Alcohol. ♏xx.
Adipis ℥j.

Rub the iodine first with the alcohol, and then with the lard, until they are thoroughly mixed.

Linimentum iodini.

Liniment of iodine.

R. Linim. sapon. f ℥j.
Tinct. iodin. f ʒj. M.

Manson.

Cataplasma iodini.

Cataplasm of iodine.

R. Tinct. iodin. f ℥ss.
Lin. pulv. ℥j.
Avenæ farin. ℥iij.
Aquæ destillat. q. s. ut fiat cataplasma.

Used as a cataplasm in *scrofulous tumours*, and *goitre.*

Iodide of Ammonium, *Io'didum* seu *Iodure'tum Ammo'nii*, *Ammonium Iodatum seu Hydroiodicum*, *Hydriodas Ammoniæ*, *Hydriodate of Ammonia*, *Ioduret of Ammonium;* German, *Iodammonium*—is formed by saturating *liquid hydriodic acid* with *caustic ammonia* and evaporating the solution. It crystallizes with difficulty, and is deliquescent. It was introduced into medical practice by M. Biett, of Paris, as a valuable therapeutical agent in *certain diseases of the skin.* Several successful cases of its employment in *lepra* and *psoriasis*, by M. Biett, are given by Dr. Pennock,[1] accompanied by interesting remarks by the latter. It is administered in the form of ointment,—from a scruple to a dram of the *iodide* being added to an ounce of *lard*—the weaker ointment being used in milder or more acute, and the latter in more inveterate cases. The ointment should be freshly prepared, or kept excluded from the air, as it is readily decomposed.

Iodide of Starch, *Io'didum* seu *Iodure'tum Am'yli*, *Amylum Iodatum;* French, *Iodure d'Amidon;* German, *Iodstärkmehl*, *Iodstärke*, *Starkmehl-oder-Satzmehlio-*

[1] Amer. Journ. of the Med. Sciences, Feb. 1835, p. 374.

dür, has been extolled by Dr. Andrew Buchanan,[1] of Glasgow. It is prepared of *iodine*, gr. xxiv.; *starch*, in fine powder, ℥j. The iodine is first triturated with a little *water*, and the starch is gradually added, the trituration being continued till the compound assumes a uniform blue colour. The iodide is then dried with a heat so gentle as not to drive off the iodine, and it must be afterwards kept in a well stopped bottle.

Iodine, in the usual forms of exhibition, is not in general given in larger doses than four or six grains daily, whilst, in the above formula, Dr. Buchanan has given as much as seventy-two grains daily. Professor Forget, of Strasburg, has published the case of a youth, seventeen years of age, who took, in 48 days, 139 ounces, or nearly nine pounds, of this iodide, containing 3336 grains, or nearly six ounces, of iodine,—being nearly sixteen grains a day.[2] Pauli[3] thought it inert; but it is proper to state, that Dr. Laurie, of Glasgow,[4] was of opinion, that it proved fatal in a case, in which not more of the iodide than corresponded to a grain of iodine, had been given twice a day for five days. It has been proposed by M. Burguet[5] to cover the abdomen in a case of *ascites* with a thick layer of iodide of starch, made of about ℈j. of *iodine*, to twelve ounces of *starch*. He found the iodine absorbed, and the dropsical effusion disappear.

Iodic Acid, *Ac''idum Iod'icum;* French, *Acide Iodique;* German, *Iodsäure*. This is obtained by boiling *iodine* with *nitric acid;* or by decomposing *iodate of baryta* by *dilute sulphuric acid*. It is a white, transparent solid, slightly deliquescent, and very soluble in water. It was proposed in medicine by Mr. Monks,[6] of Norwood, England, who gives it in combination with sulphate of quinia, rendered soluble by sulphuric acid, as a tonic, excitant and eutrophic in *hoarseness* consequent on *catarrh*, in *scrofula*, *incipient phthisis*, *chronic inflammation*, *syphilis*, &c. Unlike iodide of potassium, it can be given in combination with sulphuric or nitric acid without suffering decomposition.

The dose for children, from seven to fourteen years of age, is three grains; for adults, from three to six grains, or more. Its general effects on the system are those of iodine.[7]

Iodide of Chloride of Mercury, *Iod'idum Hydrar'gyri Chlo'ridi, Hydrargyrum iodatum cum Chlorido Mercurii;* French, *Iodhydrargyrite de Chlorure Mercureux;* German,

[1] Lond. Med. Gaz. July 2, 1836; see, also, Soubeiran, in Revue Médicale, Août, 1837.
[2] Gazette des Hôpitaux, 19 Fév., 1839.
[3] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 22, Erlangen, 1848.
[4] Lond. Med. Gazette, July 3, 1840, p. 590.
[5] Journal de Méd. et de Chirurgie Pratiques, cited in Annuaire de Thérapeutique pour 1848, p. 194.
[6] Medical Times, Oct. 3, 1846.
[7] Pereira, The Elements of Materia Medica and Therapeutics, 3d edit. i. 398. Lond. 1849.

Iod-Chlor-Quecksilber. This preparation, discovered by M. Boutigny,[1] is made by the reaction of iodine on mild chloride of mercury, (calomel.) Two iodides may be prepared in this manner—the *iodide* and the *biniodide*. The *iodide* is prepared of one equivalent of *iodine*, and one of *chloride of mercury*. The calomel is coarsely powdered, put into a matrass, (*matras d'essayeur*,) heating gently, and agitating it, until it begins to sublime: the iodine is then added in small portions.

The combination is effected with noise, without any sensible loss of iodine.

The *biniodide* is prepared of one equivalent of *iodine*, and one of the *mild chloride of mercury*. It may be run in cylinders like nitrate of silver.

The effects of both these preparations are those of violent irritants. The biniodide especially is a most powerful caustic. They are said[2] to have been used as secret remedies, in France, in obstinate *scrofulous affections of the glands*. The iodide has been given internally in the same cases: the biniodide has only been used externally, like nitrate of silver, in scrofulous and certain syphilitic ulcerations. M. Rochard[3] employs the iodine, in scrofula, in the form of ointment—one part of the salt to twenty of lard, varying the proportion according to the sensibility of the individual. Of this ointment he uses a piece, of the size of a pea, which he applies lightly, and arrests it, if too great pain and irritation supervene. In this way he has found nutrition modified locally and generally. He rubs it on the tumefaction, applies it lightly to ulcers, or rubs it in the axillæ, the inner part of the thigh, or on the back or chest.

Pilulæ Iodidi Hydrargyri Chloridi.

Pills of Iodide of Chloride of Mercury.

℞. Iodid. hydrarg. chlorid. gr. v.
Acaciæ pulv. gr. xvj.
Micæ panis ʒij.
Aq. flor. aurant. q. s. ut fiant pil. 100.

Boutigny.

Unguentum iodidi hydrargyri chloridi.

Ointment of iodide of chloride of mercury.

(*Unguentum contra Scrophulosin.*)

℞. Iodid. hydrarg. chlorid. gr. xv.
Adipis ℥ij.

Boutigny.

The other preparations of iodine are described in different parts of this volume.

[1] Bouchardat, Annuaire de Thérapeutique, pour 1848, p. 186.

[2] Aschenbrenner, Die neueren Arzneimittel und Arzneibereitungsformen, S. 150. Erlangen, 1850.

[3] Bouchardat, op. cit. p. 188.

CXIII. JUGLANS RE'GIA.

SYNONYMES. Walnut Tree.
French. Noyer.
German. Wallnussbaum, Baumnuss, Königswallnuss, Nussbaum, Wälschenuss.

The walnut tree, SEXUAL SYSTEM, Monœcia Polyandria: NATURAL ORDER, Terebinthaceæ or Juglandeæ, is a native of Persia, whence it was carried to Greece, Italy, France, &c.

EFFECTS ON THE ECONOMY.

The leaves of the walnut have been highly extolled by M. Négrier[1] as superior to all other antiscrofulous remedies. He prescribed them to 56 patients affected with different forms of *scrofula*. Of these, 31 were unequivocally cured, 18 experienced a very manifest improvement, and the majority were in course of cure. Four derived no benefit as regarded their sores. Four children died during the treatment,—two of tubercular phthisis; one of acute encephalitis, and the fourth of double pneumonia. The extract of the leaves, which may be ranked in the class of slightly aromatic bitters, M. Négrier found to be almost constantly efficacious in *scrofulous affections*, and in no case did he observe it exert any unpleasant action on the economy.

The preparations of walnut leaves excite, in the first instance, digestion and circulation, and, according to M. Négrier, communicate remarkable energy to all the functions; and he is disposed to think that they have a special action on the lymphatic system. In his last essay,[2] he arrives at the following corollaries. First. *Scrofulous affections* are, in general, radically cured by the preparations of the leaves of the walnut. Secondly. Their action on the economy is sufficiently constant to enable us to reckon upon the cure of the majority of patients treated by them. *Thirdly.* Their action is slow, unobjectionable and durable. *Fourthly.* The first effects of the treatment on the economy are general; its local influence comes afterwards. *Fifthly. Scrofulous affections of the skin, mucous membranes, lymphatics* and *lymphatic ganglions* are cured as easily, promptly and certainly as by any other known agent. *Sixthly. Affections of the osseous, cartilaginous,* and *ligamentous systems,* whose essence is a scrofulous *vice,* are at times radically cured by the preparations of the leaves of the walnut alone. Lymphatic subjects always experience good effects from them; the profound modifications which they experience often cause the cure of *caries of the bones* and

[1] Archiv. Général. de Médecine, Avril et Mai, 1841, Févr. 1844; Févr. 1850, p. 173, and Avril, 1850, p. 447. The last two memoirs have been given at length in the Edinb. Med. and Surg. Journ. for October 1850, p. 271 to 318.
[2] Archives &c., Avril, 1850, p. 466.

their appendages. The same affections of the bones in dry nervous subjects are not sensibly modified by the treatment. Liver oil is then preferable, associated with infusions of the leaves or fruit of the walnut, (the green shell,) and *seventhly, scrofulous inflammations of the eyes* are certainly and speedily cured by a treatment, the basis of which is the preparations of the leaves of the walnut.

Favourable reports of the action of the walnut leaves in scrofula are quoted by M. Négrier from Nasse, of Bonn, M. J. Kreutzwald, and Borgiali. They have likewise been given successfully by Mirault, Jurine and Hauser in the same affection; and have been recommended in *helminthiasis, otorrhœa, fluor albus, scrophulosis; chronic bronchitis; cutaneous diseases*, as *impetigo, tinea capitis, herpes*, and *chronic eczema*, by Kreutzwald, Nasse and Hauser; and in the after treatment (Nachbehandlung) of cachectic conditions,—scrofula, gout, syphilis, mercurial cachexia, &c.[1]

MODE OF ADMINISTRATION.

The preparations used by M. Négrier are the following:—

Infusum juglandis regiæ.
Infusion of walnut leaves.

This infusion is made by throwing a large *pugillus* (*pincée*) of the *cut leaves* into eight ounces of *boiling water*. This is sweetened with sugar or with the syrup mentioned below. Two or three cups were prescribed daily, and sometimes as many as five.

Decoctum juglandis regiæ.
Decoction of walnut leaves.

The decoction may be made by boiling, for ten or fifteen minutes, a small *manipulus* (*poignée*) of the *leaves* in Oijss. (*un kilogramme*) of *water*. It is advantageously used as a lotion; and as a dressing to *scrofulous ulcers*,—lint being wetted with it and applied to them. It has, also, been used as a partial and general bath; and as an injection into *fistulous openings*.

Extractum juglandis regiæ.
Extract of walnut leaves.

This extract is prepared by the method of displacement.

Syrupus juglandis regiæ.
Syrup of walnut leaves.

The syrup is prepared from the *extract* by mixing six grains with an ounce of *simple syrup*. A syrup may, also, be made of the green leaves, which is more aromatic than that formed from

[1] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 159. Erlangen, 1848.

the extract. To little children M. Négrier gives two or three dessert-spoonfuls in the 24 hours; to adults he has never given more than two ounces. The ordinary dose for the last is from eight to ten drams.

Pilulæ extracti juglandis regiæ.
Pills of extract of walnut leaves.

Each of these may be made of three grains of the extract rendered solid by a sufficient quantity of the powder of the leaves. Two are given by M. Négrier in the day. He has never exceeded four.

Where it has been necessary to have recourse to frictions on the diseased part, he has employed the following ointment:

Unguentum extracti juglandis regiæ.
Ointment of extract of walnut leaves.

℞. Extract. juglandis regiæ ℥i.
Adipis ʒx.
Ol. bergamot. ♏ iij.

The friction must be gentle, and for about a quarter of an hour, twice a day.

Vinum juglandis regiæ.
Wine of walnut leaves.

M. Négrier directs this to be prepared by macerating from an ounce and a half to two ounces of the fresh leaves, or ten to twelve walnuts covered with their drupes, cut in fragments, in a quart of Malaga or Lunel wine. In winter, it may be prepared of from half an ounce to five drams of the extract to the quart of wine.

The dose is a spoonful or more, after eating, night and morning.

M. Négrier properly remarks, that in all such deeply rooted affections, it may be necessary to persevere in the remedy for some time; as not only have the effects of the disease to be combated, but a profound modification to be induced in the constitution of the individual.[1]

Injections of a very concentrated decoction of walnut leaves, of the temperature of the room, whatever may be the season, have been used with much success in *leucorrhœa* by M. Vidal.[2]

[1] Archiv. Général. de Médecin, Mai, 1841.

[2] Essai sur un Traitément Méthodique de quelques Maladies de la Matrice, &c Paris, 1840; noticed in Brit. and For, Med. Rev. for July, 1841, p. 215.

CXIV. LACTUCA'RIUM.

Synonymes. Lettuce opium, Thridace.
German. Lattigopium, Lattigmilchsaft, Lattigbitter.

The ancient Greek and Roman physicians were well aware of the hypnotic property of the common garden lettuce (*lactuca sativa,*) the milky juice of which contains *lactucarium.* It would appear, however, that Dr. J. R. Coxe, of Philadelphia, was the first to propose the use of the inspissated juice in medicine.[1] Dr. Duncan, Senr., of Edinburgh, subsequently paid particular attention to the subject, and recommended it as a remedy in *phthisis,* in place of opium.[2] The properties of the juice have also been investigated by M. François,[3] a French physician.

METHOD OF PREPARING.

There are three kinds of lactucarium. The *first* and best, but the most costly, is obtained from incisions made into the stalks, whence the juice exudes, which is subsequently dried in the air. This preparation has a bitter taste, soon becomes of a brown colour, and solid; has a gummy fracture, but absorbs moisture from the air, becoming soft and clammy. The *second* variety is obtained by expression of the selected stalks, and subsequent desiccation of the obtained fluid, either in the air or by artificial warmth. This is said to be the variety most commonly met with in commerce;[4] and the *third* variety is prepared in the same manner as any common extract, from all parts of the plant. This is the *Thridace* of some. It is unworthy of confidence.

The first is the strongest and most uniform, and therefore to be preferred.

Chemical examination shows that lactucarium contains neither morphia nor narcotina, as had been supposed. It has been examined by M. Aubergier,[5] who found it to have the following composition:—Bitter crystallizable matter; mannite; asparamide; free acid; brown colouring matter; resin; cerin; myricin; albumen, and gum; nitrate of potassa; chloride of potassium; and phosphates of lime and magnesia. M. Aubergier regards the crystalline matter as the active principle of the lactucarium.[6] M. Quevenne[7] also analyzed it, and found it to contain a bitter principle, soluble in water and in alcohol, insoluble in ether, and not precipitable by

[1] Wood and Bache's Dispensatory, 6th edit. p. 424. Philad. 1845.
[2] Observations on Consumption, 2d edit. Edinb. 1816.
[3] Archiv. Général. de Médecine, 1825. Journal Univer. xl. 254, and xli. 147. See also, Fischer, in Rust's Magazin. B. liii. Heft. 1.
[4] Riecke, Die neuern Arzneimittel, S. 313; und 2te Auflage, S. 473. Stuttgart, 1840. See, also, Mérat and De Lens, Dict. de Mat. Méd. art Lactuca Sativa.
[5] Journ. de Pharm. Jan. 1842, p. 78.
[6] Bouchardat, Annuaire de Thérapeutique pour 1843, p. 14. Paris, 1843.
[7] A. Richard, Eléments d'Histoire Naturelle Médicale, 4ème édit., iij, 94, Paris, 1849.

the salts of lead; albumen; caoutchouc; wax; a vegetable acid, (lactucic;) chloride of calcium; phosphate of lime; potassa; gum and acetic acid.

EFFECTS ON THE ECONOMY.

To investigate these, Rothamel[1] instituted experiments with the Paris lactucarium. Half a grain to a grain produced little or no effect. From three to five grains occasioned a peculiar indescribable feeling of lightness over the whole body, without any narcotic symptoms or modification in the pulse: from six to eight grains increased this sensation, and caused dilatation of the pupils. The same doses, repeated at intervals of three or four hours through the day, diminished the number of pulsations of the heart, and the sleep was disturbed. From ten to fifteen grains caused more indisposition, nausea, oppression at the epigastrium, cold sweats, anxious respiration, cold sensation in the chest, great dulness, vertigo, considerable dilatation of the pupils, yawning and stretching, slow pulse, disturbed sleep, general prostration; the tongue coated with mucus; disagreeable taste; loss of appetite; pains in the shoulders and bones, and uncertain gait; all which symptoms were speedily removed by a few drops of acetic ether, or a glass of Rhenish wine. Coffee was much less efficacious.

Lactucarium has been extolled by numerous physicians as equally effective with opium, whilst it is not—they assert—followed by the signs of narcosis and other inconveniences, so often induced by the latter. Accordingly, it is frequently given where a pure sedative is needed—to allay cough, and where much nervous excitement is present. It has also been used topically, in the form given below, by Rau,[2] of Berlin, in *catarrhal ophthalmia*, and a solution, in the proportion of four grains to the ounce, has been advised in acute *inflammation of the conjunctiva*, by Guibert.[3]

The results of the author's experience with lactucarium have been negative. He is unable to affirm, that it is possessed of any marked sedative and hypnotic powers;[4] and such would seem to have been the general results of extensive trials made with it by others.[5]

MODE OF ADMINISTRATION.

Lactucarium is given internally, either in the form of solution or pill, in the dose of from one-third of a grain to three grains. Externally, it has been applied in plaster or ointment.

[1] Ferussac's Bulletin des Sciences Médicales, xxii. Paris, 1830.
[2] Berliner. Medicin. Central-zeitung, Nov. 2, 1838.
[3] Froriep's Notizen, Bd. xxi. S. 320, and Osann, art. Lactuca, Encyclopäd. Wörterb. der Medicinischen Wissenschaften, xx. 697. Berlin, 1839.
[4] General Therapeutics and Mat. Med. 4th edit. i. 376, Philad. 1850.
[5] Bouchardat, op. cit. p. 26, and M. Homolle, in Bouchardat's Annuaire, &c., pour 1845, p. 27. Paris, 1845.

Mistura lactucarii.

Mixture of lactucarium.

℞ Lactucar. ℈j.
Mucilag. acac. q. s. ad subactionem.
Perfectè unitis adfunde
Aq. f ℥vj.
Syrup. rub. idæi f ℥ss. M.

Dose.—Two spoonfuls, every two hours, in *spasmodic cough*, *sleeplessness* and *hysteria*. *Von Hildenbrand.*

℞ Acid. boracic. ʒij.
Lactucarii ℈j.
Solve in
Aq. destillat. f ℥vj.
Syrup. papav. f ℥ss. M.

Dose.—A small spoonful—in cases of "*spastic hæmoptysis.*" *Rothamel.*

Collyrium lactucarii.

Eyewash of lactucarium.

℞ Lactucar. gr. iij.
Aq. destillat. f ʒiij.
Mucilag. cydon. gtt. xx. M.

Rau.

M. Aubergier[1] considers the *alcoholic extract* to be the best form of preparation. The lactucarium is twice successively digested in alcohol of .922: the fluids are then mixed, distilled, and evaporated in a water bath. During evaporation the fluid must be constantly stirred. The extract, thus procured, is of a brown colour, and very bitter. It may be given in pills, or in the form of syrup. For the latter—SYRUPUS LACTUCARII—M. Aubergier recommends that every 501 parts should contain one of the extract. He gives it either alone or in association in the quantity of from f ℥iss. to f ʒij. in the twenty-four hours, in cases of *bronchitis* or *phthisis*.

CXV. MAGNES.

SYNONYMES. Magnetes, Magnet.
French. Aimant, Pierre d'Aimant.
German. Magnet, Magnetstein.

The natural magnet was employed of old both externally and internally, and in the most diversified forms and affections.[2] The artificial magnet has been used within the last century only. It is generally on the diseased part, or around it, that it is applied, and the application is made for a longer or shorter time according to circumstances—being at times drawn along the nerves of the affected part; at others applied in a more prolonged manner.

[1] Bouchardat, Annuaire, &c., pour 1845.
[2] Art. Aimant, in Dict. Univers, de Matière Médicale, par Mérat & De Lens.

It has been affirmed,[1] that magnets of 10 pounds supporting power, when drawn along the body downwards, without contact, produce certain sensations in a certain, or rather uncertain, proportion of human beings. Occasionally, in twenty persons three or four sensitive individuals are found; and in one case out of twenty-two females, examined by Von Reichenbach, eighteen were sensitive. The sensation is said to be rather unpleasant than agreeable, and is like an *aura*, in some cases warm, in others cool; or it may be a pricking, or a sensation of the creeping of insects on the skin; and at times headach rapidly supervenes. These effects, it is said, occur when the patient does not see the magnet or know what is being done. They ensue both in males and females, but more frequently in the latter: they are sometimes seen in strong healthy people, but oftener in those whose health, although good, is not so vigorous, and in nervous persons. Children are often found to be sensitive. Persons affected with spasmodic diseases—epilepsy, catalepsy, chorea, paralysis and hysteria are especially sensitive, and lunatics and somnambulists, he says, are uniformly so.[2]

It is, then, on the nervous system that the magnet exerts its efficacy. Accordingly, the class of diseases in which it has been found most beneficial are those termed "*nervous* and *spasmodic*." This is strikingly shown by the published observations of MM. Andry and Thouret,[3] Commissioner of the Société Royale de Médecine, appointed to examine into the matter. In cases of *spasms*, *palpitations*, *convulsions*, *epilepsy*, *tremors*, *cramps*, *neuralgia*, *rheumatism*, &c., the only agent employed was the magnet, and it was wholly successful. These gentlemen were disposed to infer, that the magnet exerts an incontestable magnetic action on the nervous system, to which, in part at least, the curative agency must be ascribed, and their conclusions were thought to be corroborated by cases observed by MM. Alibert, Cayol, Chomel, Recamier, &c. The celebrated Laënnec,[4] who employed the magnet in the manner recommended by Hallé,—that is, by establishing a magnetic current through the diseased parts by means of several magnetized plates, affirms, that he frequently found it moderate the pain in *pulmonary neuralgia*, diminish the oppression in *nervous asthma*, suspend *spasmodic hiccough*, and exhibit its utility in *simple neuralgia of the heart*, and in *angina pectoris*. In the

[1] Abstract of Researches on Magnetism and certain allied Subjects, &c., by Baron Von Reichenbach; translated by W. Gregory: or notice of the same in the Bulletin of Med. Science. Philad. July, 1846, p. 217.

[2] See on all this curious subject, Baron Charles Von Reichenbach, Physico-physiological Researches on the Dynamics of Magnetism, Electricity, Heat, Light, Crystallization, and Chemism in their relation to Vital Force,—translated, &c. by John Ashburner, M.D. London, 1851.

[3] Mém. de la Société Royale de Médecine de Paris, pour 1776, p. 531, and Thouret, art. Aimant, in Encyclopéd. Méthod. Partie Médicale, i. 421. Paris, 1786; also Dumont, in Bouchardat, Annuaire de Thérapeutique pour 1843, p. 79. Paris, 1843.

[4] Traité de l'Auscultation Médiate, 2de édit. tom. ii.

last disease, the application of a small blister under the anterior plate appeared to render the effects of the magnet more marked.

It is not many years since considerable interest was excited in London, by the success said to have been obtained in the treatment of *neuralgia*, *toothach*, and *other affections of the nerves*, by the application of the ordinary magnet or "*mineral magnet*," as it was termed by Dr. Blundell who employed it.[1] It would seem, too, that owing to a considerable demand for loadstone, the conductors of the Bulletino delle Scienze Mediche,[2] of Bologna, were led to make inquiries concerning the uses to which it was put. From these it appeared, that the Ex-Bey of Algiers, whilst at Leghorn, in 1831, mentioned to a Catholic dignitary, Father Campagnoli, who was suffering under *gout*, that the application of the loadstone was an oriental remedy for the disease, and of certain efficacy. He immediately procured a piece of loadstone, as he had been subject to regular and frequent attacks of gout since 1805, and its application removed the next paroxysm. Since this time, he has always had recourse to the same remedy, and has found, that the attacks come on less frequently and severely, and that they invariably yield, so that he has rejected all his former plans of treatment. On the first symptom he goes to bed, and places the loadstone in close contact with the pained part; he presently falls asleep, and awakes free from pain, and able to walk. The loadstone, which he uses, weighs five pounds, and has smooth sides. He has recommended this plan to other gouty individuals, who have experienced similar relief.

The author has witnessed the application of the mineral magnet repeatedly in *nervous diseases*, in persons of highly impressible habits; but except in such, and apart from the effects of the imagination, he has seen no beneficial results from it.

It has been affirmed,[3] that in the workshops of Fairbairne in Belgium, an artificial magnet was put up some years ago at the level of the eye; and at every instant a turner, or an adjuster, or some other workman, who has had a particle of iron driven into his eye, is seen running to the magnet, which draws it out as soon as the eyelids are separated, and the eye is held near its pole.

For Electricity, see Galvanismus; and for Magnetic Electricity, see Electro-Magnetismus.

[1] See Lancet for 1833, cited in Amer. Journ. of the Med. Sciences, Nov. 1833, p. 247.

[2] Marzo et Aprile, 1835; cited in Brit. and For. Medical Review, July, 1836, p. 246.

[3] Gazette des Hôpitaux, 14 Juin, 1842; cited in Brit. and For. Med. Rev., Oct. 1842, p. 557.

CXVI. MAGNESIÆ CITRAS.

SYNONYMES. Citrate of Magnesia.
French. Citrate de Magnésie.
German. Citronensaures Magnesia oder Bittererde.

This preparation has been introduced as an agreeable cathartic, by M. Rogé Delabarre.[1]

METHOD OF PREPARING.

Citrate of magnesia may be prepared by saturating a solution of *citric acid* with either *magnesia* or *carbonate of magnesia.* Dr. Pereira[2] finds that ℈j. of the crystallized acid of commerce saturates about fourteen grains of either light or heavy carbonate of magnesia. Another mode of preparing it is by double decomposition from *sulphate of magnesia* and *citrate of soda.*

Neutral citrate of magnesia is a white, pulverulent, insipid salt, and when aided by the addition of a slight excess of the acid, is soluble in water. The solution has an acid taste, and has not the disagreeable bitter taste of the magnesian salts. It is a mild laxative, in the dose of from an ounce to ten drams.

It is, however, in solution, and in the effervescing state, that it is best known and preferred. Four drams of citric acid, and three and a half drams of carbonate of magnesia, dissolved in a sufficiency of water, yield rather more than an ounce of solid citrate of magnesia.

Dr. Pereira gives the following formulæ for, *first*, the simple solution, acidulated with citric acid and flavoured with syrup of orange peel, called *magnesian lemonade;* and, *secondly*, the effervescing solution, called *effervescing magnesian lemonade.*

1. Liquor magnesiæ citratis.

Solution of citrate of magnesia.

℞. Acid citric. ʒss.
Magnes. carb. ℈j.
Syrup. aurant. ʒij.
Aq. destillat. ℥ij. M.

2. Liquor magnesiæ citratis effervescens.

Effervescing solution of citrate of magnesia.

℞. Acid citric. ʒss.
Aquæ destillat. ℥j.
Syrup. aurant. ʒij. M.

To be taken with f ʒx. of Dinneford's solution of bicarbonate of magnesia in a state of effervescence.

Various modes of preparing the effervescing solution of the

[1] Journal de Pharmacie, Juin, 1847, Bouchardat, Annuaire de Thérap. pour 1848, p. 118; and Amer. Journ. of Pharmacy, August, 1847, p. 218.
[2] Elements of Materia Medica and Therapeutics, 2d edit. i. 619. Lond. 1849.

citrate have been proposed by MM. Rogé Delabarre, Bardet, Massignon, Garot, Marchand, Duclou, Dorvault, V. Garnier, Maury, Cadet Gassecourt, and others.[1] Mr. Edward Parrish,[2] of Philadelphia, prepares it by forming a slightly acid citrate of magnesia—about an ounce and a half of the salt to a pint of water—which is introduced into ordinary Saratoga water bottles, containing the requisite quantity of lemon syrup, until nearly full, and the remaining space is filled with moist, recently prepared, carbonate of magnesia, immediately after which the bottles are well corked. On mixing the contents of the bottle, the carbonate of magnesia is decomposed by the free citric acid in the solution, and the evolved carbonic acid is retained by the close cork, and absorbed by the liquid.

The formula of M. Rabourdin[3] has been recommended. It is as follows:—

℞. Magnes. carbon. gr. 292.
Acid citric. crystallizat. gr. 446.
Aquæ f ℥x.
Syrup. limon. f ℥ij.

Dissolve 138 grains of the carbonate in two fluidounces of water holding in solution 170 grains of citric acid, and pour it into a twelve ounce mineral-water bottle. The remaining 154 grains are then triturated with the remainder of the water, and also poured into the bottle. 185 grains of citric acid are now added, and the bottle is immediately and strongly corked and tied over. The citric acid reacts with a portion of the carbonate, and forms citrate of magnesia, whilst the other portion is converted into bicarbonate of magnesia by the liberated and compressed carbonic acid. As soon as, with occasional agitation, the opake fluid becomes but slightly milky, the cork is carefully removed, and the solution filtered and reintroduced into the bottle, along with two fluidounces of lemon syrup and 91 grains of citric acid. The cork is then securely replaced and wired.

These quantities produce twelve fluidounces of the solution, each ounce containing about a dram of the citrate. If the carbonate of magnesia and citric acid are free from impurities, there is no necessity to filter after the second addition of acid, as the solution becomes clear a few hours after the last portion of acid has been added.

The dose is from a half to a whole bottle. It is certainly an agreeable laxative, and is much employed.

[1] Bouchardat, Annuaire de Thérap. pour 1848, p. 118, 123, and Ibid. pour 1849, p. 188, 189, 192, 193 and 194.
[2] Amer. Journal of Pharmacy, Nov. 1847, p. 264. [3] Ibid. July, 1848, p. 254.

CXVII. MANNI'TA.

SYNONYMES. Mannitum, Saccharum Mannæ, Mannite, Sugar of Manna. *German.* Mannit, Mannazucker, Mannastoff.

This principle, which was first discovered by Proust, belongs to the varieties of sugar that are not susceptible of fermentation, and constitutes the chief ingredient of manna. Its presence is not confined, however, to that substance. It is met with in several other vegetable juices—cucumbers, melons, celery, beets, &c. Yet in these it is first found after fermentation, so that chemists have been disposed to regard it as a product of fermentation.[1]

METHOD OF PREPARING.

Mannite is commonly procured from manna. Manna *in lachrymis*, as it is obtained in commerce, is treated with *boiling alcohol*, filtered, and suffered to crystallize: by rest and refrigeration, mannite is precipitated in small, beautiful, white needles. The manna in tears consists almost wholly of Mannite. Common manna, on the other hand, contains but little thereof, and in its place has a yellow extractive matter to which cathartic properties have been assigned: coarse manna consists almost wholly of the latter. To obtain mannite, consequently, the manna in tears is selected.

Should the administration of mannite as a remedial agent become more common, it may be worth the trouble to inquire, whether it might not be advantageous to prepare it from the vegetable juices above mentioned.

Mannite, prepared in the above manner, is of a white colour; soluble in five parts of cold water, and in almost every proportion in boiling water; it seems to be entirely insoluble in cold absolute alcohol; is somewhat more so in boiling alcohol, and still more so in boiling alcohol which contains water. At from 221° to 230° Fahrenheit, it melts into a colourless, adhesive fluid, and crystallizes on cooling. When more strongly heated, it burns, and is decomposed like sugar. From its alcoholic solutions it separates on cooling, in white, silky, shining, needle-shaped crystals, collected in stelliform roundish masses. When mannite is dissolved in an equal weight of boiling water, and the fluid is evaporated by a strong fire and rapid ebullition, until a small portion placed on a cold glass plate rapidly becomes solid, it may be poured out into shapes.

The taste of the sugar of manna is feeble, but agreeably sweet: it is inodorous, or at least nearly so. According to Liebig, mannite consists of 40.0228 of carbon, 7.6234 of hydrogen, and 52.3537 of oxygen.

Granatin or *Grenadin* of pomegranate root agrees so much with

[1] Art Mannite, in Mérat and De Lens, Dict. de Mat. Méd.

mannite in its properties that both have been regarded as the same substance.

EFFECTS ON THE ECONOMY.

According to Magendie,[1] mannite may be advantageously substituted for manna, as it possesses the cathartic property without the nauseous flavour. The dose is two drams for a child, and, at times, as much as half an ounce; but, in the latter dose, Magendie always found the catharsis too active: for this reason he considers it to be the best dose for the adult. He recommends, that a syrup should be prepared from it, and that this should be prescribed both as a cathartic for children at the breast, and as an addition to other articles in cases of *pulmonary catarrh*. M. Solon has likewise spoken favourably of the therapeutical advantages of mannite. He administered it in three cases of *gastricism*—in two of them combined with castor oil—in which it induced, in a few hours, critical evacuations; and in a case of *peritonitis occasioned by obstinate constipation* its use was followed by the best effects. In the last case, the inflammation completely disappeared, and the constipation yielded without any other agency. It was found, likewise, of essential service in *convalescence from bronchitis and pneumonia*. Only in two cases of females—the one labouring under *ascites*—the other under *phlegmatia dolens*, did mannite fail to have any aperient agency. This, it was presumed, was probably owing to both of the patients having been habituated to the use of powerful cathartics, and to there not being enough of the preparation to admit of the administration of the appropriate quantity.

According to M. Solon, mannite may be given in the dose of one or two ounces dissolved in from two to four ounces of a hot aromatic water, the solution to be taken warm, otherwise it forms a stiff, adhesive mass; or it may be added to ordinary cathartic potions. He assigns it the preference over manna and castor oil; *first*, because it has an agreeable saccharine taste, and *secondly*, because it is always equally good; whilst those substances are often deteriorated, and on that account uncertain in their effects. It appeared to him to be peculiarly adapted for cases in which it was desirable to evacuate the intestines with as little excitation as possible.

Magendie, in his lectures on the blood, classes mannite amongst the substances that promote the coagulation of that fluid.[2]

[1] Formulaire, &c., dern. édit.
[2] Leçons sur le Sang, &c. &c. Translation in Lond. Lancet for Jan. 26, 1839, p, 636.

CXVIII. MA'TIAS.

Synonymes. Malambo, Melambo.

A paper on the Matias bark was read before the Medical Section of the British Association for the Advancement of Science at their meeting in 1840, by Dr. Mackay. The plant, from which the bark was obtained, grows in great abundance in South America; but its botanical characters have not been given. From what Dr. Mackay heard, it would seem to belong to the genus Wintersonia. It contains an intensely bitter extractive matter, and yields, on distillation, two distinct essential oils, which differ in specific gravity, and are soluble in alcohol and ether; and but very sparingly so in water. The principal characteristic substance derived from it was a bitter resinous matter. No alkaloid was discovered in it. Mr. Ure[1] considers it to be identical with malambo, the Indian name for the bark of a tree which grows in New Grenada, and is held in high esteem by the natives as an antiperiodic, and stomachic. He describes the bark as three or four lines thick; brittle, although somewhat fibrous; of a brown colour, and covered with an ash-coloured tuberculated epidermis.

Malambo bark was analyzed by Cadet, and afterwards by Vauquelin, who found it to contain resin, a light volatile oil, and an extract very soluble in water. No tannic acid was found in it; scarcely any gallic acid, and none of the alkalies of the cinchonas.[2]

EFFECTS ON THE ECONOMY.

In its native country, matias bark is extensively used as a substitute for cinchona in *intermittents*. Its principal therapeutical properties are tonic, aromatic and astringent. Dr. Mackay stated, that it had been exhibited with marked success in *dyspepsia* accompanied by loss of appetite, which it quickly restored. In *phthisis*, where tonics were admissible, it supported the strength and prevented rapid sinking. In dropsy, it was found to be a valuable adjunct to diuretics; and, in *intermittents*, to deserve its native reputation of being a good substitute for cinchona.

The virtues ascribed to it by Dr. Mackay are confirmed by Dr. Neubigging, who has used it extensively.[3] Mr. Ure has often administered it with good effect as a substitute for cinchona. In *scrofulous ophthalmia*, after having removed feculent accumulations from the bowels, he has known an infusion, made with two drams of the bark to a pint of water, cause a speedy and complete removal of the inflammation and morbid sensibility of the eyes.

[1] Pharmaceutical Journal, vol. iii. No. 4, p. 170.

[2] Annales de Chimie, xcvi. 113: and Journ. de Pharmacie, ii. 172. See, also, Mérat and De Lens, Dict. de Mat. Méd. &c., art. Malambo.

[3] Lond. Athenæum, Oct. 1840; cited in Amer. Journ. Med. Sciences. Jan. 1841, p. 209.

The dose of the infusion was from one to two fluidounces, repeated twice or thrice in the course of the day. "It may, in some instances, be advantageously conjoined with salts of iron or of mercury, with both of which it is compatible. The addition of a little syrup of orange peel, and compound tincture of cardamoms, forms a draught by no means disagreeable."

CXIX. MATI'CO.

Synonymes. Piper Angustifolium seu Elongatum, Stephensia seu Artanthe Elongata, Matico plant, Soldier's Weed or Herb.
Spanish. Yerba del Soldado.

The name of this plant is said to have been derived from a Spanish soldier called Matico, who, lying desperately wounded, and bleeding to death, caught accidentally hold of some of its leaves, and by their application arrested the hemorrhage.

At a meeting of the Medico-Botanical Society of London, held in 1827, Mr. Frost brought a specimen of this plant before their notice; which appeared to him to be a species of pepper.[1] A specimen of Matico leaves was brought from Peru to the United States, in 1834, by Dr. Ruschenberger, of the United States Navy, who has since received other specimens from Lima, with a portion of which he kindly favoured the author. The leaves are considered to be those of Piper angustifolium, of Ruiz and Pavon;[2] but Dr. Ruschenberger observes, the properties of the plant, so far as we can judge from the imperfect dried specimens, differ somewhat from the pepper family, when we compare different parts of the plants. The dried leaves are deeply reticulated, and of a greenish ashy-gray colour; the stem is herbaceous and jointed; but the specimens are so much broken, as to render it difficult, if not impracticable, to form an accurate idea of the plant. It has been introduced of late years into Great Britain, and, according to Messrs. Ballard and Garrod,[3] promises to maintain the reputation it has enjoyed in South America as a most powerful styptic.

Dr. Carson[4] states, that the specimens he has examined consist of the broken, and, in most cases, crumbled leaves, with portions of twigs, and flower spikes or fruit; and such is the character of the specimens examined by the author. Dr. Hodges has seen two samples,—the one consisting of the dried leaves, whilst another,

[1] London Medical and Physical Journal, cited in the North American Medical and Surgical Journal, iv. 419. Philad. 1827.
[2] Persoon, i. 32, Cramer's edit., cited by Jeffreys in Transactions of the Provincial Med. and Surg. Association, xi. 351. Lond. 1843; Carson, 2d. Amer. edit. of Pereira's Elements of Mat. Med. and Therap. ii. 222. Philad. 1846: and Ballard and Garrod, Elements of Mat. Med. and Therap. p. 411. Lond. 1845.
[3] Op. cit.
[4] Op. cit.

which he procured more recently, had mixed with the leaves a considerable quantity of the flowering twigs, and woody stems of the plant compressed together, and flattened into a cake. The leaves, according to him, have a strong aromatic and slightly astringent taste; and the smell and taste of their infusion in water very much resemble those of the tea prepared by the country people in Ireland from the leaves of the indigenous *Salvia verbenaca*. Dr. J. H. Scrivener, in a letter to Dr. Ruschenberger, dated Lima, April 30, 1845, says, that Matico grows abundantly along the sides of the mountains of Monobamba and Huanuco in the department of Junin. There are three species, distinguished by the colour of their stems, which are red, brown and white. The red is considered superior to the others, and is carried to Lima in large quantities by the Indians, and sold to the druggists. When the Flora Peruana was published, the medicinal properties of the plant were unknown. Their discovery is attributed to a oldier, who was wounded on the 9th of December, 1824, at the battle of Ayacucho.[1]

The specimens examined by the author had no marked sensible properties.

When analyzed by Mr. Clay, of Liverpool,[2] Matico seemed to have gallic acid in its composition; but from the experiments of Dr. Hodges, he concluded, that besides the ordinary constituents of leaves, it contains a soft, dark-green resin, some aromatic volatile oil, and a bitter principle, to which he gave the name *maticin*. Its virtues are imparted to dilute alcohol, and to hot and cold water. Decoction, according to Messrs. Ballard and Garrod, volatilizes the essential oil, and if so, it would be an improper mode of preparation. Dr. Ruschenberger, however, affirms, that the oil is heavier than a saturated solution of common salt.[3]

EFFECTS ON THE ECONOMY.

Matico, under the name *Yerba del Soldado*, ('Soldier's Weed,') has a popular reputation in Peru of being a remarkably powerful styptic; and it is said, that soldiers on going to battle carry with them a supply of it to stanch the blood. It is asserted, and popularly believed, that a Matico leaf applied at once, will arrest hemorrhage in a fowl after decapitation. It is very generally used in Lima, and along the coast, in cases of *hemorrhage*, and of all kinds of *ulcers*. The leaves are well pounded, and then applied to the wound: the vessels contract, and the hemorrhage ceases. An infusion of the plant is used as a wash to *ulcers*, and after washing a small quantity of the powder is applied; but it does not appear that Matico has ever been used in Lima as an internal remedy. In the province of Chequas, however, in the eastern

[1] Ruschenberger.
[2] Jeffreys, op. cit. p. 352.
[3] Med. Exam., July, 1846, p. 401.

extremity of Bolivia, where it is equally regarded as a valuable hæmastatic, it is said to be given as a diuretic.[1] In a case of *hemorrhage from the tongue*, occurring in a lad of the *hemorrhagic diathesis*, Mr. J. Hamilton, of Dublin, arrested the flow of blood by the application to the under surface of a small piece of Matico leaf.

In one case, Dr. Ruschenberger employed the leaves to arrest hemorrhage after an operation below the angle of the jaw, where there was considerable bleeding, and difficulty in taking up the vessels, owing to the indurated condition of the parts, attributable to inflammation of long standing, caused by the pressure of a molar tooth, which had been driven in by a musket ball to a point between the base of the tongue and the angle of the jaw. The tooth was removed by incision, and the application of the Matico was successful. The wound, an inch and a half in depth, was filled with leaves moistened with water, and the bleeding ceased almost instantaneously.

In enlarging a burrowing bubo, Dr. Ruschenberger divided the arteria ad cutem abdominis, which bled freely. He directed that an attempt should be made to arrest the hemorrhage by lint and pressure. After a trial of ten minutes, which totally failed, he directed moistened Matico leaves to be applied. The assistant reported, in a few moments, that the Matico exerted no influence, and proposed to secure the bleeding vessel by ligature. Dr. Ruschenberger now visited the patient, who had lost six or eight ounces of blood, and was still bleeding. Coarsely powdering some Matico leaves in the palm of his hand, he formed the mass into a paste with cold water. He then removed a clot, through which the arterial blood had formed a passage of the size of a crow's quill: the blood flowed *per saltum*, forming a jet at least three-fourths of an inch high. The paste was applied lightly with the fingers, and filled the wound. The surrounding skin was immediately sponged clean: the hemorrhage ceased instantly, and not a single drop of blood flowed afterwards. No pressure was used, nor dressing applied. On the first application, which failed, the entire Matico leaf had been simply dipped in water and applied.

A cupper and leecher, in Brooklyn, informed Dr. Ruschenberger that he found Matico, applied as described above, arrest, instantly, *bleeding from leech-bites* in children, which, before he obtained the leaves, often caused him great anxiety. He expressed himself perfectly satisfied, that there need be no difficulty in arresting hemorrhage from leech-bites where Matico can be obtained. Mr. Edward Young[2] has also found it a valuable agent in arresting the bleeding in such cases.

[1] Jeffreys, Lond. Lancet, Jan. 5, 1839, p. 567.

[2] Dublin Hospital Gazette, cited in Braithwaite's Retrospect, xii. 179, Amer. edit. New York, 1845.

When first introduced into England, it was found by Dr. Jeffreys[1] to possess the power of controlling obstinate *accidental hemorrhages;* such as arose from leech-bites, the removal of nævi, incisions, &c., when the under side of the leaf was applied to the bleeding surface. Testimony of its hæmastatic powers was also furnished by Dr. Kendrick,[2] Dr. Monroe,[3] Dr. Scott, Mr. Hamilton,[4] and others.

The stump of an arm, amputated near the shoulder, bled to a dangerous amount from the whole surface. Pressure having failed, a paste was made by moistening powdered Matico, which was spread over the part. It acted as an artificial coagulum, and checked the flow of blood, which did not subsequently recur. The only other remedy would have been to tie the subclavian artery.[5]

Possessed apparently of powers as a styptic, it was soon administered internally in cases where astringents appeared to be indicated. By Dr. Jeffreys and others, it was found to be valuable in *gonorrhœa, leucorrhœa, menorrhagia, hemorrhoids, catarrhus vesicæ*, &c. In a case related by Dr. Jeffreys, the patient had been subject for two months to *excessive discharges of blood and coagula from the vagina*, occurring every ten days or a fortnight, and followed by a serous or muco-purulent discharge. The usual treatment had been unsuccessful; when a wine-glassful of infusion of Matico was given four times daily; and in ten days she recovered from all severe symptoms. In another case of *discharge of blood from the bowels*, with scarcely any feculent matter in the evacuations, a decoction of Matico, in the proportion of half an ounce to the pint, was prescribed, of which two tablespoonfuls were taken every four or six hours. Three doses were sufficient for the cure. In *melæna*, occurring in the course of adynamic fever, Dr. Watmough[6] found a combination of it with senna particularly beneficial. Two drams of each were infused in a pint of water; and a wine-glassful of the infusion was given frequently.

Dr. Hunter Lane[7] found the infusion and tincture very serviceable in similar cases. In *chronic diarrhœa*, it did not prove of very eminent service, but as an injection in *leucorrhœa*, it had, he thought, all the advantages, and none of the disadvantages of a solution of nitrate of silver. He also found it serviceable in

[1] London Lancet, Jan. 5, 1839, p. 567.
[2] Jeffreys, op. cit. p. 357.
[3] Provincial Med. and Surg. Journal, June 18, 1842, p. 209, and London and Edinburgh Monthly Journal of Medical Science, Aug. 1842, p. 737.
[4] Monthly Journal of Med. Science, for Nov. 1846, cited in Amer. Journ. of the Med. Sciences, Jan. 1847, p. 142.
[5] H. Hartshorne, Amer. Journ. of the Med. Sciences, Jan. 1850, p. 112.
[6] Provincial Medical Journal, March 10, 1847.
[7] Lond. Med. Gazette, Oct. 6, 1843, p. 9.

menorrhagia, and in the *varicose* and *ulcerated condition of the rectum* for which Dr. Houston proposes the topical application of nitric acid.[1] (See ACIDUM NITRICUM.) Mr. Butler[2] used the Matico infusion internally, and by injection, with the best results, in two cases of *uterine hemorrhage* accompanying *abortion*. Mr. Edward Young[3] also found great benefit from it in *leucorrhœa*, in the form of injection, made by boiling an ounce of the leaves in a pint of water for ten minutes; and he considers it unsurpassed as an external application in *hemorrhoids*, when made into an ointment with opium, according to the form given hereafter, and applied night and morning.

Dr. Ruschenberger used the tincture advantageously in a case of *hæmatemesis*, after other plans of treatment had been resorted to ineffectually. In several cases of *gonorrhœa*, its impression was very slight. He does not think it equal to cubebs. He used the syrup in teaspoonful doses, with decided advantage, in *leucorrhœa* of long standing. In certain cases of *chronic ophthalmia*, where astringent applications were indicated, he prescribed the watery infusion, dilute tincture, and watery solution of the extract, and in every case with beneficial results.

From the whole of the testimony, then, there is encouragement to expect beneficial results from Matico. The difficulty, however, of establishing the action of styptics is considerable, as is sufficiently exemplified in the history of the Acqua Binelli and the Acqua Brocchieri. The same difficulty likewise exists in regard to the determination of its powers as an internal astringent. After the discharge of an uncertain amount of blood, hemorrhage generally ceases spontaneously; and hence any article that may have been administered may acquire a hemastatic reputation. This is probably the history of the employment of chloride of sodium to check the flow of blood in hæmoptysis. Doubtless, however, Matico is worthy of more extensive trials, although its sensible properties, taken alone, would not encourage us to place more faith in it than in the overrated hemastatic 'Waters' referred to.

MODE OF ADMINISTRATION.

Matico may be given internally in powder, in the dose of from half a dram to a dram, in infusion, decoction, tincture, syrup, or extract. Externally, it has been employed in the first three forms; and also in ointment. In *epistaxis*, the powdered herb, used as snuff, has been found a convenient mode of application.[4]

[1] See, on this subject, Dr. O'Ferrall, Dublin Hospital Gazette, Oct. 1, 1845; cited in Braithwaite's Retrospect, xii. 203, Amer. edit., New York, 1846.

[2] London Lancet, Jan. 18, 1845.

[3] Op. cit.

[4] Jeffreys, Provincial Med. and Surg. Journal, June 12, 1844, p. 161.

Infusum piperis angustifolii.

Infusion of matico.

℞. Piper. angustifol. fol. ℥j.
Aquæ bullientis Oj.

Infuse for two hours. Dose, two table-spoonfuls twice or thrice a day, or oftener. *Jeffreys.*

Infusum matico.

℞. Piper. angustifol. fol. concis. ℥ss. (avoirdupois.)
Aquæ bullientis Oss. (f ℥x.)
Infunde per horam et cola.

The product should measure about eight ounces.
Dublin Pharmacopœia of 1850.

Decoctum piperis angustifolii.

Decoction of Matico.

℞. Piperis angustifol. ℥j.
Aquæ Oj.

Boil for ten or fifteen minutes, and strain.

Dose, the same as that of the infusion. *Jeffreys.*

Tinctura piperis angustifolii.

Tincture of matico.

℞. Piperis angustifolii fol. ℥iij.
Alcohol. dilut. Oj.

Digest for fourteen days, and filter.

Dose from 30 to 60 drops in water. *Jeffreys.*

The Dublin Pharmacopœia of 1850 has a Tinctura Matico, formed of ℥viij., avoirdupois, of *matico leaves*, in coarse powder, to a quart (f ℥xl.) of *proof spirit*.

Syrupus piperis angustifolii.

Syrup of matico.

℞. Piperis angustifol. fol. ℥iv.
Alcohol. dilut. Oj.

Exhaust by displacement; evaporate to one half, and add the proper quantity of sugar.

Dose, a tea-spoonful or two. *Ruschenberger.*

Extractum piperis angustifolii.

Extract of matico.

This is made by treating *Matico* with *alcohol* and with water successively, and reducing to the consistence of a fluid extract.

Dose—ten to twenty grains. *Ruschenberger.*

Unguentum piperis angustifolii et opii.

Ointment of matico and opium.

℞. Piper. angustifol. fol. pulv. ʒiij.
Opii pulv. gr. iij.
Adipis ℥i. M.

Applied night and morning in *hemorrhoids*. *Young.*

CXX. MONE'SIA.

This vegetable substance has been imported into Europe, from South America, within the last twelve years, and, in consequence of the trials that have been made with it, by the French practitioners more especially, it was introduced in the year 1840 into this country. It is imported into France, in the form of hard, thick cakes, weighing upwards of twenty pounds. These cakes or loaves are much flattened, and have a yellowish coloured paper strongly adhering to them.[1] They are composed of an extract, prepared in South America from the bark of a tree. It would seem, that a French merchant, who had dwelt for a long time in the interior of South America, and had witnessed the surprising effects, in certain diseases, from the employment of an extract which the natives made from the bark of a tree of the country, determined to import it into France, and to submit it to the experiments of his medical and pharmaceutical countrymen.[2] A quantity of the drug was accordingly sent to Paris, and placed in the hands of M. Derosne. About a year and a half after this, he obtained some specimens of the bark of the tree, from which he procured an extract presenting all the characters of that previously sent to him, and identical in composition. This bark is said by M. Derosne to be called by some travellers *Goharem*, and, by others, *Buranhem* and *Guaranhem;* and the naturalists, who have examined it there, think that the tree which furnished it is a chrysophyllum—*chrysophyllum Buranhem* seu *glycyphlæum*.[3] It is smooth and grayish, like that of the plane tree; but with this difference, that it is much thicker; its fracture is imbricated, and its sweet taste contrasts singularly with the bitterness of the thin laminæ that are detached from the plane tree. The extract—monesia—is of a deep brown colour. It is very friable, and its fracture presents the same appearance as that of a well torrefied cacao nut. It is wholly soluble in water, and its taste,—which is at first sweet like liquorice,—soon becomes astringent, and leaves behind a well-marked and enduring acrid impression, which is felt especially in the tonsils.

Chemical analysis of the bark has detected the following separate principles:—chlorophyll; vegetable wax; fatty and crystallizable matter; glycyrrhizin; an acrid and slightly bitter matter; a little tannic acid; an organic acid, not studied; a red colouring matter, analogous to that of cinchona; phosphates of lime and magnesia; and salts of lime, with an organic acid.[4] The extract

[1] Martin Saint-Ange, Gazette Médicale de Paris, 19 Oct., 1839.

[2] Bernard Derosne, Notice sur le Monésia. Paris, 1839; Sigmond, Lond. Lancet, 1840; and A. Richard, Eléments d'Histoire Naturelle Médicale, 4ème édit. iii. 3. Paris, 1849.

[3] See a translation of a communication by M. Saint-Ange, in American Journal of Pharmacy, July, 1840, and in Amer. Med. Intel. March, 1840, p. 363.

[4] Bernard Derosne, and O. Henry, in Notice sur le Monésia, par B. Derosne; and in

—monesia—contains nearly 8 *per cent.* of glycyrrhizin, and 20 *per cent.* of acrid matter (*monesin;*) and no difference was found by M. Derosne on analysis between the imported extract and that prepared from the bark.

An analysis by M. Persoz,[1] Professor at the *Académie des Sciences* of Paris, gave the following as the constituents of the extract:—tannic acid, rendering iron blue, 52; gum or mucilage, 10; sweet matter, 36; loss, 2.

It has been suggested, that the bark of the tree which furnishes monesia is the same with that of *quillaia saponaria* of Chili. Neither the bark nor the extract would seem, however, to be identical, although in certain respects they resemble each other: moreover, the analysis of quillaia was made by MM. Henry, fils, and Bourtron-Charlard, and if monesia and quillaia were the same, the identity could not have failed to be detected by these able chemical analysts.[2]

EFFECTS ON THE ECONOMY IN HEALTH.

When monesia is exhibited internally, in the dose of from 15 grains to a scruple daily, for eight or ten days, it exerts at first a direct operation on the digestive passages, and accelerates in a remarkable manner the action of the stomach. If the dose be pushed to a dram or more in the day, and it be continued for fifteen or twenty days, the appetite increases, but a feeling of heat is experienced in the epigastric region; and tenesmus and obstinate constipation may likewise supervene.[3] Its action is manifestly excitant, and slightly astringent, and as such it may be adapted for many pathological conditions in which such agencies are indicated.

EFFECTS ON THE ECONOMY IN DISEASE.

Being possessed of the properties described above, monesia has been used in the *various profluvia*, and especially in such as are of an atonic character. In *chronic bronchitis*, and *bronchorrhœa*, it has been successfully employed by Alquié, Daynac, Manec, and others,—sometimes alone, at others associated with opium; and, in the majority of cases, benefit has appeared to accrue from its use. The same has been the result in *hæmoptysis*, according to Alquié. On *phthisis*, it of course exerted no direct efficacy; but its administration appears to have been followed by increased tone of stomach and facility of expectoration. The first of these re-

Tableau Synoptique, &c., du Monésia, par M. Saint-Ange. See, also, Saint-Ange, in op. cit., and MM. Bernard Derosne, O. Henry, and J. F. Payen, in Journal de Pharmacie, Janvier, 1841, p. 20.

[1] Forget, Bulletin Général, de Thérapeutique, Avril, 1839.

[2] See, on this subject, Drs. Chaloner and Ruschenberger, in Amer. Med. Intel. Sept. 15, 1840, p. 184–187. Mérat and De Lens, art. Quillaia; and the analysis of Quillaia, by Boutron-Charlard, and Henry, fils, in Journal de Pharmacie, xiv. 247; and in Amer. Journ. of Pharmacy, for Oct. 1840, p. 210, with remarks by Carson.

[3] Martin Saint-Ange, op. cit.

sults has led to its use in *languor of the digestive functions;* and it has been given as a tonic to *females who have been exhausted either by antecedent maladies, or by uterine hemorrhage.* In one case,[1] where the debility was so great that syncope was induced on the least movement of the body, the extract was given in pills in the dose of sixteen grains in the course of the day, with the best effect. In *chronic enteritis*, it has been prescribed by Alquié, Baron, Manec, Monod and others, and in many cases with decided advantage. Its success is said to have been most marked in *diarrhœa*, especially when owing to improper diet, and several fortunate results have been published by M. Adrien;[2] and by Dr. Q. Gibbon, of Salem, N. J.,[3] and a pupil of the author, (1851,) Mr. J. Hendley Kennon, informs him, that his father, Dr. H. C. Kennon, of Greene county, Alabama, and himself, have employed it successfully in some very obstinate cases. Even in the *colliquative diarrhœa of phthisis* it has acted beneficially. B. Derosne affirms, that surprising results have followed its administration in the *diarrhœa of phthisis* with *intestinal ulceration*, after all astringents had been employed to no purpose. Notwithstanding the disadvantageous circumstances in such cases, monesia is said to have constantly mastered the diarrhœa. Dr. Joseph G. Nancrede[4] gave it successfully in a case of *diarrhœa of long standing*, and Dr. Burns[5] in two cases of *chronic diarrhœa succeeding to cholera infantum.* In *leucorrhœa*, the efficacy of monesia, as of every other astringent, is less marked than in diarrhœa. Where the internal treatment is alone employed, the astringent has probably to pass into the mass of blood, and in this manner to act upon the parts concerned, whilst in every form of chronic enteritis, it can come into immediate contact with the seat of the disease. Injections of monesia have accordingly been more advantageous in *leucorrhœa.* M. Baron, after having employed all the ordinary means in a case of *inflammation of the vagina*, had recourse to them, and arrested the discharge. M. Payen gives a case in which, when taken internally, it augmented the discharge, but when it was employed in the form of injection, the discharge yielded, and did not recur. In all the cases of *metrorrhagia* or *uterine hemorrhage*, in which monesia has been given, it is said to have succeeded in moderating or suppressing the flow more perfectly than any other agent. It has been given, with excellent effects, in these cases by MM. Daynac, Payen, Alquié, and Martin Saint-Ange. In an obstinate case of *menorrhagia*, of seven weeks' duration, after the usual agents had been employed in vain, Dr. Chaloner[6] administered the extract in

[1] Bernard Derosne, Notice sur le Monésia, p. 7.
[2] Journ. des Connoiss. Méd. Chirurg. Nov. 1840.
[3] American Medical Library, Jan. 1842, p. 143.
[4] Medical Examiner, April 4, 1840, p. 215.
[5] Ibid. Aug. 15, 1840, p. 517.
[6] Ibid. July 11, 1840, p. 441.

the dose of three grains in the form of pill, every hour and a half, until an effect on the discharge was manifest. After three pills had been taken, benefit was experienced, and the patient was directed to take three more,—one every two hours. The cure was complete. It is proper to add, that perfect rest and cold drinks were used at the same time; and the same may be said of a successful case reported by Dr. Burns.[1] In *blennorrhœa*, it has exerted but little action when administered by the stomach; but when injected into the urethra it effected a cure in half the cases, and diminished the amount of the discharge in the other half.[2] In a case of well marked *scorbutus*, with *petechiæ* of the inferior extremities, *soft* and *bleeding gums*, and frequent *epistaxis*, which had required plugging of the nasal fossæ, M. Laurand obtained a complete cure, by giving, daily, from 24 to 40 grains of the extract in the form of pill, washing the mouth, at the same time, with a collutory formed of a dram of the *tincture* to four ounces of *honey* and *water*, and inhaling, by the nostrils, acidulated water containing an ounce of the *tincture* to a pint of *water*. In two cases of *scrofula*, the tincture was used internally by M. Daynac, and with excellent effects.

In *ulcers* of a bad character, monesia has been applied externally with advantage;—sometimes, in the form of ointment; at others, of the powdered extract. In *venereal* and *scrofulous ulcers*, excellent effects were obtained from it by MM. Baron and Martin Saint-Ange. M. Manec used it with benefit in an obstinate *serpiginous ulcer* of long duration. M. Monod cured a *phagedenic ulcer* by it, which had resisted the use of nitrate of mercury and the arsenical paste. M. Payen was equally successful with an *ulcer on the lower jaw*, which, for ten months, had resisted all treatment, internal as well as external. He employed it likewise with much success in *ulcerated chilblain;* in two cases of *stomatitis*,[3] one of a gangrenous character; and in cases of *fissure of the anus*, the result of *inflammation from hemorrhoids*. Two cases of *purulent ophthalmia* were cured by M. Saint-Ange; and M. Laurand was equally fortunate in a case of *gangrenous sloughs* on the region of the sacrum. M. Buchey, surgeon dentist, has employed it in cases of *caries of the teeth*, the progress of which it appeared to him to retard, and, when united with opium, it seemed to assuage the pain more than when the latter was given singly. He recommends the use of the tincture to maintain a good state of the *gums*.[4]

Such are the chief diseases in which monesia has been used. Its employment can readily be extended to others, by bearing in mind the nature of its powers. It would appear, that experiments have

[1] Medical Examiner, August 15, p. 517.
[2] Martin Saint-Ange, op. cit.
[3] See, also, J. G. Nancrede, op. cit.
[4] Bernard Derosne, Notice sur le Monésia, &c. &c.

been made in Dublin, and that much benefit had been derived from it as an astringent.[1] Still, it is not much used.

MODE OF ADMINISTRATION.

Monesia is generally given in pills in the dose of from twelve to forty grains a day;—the medium dose, in the twenty-four hours, being fifteen to twenty grains, taken at twice or thrice. M. Martin Saint-Ange has given it to the extent of forty-five grains a day.

The SYRUP, which contains six grains of extract to the ounce, is given less frequently. It is esteemed to be less active than the pure extract, and is preferred only in the case of infants.

The HYDRO-ALCOHOLIC TINCTURE, which contains thirty-two grains to the ounce, has been most commonly used in injections, in the proportion of a dram to a dram and a half to six ounces of water. It has also been prescribed internally in the dose of one or two drams a day in a bitter infusion.

For external use, an OINTMENT, containing one-eighth part of its weight of monesia, has been applied to *ulcers;* at others, powdered monesia; and at others again, the acrid matter itself referred to in the analysis.

MORPHIA ET EJUS SALES.

SYNONYMES. Morphia and its Salts.
French. Morphine et Sels de Morphine.
German. Morphin und Morphinsalze.

CXXI. MOR'PHIA.

SYNONYMES. Morphina, Morphinum, Morphium, Morpheum, Morphine, Papaverine.[2]
German. Morphin, Mohnstoff, Opiumalkaloid.

The discovery of this principle is ascribed to Séguin and Sertürner, who were engaged in the chemical analysis of opium upwards of forty years ago; but although the former may have first detected it, the latter deserves the credit of having improved our acquaintance with it, and of having attracted to it the attention of chemists and physicians.

METHOD OF PREPARING.

The following is M. Robiquet's method.[3] He boils a very concentrated solution of *opium* with a small quantity of *magnesia* —ten grains of the latter to a pound of opium—for a quarter of an hour. By this means, a tolerably copious, grayish precipitate is formed, which is collected on the filter, and washed with *cold*

[1] Sigmond, op. cit. See, also, Forget, Bulletin Général de Thérapeutique, Avril, 1839.
[2] Jahn's Handwörterbuch der Chimie, B. iii. S. 150.
[3] Annales de Chimie et de Physiq. v. 276.

water. The well dried precipitate is then digested with *weak alcohol* for some time, at a temperature short of ebullition; by which means a very small quantity of morphia, and a considerable quantity of colouring matter, are separated. The liquid is then filtered, and the residue washed with a little *cold alcohol*. It is then boiled for some time in *pure alcohol*, and filtered again, whilst the liquid still boils. On cooling, the morphia is obtained, which by repeated crystallization may be freed from the attached colouring matter.

The process of Hottot is greatly followed in France. It is a modification of that used by Sertürner, and similar to that adopted in the Pharmacopœia of the United States. In this, *opium* is exhausted by *tepid water*, and the clear liquid is evaporated to a density of 2° of Beaumé. Whilst the liquid is still tepid, a small quantity of *ammonia* is added, in order to render it neutral or even slightly ammoniacal. In this manner, a brown, resinoid precipitate is thrown down, which contains only traces of morphia and narcotina. The liquor is filtered, and by the addition of a fresh quantity of *ammonia* to it when cold, crystalline morphia is thrown down, which, when collected, dissolved in *alcohol*, and evaporated, is set aside to crystallize.[1] The process of the U. S. Pharmacopœia is essentially the same with that of Dr. Edward Staples, which was published in the Journal of the Philadelphia College of Pharmacy.[2]

Mr. Brande considers the process proposed by Robertson and Gregory to be the simplest and the best.[3] *Chloride of calcium* is added to a strong aqueous solution of *opium* to precipitate the acids by which the alkaloids are held in solution; it is then filtered and evaporated to the consistency of syrup, and set aside to crystallize; the crystals are strongly pressed to squeeze out the mother liquor, which contains narcotina and other impurities. The pressed crystals are then purified by solution, crystallization, and the action of animal charcoal, till they are obtained colourless; they consist of the chlorohydrates of morphia and codeia; these are dissolved in *hot water*, and *ammonia* is added, which throws down morphia, which, being separated upon a filter, may be redissolved in *boiling alcohol*, and obtained in crystals. The liquor, from which the morphia has been precipitated, contains codeia, together with chlorohydrate of ammonia, and some morphia; it must be evaporated until it crystallizes, and the crystallized mass be dissolved in a small quantity of *water*, and be decomposed by excess of a solution of *caustic potassa;* codeia is thrown down, and, when redissolved in ether, may be obtained in crystals.

[1] Journal de Pharmacie, x. 479.

[2] Vol. i. p. 15: see Dispensatory of the United States, 6th edit. p. 1035. Philad. 1845. For Fauré's process, see Journal of the Philadelphia College of Pharmacy, ii. 71. Philad. 1831; and for Mohr's process, Journal de Pharmacie, cited in American Journal of Pharmacy, April, 1841, p. 60.

[3] Dictionary of Materia Medica, p. 383. Lond. 1839.

In the London Pharmacopœia, morphia is directed to be prepared from the hydrochlorate or muriate. Take of *Hydrochlorate of morphia*, ℥j.; *Solution of ammonia*, f ʒv.; *Distilled water*, Oj.; (imperial measure.) Add the hydrochlorate of morphia, dissolved in a pint of water, to the solution of ammonia diluted with an ounce of water, and agitate. Wash the precipitate with distilled water, and dry with a gentle heat.

Tilloy, Petit, and others, have obtained morphia on the large scale from domestic opium.[1]

The crystals are completely white, translucent, almost transparent, and slightly opaline; they are wholly inodorous. In the form of powder, morphia is of loose texture, and as fine as magnesia. It melts at a trifling degree of heat, and very much resembles in this state melted sulphur; but crystallizes again on cooling. It is sparingly soluble in hot water; and in cold water scarcely at all so. Boiling water, according to Choulant, dissolves one eighty-second part; according to Jahn, only one four-hundredth; and, according to Bally,[2] it is even less soluble than strychnia, which, he says, requires 6000 parts of water for its solution. It is more readily soluble in alcohol, and still more so in ether, as well as in fixed and volatile oils: the solutions have a nauseous, bitter taste. It is alkaline in its nature. The crystals appear to be rectangular four-sided prisms. With all the acids, it forms peculiar, readily soluble, and very bitter salts, of which the sulphate, acetate, and muriate are the most used.

EFFECTS ON THE ECONOMY IN HEALTH.

Generally—it has been affirmed—morphia acts on the nervous system like opium, but does not exert the same agency on the vascular system. Magendie[3] asserts, that it possesses all the advantages of opium without any of its disadvantages. Bally[4] took especial pains to investigate the effects of morphia on the organism, and the results were communicated to the *Académie Royale de Médecine*, of Paris. The most striking was its action on the brain, which, when sufficient doses were administered, appeared to cause death by sanguineous apoplexy, as Bally had an opportunity of observing, in one case, on dissection. In this, there were no traces of injection of the membranes of the brain, whilst under the arachnoid much albuminous serum was effused, and there was an extravasation of blood into the left hemisphere of the brain.

This result is especially to be apprehended in those who have experienced an apoplectic attack previously. Bally found, moreover—which does not accord with the author's experience—that morphia was more soothing and soporific in small doses than in

[1] Art. Morphine, in Mérat and De Lens, Dict. de Mat. Méd.
[2] Mémoires de l'Académie Royale de Médecine, i. 99.
[3] Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicamens.
[4] Revue Médicale, Fév. 1824; and Mém. de la Société Royale de Médecine, i. 142.

larger. It occasioned, in the latter case, cerebral confusion, vertigo, perversion of the senses, and a feeling of electric agency, which commenced in different parts of the trunk, and also in the extremities; but no delirium supervened, and the intellectual faculties experienced no alteration. In consequence of these effects on the sensorium, the energy of the motory apparatus suffered. By long administration, morphia, like opium, excited troublesome tremours. He found the pupils contracted under its use when larger doses were given, which is opposed to the ordinary effect of narcotic agents. Not unfrequently, when morphia was continued, the soothing and soporific effect was preceded, for some days, by restlessness, and loss of sleep. Very often it excited headach. On the vascular system it did not act as an excitant—neither rendering the pulse quicker, more frequent, nor tenser. The opposite effect seemed, indeed, to be induced. It has no action, Bally affirms, as an emmenagogue; produces no diaphoresis—which does not, by the way, at all accord with the author's observation—does not even augment the animal heat, or redden the face, but frequently causes itching either over the whole surface of the body or topically; in the latter case, the sensation being chiefly felt in the face, neck, loins or genitals. At times, the itching is associated with an eruption of conical wheals or bumps, which are either red or of the ordinary colour of the skin, and can generally be detected more readily by the touch than the sight. On the organs of respiration, morphia exerts no influence; and as to its effects on the digestive organs, it may be remarked, that it has no effect on the mouth, pharynx, or œsophagus, except that ptyalism has been observed to result from it. The tongue is not made red or dry, nor are the tonsils. It does not excite thirst; but, at times, there is a sense of bitterness in the mouth, which is a forerunner of its effects on the stomach. The appetite is not diminished, except when its emetic properties are developed in a high degree. Vomiting is not caused by large doses only, but in many individuals by small doses, and it may be very violent. Commonly, morphia causes constipation, on which, at times, diarrhœa supervenes. Very frequently, also, colic is induced by it.

Morphia possesses, according to Bally, vermifuge properties. In men, he found it frequently excite ischuria, but not in women. The urine, however, exhibited no change of character.[1]

The author's own view of its action—when no idiosyncrasy interferes with its ordinary operation—is, that it exerts a decided sedative influence on the nervous and sanguiferous systems; and this accords with the experiments instituted on animals by Dr. Blake.[2] He found, when it was introduced into the veins, that it

[1] Richter's Specielle Therapie, 2te Auflage, S. 358. Berlin, 1828.
[2] Edinb. Medical and Surgical Journal, April, 1839, p. 344.

exhibited its effects upon the heart, by rendering its pulsations slower, and diminishing the pressure of the arterial system.

As in the case of opium, the system may, under excessive pain or long continued use, be so habituated to its action as to bear very large doses. Mr. Lingen,[1] of Hereford, has published a case in which a female, under a painful affection, took scruple, and, according to her own report, half dram doses of the acetate; and Mr. Teevan,[2] of London, one of a gentleman, labouring under a disease of the spinal cord, attended with violent spasms of the muscles of the chest, abdomen, and inferior extremities, who took, on one occasion, twenty-five grains in the twenty-four hours.

EFFECTS ON THE ECONOMY IN DISEASE.

Morphia may often be administered advantageously, not only where opium is indicated, but, it is thought, where it disagrees. Riecke[3] remarks, that where diaphoresis is needed, it cannot supplant opium; but in this we apprehend he is mistaken, at least in febrile and inflammatory diseases. In such cases, the author has observed a sedative dose of opium succeed in restoring the cutaneous transpiration more effectually than any other agent, by allaying the pathological condition on which the suppression of perspiration was dependent. With many persons, and in many cases, it possesses decided advantages over opium, but the author has often found, where opium disagreed, that morphia and its preparations did so likewise.

As a general rule, it may be said, morphia is proper where opium, in sedative doses, is demanded; hence it is had recourse to in *febrile and inflammatory diseases*, where there is much pain or sleeplessness—singly or combined, and in the various *neurotic affections*.

On account of the very sparing solubility of morphia in water, it is but seldom prescribed; although Bally, in opposition to many experimenters, asserts, that he has found it equally efficacious with its salts. As, however, this result is doubtless owing to the existence of acid in the stomach, and, consequently, is liable to uncertainty, it is advisable to give the salts of morphia the preference. These are administered in nearly the same doses as pure morphia itself.

It has been likewise proposed to *inoculate with morphia and its salts*. If the point of a lancet, dipped in an aqueous solution of morphia, be inserted horizontally about one line in depth beneath the epidermis, and be allowed to remain there a few seconds, the following effects, according to M. Lafargue, are observed:—About a minute and a half after the operation, a small pimple ap-

[1] London Lancet, Jan. 26, 1839, p. 680.
[2] Ibid. for February 9, 1839, p. 738.
[3] Die neuern Arzneimittel, u. s. w. S. 327.

pears, with a diffuse rosy areola, and slight itching: in about twenty minutes, the pimple becomes about four lines in diameter, and one line in thickness, and is flattened: its colour is somewhat deeper than that of the skin; it is hard; the areola very red, and about an inch and a half in diameter; its heat is increased, but the sensation of itching remains about the same. During the first hour, the pimple and its areola are at the highest degree of development, after which they gradually disappear. The general effects, which M. Lafargue experienced from thirteen punctures thus made on the anterior part of his forearm, were,—heaviness of the head, frequent yawnings, clamminess of the mouth, and an invincible desire to sleep; yet the quantity of muriate of morphia employed could not have exceeded a quarter of a grain. He considers that the inoculation of morphia may supersede the use of blisters and ammoniacal plasters, and that it deserves employment more particularly where the object of the physician is to produce the local effects of morphia. Its influences as a rubefacient are marked, and hence its probable utility in *superficial neuralgia* and in *chronic rheumatism*.[1]

The experiments of M. Lafargue were repeated by M. Martin Solon, with nearly the same results.[2]

M. Jaques of Anvers,[3] and Castiglioni,[4] an Italian physician, also recommend inoculation with morphia — the sulphate — in *neuralgia*. In one case, the former made about forty punctures over the seat of pain. The same plan was used in *sciatica*,—the inoculations being made the whole length of the sciatic nerve. Poultices are useful in subduing the irritation produced by the punctures. The latter employs the acetate in a similar manner. He uses a solution of three grains of the salt in half an ounce of distilled water, and makes numerous punctures in the course of the affected nerve. Dr. A. T. Thomson[5] has drawn the following conclusions in regard to the utility of the endermic use of the salts of morphia in *certain articular affections*. *First*, In *painful, swollen*, and *contracted joints*, depending on *rheumatism*, or other causes, the topical application of muriate or acetate of morphia to a blistered surface, on the affected joint, is capable of reducing the swelling, abating pain, and restoring the motion of the joints. *Secondly*, These salts seem to produce their beneficial results by reducing the sensibility of the nerves of the joint, and favouring absorption by their counter-irritant influence. *Thirdly*, They do not act as narcotics until the joints are relieved: (?) and, *fourthly*,

[1] Rev. Méd. Chirurg. ii. 163, Gibbon, American Medical Intelligencer, July, 1841, p. 1.
[2] Bulletin de l'Académie Royale de Médecine, Nos. 1 & 7, 1836–7.
[3] Bouchardat, Annuaire de Thérapeutique, pour 1844, p. 24.
[4] Provincial Medical and Surgical Journal, July 3, 1844, p. 208.
[5] London and Edinburgh Monthly Journal of Medical Science, Oct. 1845, p. 774.

they frequently excite a pustular eruption over the body; but this appears spontaneously soon after the use of the topical application is discontinued. Mr. Rynd,[1] too, has found the inoculation of morphia triumphantly successful in rebellious cases of *neuralgia*. He associates the acetate of morphia, however, with creasote; in the proportion of ten or fifteen grains of the salt of morphia, to a dram of creasote. In a case of inveterate *facial neuralgia*, the solution was introduced into the supra-orbitar nerve, and along the course of the temporal, malar, and buccal nerves, by four punctures of an instrument made for the purpose. In the course of a minute, all pain, except that caused by the operation, which was very slight, had ceased. In another case—of *sciatic neuralgia*—the fluid was introduced by one puncture behind the trochanter, and another half way down the thigh. The man was instantly relieved from pain. Should the pain return, the fluid must be again introduced.

M. Ebrard, of Bourg,[2] has employed, with signal success in the cure of *toothach*, the muriate of morphia, by friction on the gum of the pained part. These frictions are made in the following manner. The patient takes upon the moistened extremity of his fingers 13 *milligrammes*,—about one-fifth of a grain, Troy,—of the salt, and applies it for two or three minutes to the pained gum. Then, while inclining the head on that side, taking care not to swallow or eject the saliva which holds the salt of morphia dissolved, he must allow the saliva to be in contact with the gum for five or ten minutes. He may afterwards swallow the saliva. Should there be no relief, and symptoms of narcosis be absent after a period of two hours, the application may be repeated; but the repetition is rarely required.

In *frontal neuralgia*, M. Ebrard has found a successful treatment to consist in causing the patient to take as a pinch of snuff, from four-tenths, to three-fourths of a grain, of muriate of morphia. He advises, however, that great caution should be used in employing this powerful agent.

MODE OF ADMINISTRATION.

Pure morphia is only given internally in the form of powder or of pill, beginning with from one-sixteenth to one-fourth of a grain once or twice a day, and gradually increasing the dose to a grain and a half. If its use has been discontinued for some days, the dose, when resumed, must be again small, and be gradually increased. Its salts—as is shown hereafter—have been introduced into the system both endermically and iatraleiptically, and by inoculation.

[1] Dublin Medical Press, March 12, 1845.
[2] Gazette des Hôpitaux, cited in Amer. Journ. of the Med. Sciences, July, 1846, p. 220.

Haustus morphiæ.

Draught of morphia.

(*Potio Narcotica.*)

℞. Morphiæ gr. ¼.
Syrup. papav. f ʒj. M.
Aq. destillat. f ℥j.

To be taken at bed-time.

Enema morphiæ.

Injection of morphia.

(*Injectio leniens.*)

℞. Morphiæ gr. ij.
Ol. amygdal.
— lilior āā. ℥ss.

To allay *pain in the ear*, the suffering in *acute blennorrhagia*, and the *tenesmus in hemorrhoids*, &c. BRERA.[1]

Linimentum morphiæ.

Liniment of morphia.

℞. Morphiæ gr. iij.
Solve in
Ol. amygdal. ʒi.—ʒiss.

To be rubbed on the neighbourhood of the eye, as an anodyne, in cases of *cancerous* and other *painful affections of the eye.*

A. Poli.[2]

CXXII. MORPHIÆ ACETAS.

SYNONYMES. Morphinæ Acetas, Morphium Aceticum, Acetas Morphii, Acetas Morphicus, Acetate of Morphia.
French. Acétate de Morphine.
German. Essigsaures Morphium, Morphiumacetat.

METHOD OF PREPARING.

Acetate of morphia may be obtained by mixing *morphia*, *acetic acid* and *distilled water* in an appropriate vessel, and gradually evaporating to dryness, at a temperature of about 90° Fahr.[3] This mode of preparation is required, owing to the difficulty of obtaining the acetate crystallized, in consequence of its extreme deliquescence. Crystallized acetate of morphia may, however, be prepared by dissolving *morphia* in *alcohol*, saturating with *acetic acid*, filtering the solution, and evaporating gradually in a vessel covered over with thin rag. The acetate crystallizes in an arborescent manner on the sides of the vessel.

Acetate of morphia is one of the substances, which, in the ex-

[1] Ricettario Clinico. Padova, 1825.
[2] C. G. Lincke, Vollständiges Recept-Taschenbuch, u. s. w. ii. 288. Leipz. 1841.
[3] Pharmacopœia of the United States, p. 144. Philada. 1842.

periments of Magendie,[1] were found to promote the coagulation of the blood.

This salt of morphia has been highly recommended in *arthritis* and *nervous affections*, by M. V. Cristin,[2] of the Hospital St. John, Turin, according to a form given below. When the pains are relieved, or sleep is about to commence, the intervals between the doses are increased, or it is suspended altogether. Its good effects in *neuralgia* have been extolled by many others;—the effect of the remedy being kept up for days and weeks, if necessary. Mr. Braithwaite[3] remarks, that Dr. Cristin prescribes it in the dose of one-tenth of a grain every hour, but that he has generally found it necessary to give much larger doses without any other bad effect than severe sickness, which was easily abated by creasote or excitants—as the *spiritus ammoniæ aromaticus*. He prescribes one-fourth or one-sixth of a grain every hour or two, in severe cases, until the system is completely under its influence, and then keeps up its effects by smaller, and less frequently repeated, doses. It is questionable, however, whether the acetate be superior to opium. M. Gérard, of Avignon, has found it so highly useful in *Asiatic cholera*, that he prefers it to all other remedies. Of ninety-nine patients, treated thereby, eighty-one were cured. He found, when given early, that it especially checked the vomiting, and moderated the subsequent reaction, after which the other symptoms gradually ceased. When, however, the resources of art had been long postponed, the effects of the remedy were less marked; the vomiting and the other symptoms persisted longer; the supervening reaction was much more tardy, and frequently ended in a state of collapse, which, under the most trifling imprudence, produced an unfortunate result. Gérard administered the acetate at first in the dose of one-fourth of a grain every half hour, until the serious symptoms were removed, and he omitted it as soon as the spasms and the diarrhœa and vomiting had ceased, or as soon as reaction ensued.

In the treatment of *chronic gastralgia*, M. Valleix[4] derived the greatest benefit from the employment of small doses of the acetate. Its use in that disease is not new, but he modifies the usual mode of its administration. Instead of giving it before a meal, he prescribes it after, and in this way has relieved cases that had resisted all other treatment. He orders a grain of the *acetate* to be dissolved in thirty drams of *distilled water* and nine drams of *syrup*, and directs a teaspoonful to be taken immediately after each meal.

[1] Leçons sur le Sang, &c., and translation in London Lancet, Jan. 26, 1839, p. 636.
[2] Repertorio Medico-chirurgico del Piemonte, cited in British and Foreign Medical Review, Jan. 1840, p. 252.
[3] Retrospect of Practical Medicine and Surgery, vol. i. Jan. to July, 1840, 3d edit. p. 15. London, 1842.
[4] Revue Médico-Chirurgicale, ii. 100, cited in Brit. and For. Med. Chir. Review, Jan. 1848, p. 275.

Under the use of these small doses, the bowels, instead of being very constipated, are better regulated.

Acetate of morphia has been much used *endermically*, in the diseases mentioned under the head of MORPHIA. A quarter or half a grain or more is placed in some part of the skin whence the cuticle has been removed; and it may be repeated, as the case may require. In the severer *neuralgic* and *neurotic cases*, the quantity applied in this way has been sometimes very large. In a case of *hydrophobia*, reported by Dr. Burne,[1] of London, ten grains at a time were sprinkled on a blistered surface, with excellent tranquillizing effects. At times, when applied to a blistered surface for several days in succession, a papular eruption has been observed, which quickly becomes vesicular, proceeding from the edges of the blister, and gradually spreading over the entire surface.[2] A case of *traumatic tetanus* has been published, which was cured by the internal and endermic use of the acetate.[3]

MODE OF ADMINISTRATION.

The dose of acetate of morphia is from a quarter of a grain and less to a grain or more. Its strength does not vary materially from that of pure morphia.

Liquor morphiæ acetatis.

Solution of acetate of morphia.

℞. Morphiæ acetat. gr. xvj.
Acid. acetic. f ʒij.
Aquæ destillat. f ʒvj. M.

This formula was proposed by the author[4] as a substitute for the "*gouttes calmantes*" of Magendie,[5] which permit the deposition of the morphia when kept for a short time. The dose is from six to twenty-four drops.

℞. Morphiæ acetat. gr. xvj.
Acid. acetic. gtt. iij. vel iv.
Alcohol. f ʒj.
Aquæ destillat. f ℥j. Fiat solutio.

Magendie.

Mistura morphiæ acetatis.

Mixture of acetate of morphia.

℞. Morphiæ acetat. gr. i.
Syrup. acaciæ f ℥i.
Aquæ destillat. f ℥iv. M.

Dose.—A spoonful every hour in *arthritis* and *nervous affections*, until the pains are removed. *Cristin.*

[1] London Medical Gazette, April 14, 1838.
[2] A. T. Thomson, in London Lancet, for Jan. 19, 1839, p. 632.
[3] L. Piquot, Journ. des Connais. Méd. Chirurg. Dec. 1840.
[4] Formulary, &c., translated from Magendie, by C. T. Haden, 2d edition, by Robley Dunglison, p. 14. Lond. 1824. Amer. edit., Philad. 1825.
[5] Formulary, &c.

Syrupus morphiæ acetatis.

Syrup of acetate of morphia.

℞. Morphiæ acetatis gr. iv.
Syrupi simplic. Oi.

Dissolve the salt in half a dram of water acidulated with a few drops of acetic acid; filter, and add it to the syrup.

This syrup is recommended and used in Paris, in place of the *syrupus papaveris*. It has the advantage of being always of uniform strength. *Magendie.*

It has been suggested,[1] that the syrup of the acetate or sulphate of morphia should always be made of the strength of one grain to the ounce; and it is certainly desirable that uniformity should prevail in this respect. If this exist, it matters but little what the proportion is, within certain limits.

The acetate may, also, be applied in the form of OINTMENT; and it is frequently added to glysters, *in chronic diarrhœa*. Hildenbrand recommends the following ointment to be rubbed on the pubes in *cancer of the uterus*:—

Unguentum morphiæ acetatis.

Ointment of acetate of morphia.

℞. Morphiæ acetat. gr. iv.
Ung. hydrarg. ciner.
—— simpl. āā. ʒij. M.

A piece, the size of a pea, to be rubbed on twice daily.

A solution of acetate of morphia, which he terms *liquor opii*, has been proposed by Mr. Houlton.[2] He prepares it as follows:—Take two ounces and a half of the *best Turkey opium;* thirty-two fluidounces of *Beaufoy's acid*, of the strength of pickling vinegar: macerate with a gentle heat for six days, frequently shaking the vessel; then filter, and evaporate the fluid to the consistence of the extracts of the pharmacopœia, finishing the evaporation by the spontaneous method. This Mr. Houlton employs under the name *extractum opii aceticum*. To the above extract he adds, *alcohol*, five fluidounces; *distilled water*, thirty-five fluidounces; macerating for eight days, and filtering.

This *liquor opii* is about the strength of the tinctura opii in sedative property, and Mr. Houlton affirms, from his observations, that it is in no respect inferior to Battley's *liquor opii sedativus*,—a secret preparation which has been much used.

[1] Duhamel, Amer. Journ. of Pharmacy, for Oct. 1840, p. 187.
[2] Lond. Medical Gazette, Aug. 12, 1837. See, also, Buchner, père, in Journal de Pharmacie, Février, 1842, p. 48.

CXXIII. MORP'HIÆ HYDRI'ODAS.

SYNONYMES. Hydriodate or Iodhydrate of Morphia—called by some Iodide or Iodu ret of Morphia.
French. Iodhydrate ou Hydriodate de Morphine.
German. Iodwasserstoffsaures Morphin.

An IODURET or IODIDE of IODHYDRATE of MORPHIA, has been introduced of late years. It is prepared by mixing a solution of *acid sulphate of morphia*, with a solution of *ioduretted iodide of potassium*, keeping the liquors for an hour at a temperature of 140°: the liquid is then poured off; and the residuum washed, collected on a filter, and dried.

The iodide of hydriodate of morphia is in small brilliant spangles, (*paillettes,*) of a beautiful deep purple colour. It is insoluble in water, very soluble in alcohol, and very little so in ether. It appeared from the few trials made of it by M. Bouchardat,[1] to possess the narcotic properties of morphia, without diminishing the appetite. It requires to be given in double the dose of the other preparations of morphia.

CXXIV. MOR'PHIÆ MU'RIAS.

SYNONYMES. Morphinæ Murias seu Hydrochloras, Morphiæ Hydrochloras, Morphium Muriaticum, Murias seu Chlorhydras Morphicus, Hydrochloras Morphicus, Murias Morphii, Muriate of Morphia, Hydrochlorate of Morphia or Morphine.
French. Hydrochlorate ou Muriate de Morphine.
German. Salzsaures Morphium, Hydrochlorsaures Morphium.

METHOD OF PREPARING.

According to the last Pharmacopœia of the United States, muriate of morphia is prepared as follows:—Take of *morphia* in powder, ℥i.; *distilled water* Oss.; *muriatic acid*, a sufficient quantity. Mix the morphia with the water; then carefully drop in the acid, constantly stirring till the morphia is saturated and dissolved. Evaporate the solution by means of a water bath, so that it may crystallize on cooling. Dry the crystals on bibulous paper.

In the London and Edinburgh Pharmacopœias, morphia is first separated from opium in the form of the muriate.[2]

Muriate of morphia is in snow-white feathery crystals, which are wholly soluble in water.

[1] Nouveau Formulaire Magistral, p. 70. Paris, 1845.

[2] For Wm. Gregory's mode of preparing the muriate, see Edinb. Med. and Surg. Journal, for April, 1831; or Philad. Journal of Pharmacy, iii. 124. See, also, M. Robertson, in Edinb. Med. and Surg. Journal, for April, 1832; and A. T. Thomson, Lond. Pharmaceut. Journ. and Transact., or Amer. Journal of Pharmacy, July, 1842, p. 154.

MODE OF ADMINISTRATION.

It may be given in the same cases and doses as the other salts of morphia.

The following preparations are directed in the Edinburgh Pharmacopœia.

Trochisci morphiæ.

Morphia lozenges.

℞. Morphiæ muriat. ℈i.
Tinct. tolut. f ℥ss.
Sacchar. ℥xxv.

Dissolve the muriate of morphia in a little hot water; mix it and the tincture of tolu with the sugar; and with a sufficiency of mucilage form a proper mass for making lozenges; each of which should weigh about 15 grains.[1] Each lozenge contains about one-fourth of a grain of muriate of morphia. Dr. Pereira[2] states, that the morphia lozenges of the shops usually contain one-twenty-fourth of a grain of the muriate. It is a good mode of employing morphia with the view of allaying cough.

Trochisci morphiæ et ipecacuanhæ.

Morphia and ipecacuanha lozenges.

℞. Morphiæ muriat. ℈i.
Ipecac. in pulv. subtil. ʒi.
Tinct. tolut. f ℥ss.
Sacchar. ℥xxv.

Proceed as for Trochisci Morphiæ.

Each lozenge contains about one-fourth of a grain of muriate of morphia, and one-thirteenth of a grain of ipecacuanha. They are used in the same cases as the last.

CXXV. MOR'PHIÆ SULPHAS.

Synonymes. Morphinæ Sulphas, Morphium Sulphuricum, Sulphas Morphii seu Morphicus, Sulphate of Morphia or Morphine.
French. Sulfate de Morphine.
German. Schwefelsaures Morphium, Morphiumsulphat.

METHOD OF PREPARING.

Morphia is dissolved in dilute *sulphuric acid.* The solution is then evaporated by heat, and suffered to crystallize, which it does in silken tufts, or snow-white feathery crystals that are wholly soluble in water.

EFFECTS ON THE ECONOMY.

The general effects of sulphate of morphia on the economy in

[1] Christison, Dispensatory, p. 643. Edinb. 1842.
[2] Elements of Mat. Med. and Therap. ii. 1782. Lond. 1842; or 2d American edition, by Carson. Philad. 1846.

health and disease resemble those of the acetate, to which it is perhaps to be preferred on account of its greater uniformity. There is an advantage, however, in retaining both preparations in the Materia Medica, as when the system becomes accustomed to the one, the other may be substituted.

In his experiments on the blood, Magendie[1] found that the sulphate of morphia—unlike the acetate and the muriate—opposed the coagulation of that fluid.

A *syrupus morphiæ sulphatis*, a *liquor morphiæ sulphatis*, and an *unguentum morphiæ sulphatis* may be formed in the same manner as with acetate of morphia. The common form for the solution of sulphate of morphia is the following: it is that of the Pharmacopœia of the United States; and it is to be regretted, that the strength is not the same as that of the *Liquor Morphiæ Acetatis*.

Liquor morphiæ sulphatis.
Solution of sulphate of morphia.

℞. Morphiæ sulph. gr. viii.
Aquæ destillat. Oss. Fiat solutio.

Dose.—A tea-spoonful (which is considered to be equivalent to about twelve or fourteen drops of laudanum,) to be repeated as occasion may require.

Lotio morphiæ sulphatis et sodæ boratis.
Lotion of sulphate of morphia and borate of soda.

℞. Morphiæ sulphat. gr. vj.
Sodæ borat. ℥ss.
Aquæ rosæ f ℥viij. M.

To be applied thrice a day to the affected parts by means of a piece of sponge, or a piece of linen, in *pruritus vulvæ*, taking the precaution first to wash the surface with tepid water and soap, and to dry them before applying the lotion. *Meigs.*[2]

Citrate of Morphia is occasionally used; but it possesses no advantage over the preparations described above. Many years ago, Dr. Porter, of Bristol, recommended a *liquor morphiæ citratis* to be prepared in the following manner:—Beat four ounces of the best crude *opium* in a mortar, with two ounces of *crystallized citric acid;* mix well with a pint of *boiling water;* and filter after twenty-four hours' maceration. Dr. Paris speaks well of this preparation.[3] Magendie recommends the substitution of the following process:

[1] Leçons sur le Sang, &c.; or translation in London Lancet, January 26, 1839.
[2] A Treatise on the Diseases and Special Hygiène of Females, by Colombat de l'Isère, translated by C. D. Meigs, p. 272. Philad. 1845.
[3] Pharmacologia, 4th American from the 7th London edit. By J. B. Beck, p. 439. New York, 1831.

℞. Morphiæ pur. gr. xvj.
Acid. citric. crystalliz. gr. viij.
Aquæ destillat. f ℥j.
Tinct. cocci. q. s. Fiat solutio.

Dose.—Six to twenty-four drops in the twenty-four hours.

A TARTRATE of MORPHIA was suggested by Mr. Haden[1] as a substitute for the *liquor opii sedativus* of Battley. Mr. Haden made it by macerating the *dregs*, remaining after making the tincture of opium, in a solution of *tartaric acid*. Forty drops acted in all respects like twenty of the liquor opii sedativus. It neither stimulated nor induced costiveness.

The *bimeconate of morphia* has been brought before the notice of the profession by Mr. Squire.[2] It may be prepared by adding freshly precipitated *morphia*, to *meconic acid* in solution. It occurs in minute crystals of a white colour, soluble in water, —the solution giving the reaction due to meconic acid and morphia. It is an acid salt; for meconic acid is tribasic; and in the bimeconate of morphia, there are two equivalents of morphia, and one equivalent of water to each equivalent of acid.[3]

Impressed with the idea, that the combination of the active principle of opium, as prepared by nature, would prove more beneficial as a therapeutical agent than the artificial salts, Mr. Squire instituted a number of experiments, with the view of procuring the bimeconate as free from the other ingredients of opium as possible; and he asserts, that at length he obtained a tolerably pure salt, which, from the trials that have been made with it, has fully answered his expectations as to its superior medicinal power over the other preparations of opium. The salt is given in solution made nearly of the same strength as laudanum. The dose of the bimeconate is gr. $\frac{1}{4}$ and upwards.

Dr. Macleod, who made trial of it, asserts, that it appeared to him to be a very mild and efficient preparation, rarely producing headach or other discomfort; and that it repeatedly answered, in the most satisfactory manner, where opium had disagreed, and succeeded in some cases where other salts of morphia—the acetate and the muriate—had failed to give relief. Equally strong testimony in its favour is afforded by Dr. A. T. Thomson, who details three cases—one of *neuralgic pain* of the left side of the face; another of *wakefulness*, without any apparent cause, and a third of *anomalous pain of the hip and thigh*, all benefited strikingly by its use.

A preparation termed *M'Munn's Elixir of Opium* has been

[1] Translation of Magendie's Formulary, 2d edit. By Robley Dunglison, p. 19. Lond. 1824.
[2] Lond. Med. Gaz., Mar. 9, 1839.
[3] Ballard and Garrod, Elements of Mat. Med. and Therap. p. 406. Lond. 1845.

introduced into American practice with many testimonials in its favour; but the formula for its preparation is kept secret; and therefore, it merits no farther notice here.

M. Bouchardat[1] speaks of a DOUBLE MURIATE of MORPHIA and CODEIA; French, *Chlorhydrate double de morphine et de codeine* ou *Sel de Gregory*, which is obtained directly in the preparation of morphia by the process of Dr. Gregory. It is not used in France, but, he says, it is much employed in England,[?] where it is considered to enjoy decidedly sedative properties. It is given in the same cases as the salts of morphia, from which it differs but little.

CXXVI. MOXA.

SYNONYME. Moxiburium.

By the term *moxa*, the Chinese and Japanese designate a cottony substance, which they prepare by beating the dried leaves of Artemisia Chinensis, a kind of Mugwort. Dr. Lindley, however, states, that it is made from A. Moxa.[2] With this down they form a cone, which is placed upon the part intended to be cauterized, and is set fire to at the top. This mode of exciting counter-irritation has been long practised by the Chinese and Japanese, and by the ruder nations of the old world; but it was not much employed in Great Britain and France until about the commencement of the seventeenth century, when it was introduced through the agency of a Dutch physician[3] who had resided in India. It fell again, however, into disuse, until attention was redirected to it, during the last century, by Pouteau[4] and Dujardin, and, at the commencement of this century, by Percy and Laurent,[5] and others.[6]

METHOD OF PREPARING.

Various agents have been used by different people, in "moxibustion,"—for so the mode of cauterization has been termed, which consists in placing some combustible substance on a part of the body, and suffering it to burn down. From the earliest ages, the Nomades employed the fat wool of their flocks, as well as certain spongy substances growing upon oaks,[7] or springing

[1] Nouveau Formulaire Magistral, p. 70. Paris, 1845.
[2] Flor. Med. 463.
[3] Ten Rhyne, Medit. de Veteri Medicin.; Dissert. de Arthritide, Lugd. Bat. 1672; and Kæmpfer's History of Japan, translated by Scheuchzer, vol. ii. append. sect. iv. Lond. 1728.
[4] Mélanges de Chirurgie, p. 49.
[5] Dictionnaire des Sciences Médicales, art. Moxibustion.
[6] See, for a history of the Moxa, the author's translation of Baron Larrey's Memoir on the Use of the Moxa. Lond. 1822.
[7] Hippoc. lib. de Affect. cap. xxx.

from the hazel:[1] the Indian, the pith of the reed,[2] and flax or hemp impregnated with some combustible material;[3] the Persian, the dung of the goat; the Armenian, the agaric of the oak; the Chinese and Japanese, the down of the artemisia; the Thessalian, dried moss;[4] the Egyptians, the Arracanese, and several oriental nations, cotton;[5] the Ostiaks[6] and the Laplanders,[7] the agaric of the birch; and the aborigines of this continent, rotten and dried wood. Hippocrates[8] was in the habit of employing fungi and flax for the same purpose.

In modern times, also, various substances have been used for the fabrication of moxas. Whatever article is selected, it ought to be a spongy, light, vegetable matter; readily combustible, and so prepared as to burn down slowly. In Germany, they use the tinder—*amadou*—which is known to be an agaric prepared for the purpose; and it is not uncommonly employed in our hospitals,—a small disc or cylinder being placed on the part, and set fire to. It has been generally used in the French hospitals.[9] The match used by artillerists was recommended by Percy,[10] after Bontius:[11] it is composed of hemp steeped in a solution of nitre. He likewise proposed the pith of the sun-flower—*helianthus annuus*—recommending that the stalk should be cut into cylinders of the desired length, the bark being left on; so that, when ignited, it may burn in the centre and be held with the hand.[12] This he called *moxa de voleurs*.[13] These moxas, called *Percy's moxas*, prepared by Robinet, are found in the London shops. They consist of pith, rolled in cotton and enveloped in muslin.[14]

The moxa, used by Larrey, and very generally employed by many practitioners, is made by taking a quantity of cotton wool, pressing it somewhat closely together, and rolling over it a piece of fine linen, which is fastened at the side by a few stitches. Larrey advises, that it should have the shape of a truncated cone—the form usually adopted—and be about an inch long. Commonly, the cylinder is shorter than this; six or eight lines—as, when above six lines high, the combustion is not felt—and about four or five lines broad. The moxas employed by Dr. Sadler,[15] of St.

[1] Paulus Æginet. lib. vi. cap. 49.
[2] Kæmpfer, vol. ii. app. sect. iv. p. 36. [3] Bontius, De Medicinâ Indorum, p. 32.
[4] Percy in Pyrotechnie Chirurgicale Pratique, p. 12.
[5] Prosper. Alpin. de Medicinâ Ægyptiorum, lib. iii. cap. 12.
[6] Voyages de M. Pallas, iv. 68.
[7] Acerbi's Travels through Sweden, Finland, and Lapland, ii. 291; and Linnæus, in Lachesis Lapponica, translated by Sir James Smith, i. 274. [8] De Affect. cap. viii.
[9] Bulletin Général de Thérapeutique, Juillet, 1840.
[10] Op. cit. p. 77. Paris, 1811. [11] Op. cit. p. 32. Paris, 1645.
[12] Art. Moxibustion, in Dict. des Sciences Médicales.
[13] Mérat and De Lens, Dict. de Mat. Méd. art. Moxa.
[14] Pereira, Elements of Mat. Med. 2d edit. p. 1352. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.
[15] Zeitschrift für die gesammte Médicin. B. iii. H. ii. & iii., cited in British and For. Med. Review, July, 1837, p. 217.

Petersburg, are about half an inch in diameter; and three-quarters of an inch in height. They are composed of a nucleus formed of the pith of the sun-flower wrapped in layers of cotton of various thickness, and surrounded with an external envelope of thin muslin; both of the latter being previously steeped in a solution of nitre. They are held, while burning, by means of two long hair-pins, the legs of which are slightly bent, in order to accommodate them to the shape of the moxa; and when the latter is burned down to the place where it is held by the first hair-pin, it can be held with the other, and retained in its proper position.

With this last view, Larrey[1] has a special *porte-moxa*, consisting of a ring to receive the cylinder, with a handle attached to it, and three small supports or knobs of ebony, placed beneath the ring, to prevent the heated metal from acting upon the surface. Mr. Leney[2] soaks a piece of lint in a strong solution of nitrate of potassa, dries it, and cuts off pieces of the size of the thumb nail, which he fastens with thin adhesive plaster over the seat of pain; sets fire to the opposite extremity, and then applies the blow-pipe. The pain during the process is very severe, but he affirms, that the Irish prefer it greatly to the application of a blister. Professor Gräfe[3] employs moxas made of wafers, dipped in a mixture of three parts of oil of turpentine, and one part of sulphuric ether. Before applying this inflammable matter to the skin, it is necessary to remove carefully the superfluous liquid. These moxas are said to ignite readily, burn promptly and uniformly, and not to crepitate.

A plan for raising vesication on the surface has been adopted, which, as Dr. Granville remarks, must be regarded as a kind of moxa.[4] This he admits to be equally successful with the one he proposes, and which has been already described (p. 248,) in forming a rapid vesication: "but it is, at the same time, so complicated, and attended by such intense pain," that, in practice, he says, it will not bear comparison with the preparations which he recommends. A piece of linen or paper, being cut of the requisite size, is immersed in spirit of wine, or brandy. It is then laid on the part to be blistered, care being taken, that the moisture from the paper or linen does not wet the surrounding surface. The flame of a lighted taper is applied quickly over the surface, so as to produce a general ignition, which is exceedingly rapid. At the conclusion of this operation, the cuticle is found detached from the true skin beneath. In cases of *convulsions*, the region of the spine has been treated in this manner, and with good effects.[5]

[1] The author's translation of his Essay on the Moxa, p. 5.
[2] Lond. Med. Gaz., July 15, 1842. [3] La Lancette Française, 26 Jan., 1839.
[4] Counter-irritation, its Principles and Practice, Amer. Med. Library edit., p. 21 and p. 42. Philad. 1838.
[5] C. J. Edwards, in Provincial Med. and Surg. Journal, Jan. 1842.

Dr. Osborne, of Dublin,[1] avails himself of the high temperature produced by lime in the act of slaking, for the purpose of a moxa. Some quicklime in powder is placed to the depth of about half an inch within a strip of card, bent and tied so as to form a circle. Water is then dropped on the lime, and mixed with it. In about two minutes, it swells, and becomes dry; and, at the same time, a degree of heat is produced, which—according to some experiments—may amount to 500° Fah. He considers this moxa superior to all others;—*first*, from the intensity of the heat, and *secondly*, from its convenience,—not requiring the assistance of any heated substance, and being unaccompanied by the emission of sparks or smoke, which frightens the patient. When the quantity of lime used is smaller than that mentioned above, or if it be not kept on long, an appearance results, resembling that produced by acetic acid; and a thick crust is formed, which separates as the new skin is perfected beneath. But if the quantity of lime be large, and it be kept on as long as the heat continues, a complete destruction of the skin ensues; and in this manner issues may be made of greater depth, and in a much shorter time, than by the usual cauterants. Dr. Osborne gives a case of apparent *ulceration of the upper part of the rectum and sigmoid flexure of the colon;* in which all the symptoms of internal ulceration disappeared after the application of a lime moxa, of about the size of a crown, over the region of the sigmoid flexure. In a case of *incipient softening of tubercles;* and in another apparently of *purulent infiltration after pneumonia*, its effect in arresting the ulcerative process was most decided. In a case of *hip-joint disease*, in which there was great pain, and consequent loss of sleep, the patient slept well on the following night, and, in a few days, had gained much power over the limb; and in another case of the same disease, which had proceeded to destruction of the joint, and extensive enlargement of the parts around it, great relief was obtained. The size of the ulcer formed by it is always much larger than that of the lime applied. When the lime is prepared from calcareous spar, the heat, produced on the addition of water, is sudden and intense, and the pain is proportionably urgent. For ordinary purposes, however, well selected pieces of lime from a lime-kiln answer well if fresh, but not otherwise.

In the application of the various moxas, or of most of them, their agency can be so graduated as to produce either simple rubefaction, vesication or the formation of an eschar. Where it is desirable to produce the first result only, the cylinder of cotton may be removed when the pain becomes somewhat severe; or the burning material may be held close to the surface, and be moved gradually along it. In this manner, a counter-irritant effect may

[1] Dublin Journal of Medical Science, Jan. 1842.

be exerted along the spine or any extensive surface. Any burning substance—a lighted coal, for example—will answer for this purpose. When vesication is needed, it must be kept on longer; and if it be desirable to produce an eschar, the moxa may have to remain on until it is wholly consumed. Larrey,[1] indeed, advises, that the blowpipe should be occasionally employed to hasten the combustion. When the integument has once become disorganized, the slough will be thrown off in due time, leaving an ulcer. Larrey says the sloughing can be prevented by the application of liquid ammonia [2] to the burnt surface, after the moxa has been removed. This will do when the disorganization is partial; but we know, from experience, that it often fails.

EFFECTS ON THE ECONOMY IN DISEASE.

Moxa—in its different forms—is doubtless a most valuable agent, when rapid counter-irritation is indicated. It resembles, indeed, in its action, the ammoniated counter-irritants of which we have already treated, and is applicable to the same diseases;—the only difference between them—when cauterization is effected—being, that the agent in the case of the ammoniated lotion is a *potential*, in that of moxa an *actual*, cauterant.

The moxa must be regarded as one of our most valuable revellents.

CXXVII. NARCOTI'NA.

Synonymes. Narcotinum, Narcotin, Narcotine, Opiane, Matter or Salt of Derosne.
French. Matière ou Sel de Dérosne, Sel Essentiel d'Opium.
German. Narkotin, Opian, Derosne'sches Opiumsalz.

In regard to the precise properties of this substance, which is one of the immediate principles of opium, and has attracted the attention of many chemists and therapeutists, much uncertainty exists. It seems, that it has not hitherto been found except in opium.

METHOD OF PREPARING.

It is commonly obtained, either from *crude extract of opium*, by means of *ether*, which only dissolves the narcotina, and consequently requires but to be evaporated to obtain it; or from *crude opium*, which has been exhausted by *cold water:* it may hence be obtained from the residue after the preparation of the aqueous extract of opium of the shops. With this view, the *opium or residue* is twice treated with *boiling acetic acid* at 2° or 3°; it is precipitated by *ammonia*, and the washed precipitate is purified by treating it with *hot alcohol* at 40°, and a little *animal charcoal;*

[1] Op. citat. p. 5. [2] Ibid. p. 9.

the liquid is then filtered, and the pure narcotina is precipitated on cooling.

It crystallizes in very white needles; is devoid of taste and smell; fusible in the manner of resins, and very slightly soluble in water; soluble with the aid of heat in alcohol, and in the volatile and fixed oils; very soluble in ether, which distinguishes it from morphia; very soluble also in cold acetic acid, whence it is precipitated on heating the solution—another mode of separating it from morphia—and soluble in dilute acids. It is coloured of a vivid red by nitric acid; and is analogous, in some respects, to the crystallizable resins or *sub-resins* of M. Bonastre.[1]

Narcotina is generally reckoned amongst the vegetable alkaloids; but by some it is considered to be neuter.[2] Dr. Christison[3] states, that "opium contains no fewer than seven crystalline principles; —morphia, codeia, and paramorphia, narcotin, narcein, porphyroxin and meconin, of which the first three are alkaline and the others neutral."

Dr. O'Shaughnessy[4] prepares *muriate of narcotina* by taking of *Bengal opium*, two pounds; *Alcohol*, 20 pounds. These are rubbed together in a large mortar, adding the spirit by degrees, until the opium is exhausted of its soluble parts. The solution is then decanted, and the insoluble portion pressed. To the alcoholic solution as much *ammonia* is added as renders the liquid slightly turbid. Fifteen pounds of the alcohol are then distilled from a common alembic; and the fluid in the still is drawn off, and set aside to cool. On cooling, a mass of coloured crystals is deposited, composed of narcotina, meconate of ammonia, and resin. This is washed with *water*, which dissolves the meconate of ammonia, and afterwards with a quart of *water* and a dram of *muriatic acid*, which dissolves the narcotina and leaves the resin. The solution is then filtered, and evaporated to dryness.[5]

Muriate of narcotina, thus prepared, is a transparent resinous mass, of rosy colour, and brittle vitreous texture. It is very soluble in distilled water and spirit; and its salts are intensely bitter.

EFFECTS ON THE ECONOMY IN HEALTH.

These have been so contradictory, that it has been conceived the same preparations cannot have been used by different observers.[5] According to Magendie,[6] morphia is the anodyne principle of opium, and narcotina the exciting. When a grain of narcotina dissolved in oil was given to a dog, it produced a state of stupor, which superficial observers might readily confound with

[1] Mérat and De Lens, Dict. de Mat. Méd. art. Narcotine.
[2] Christison, Dispensatory, Amer. edit. p. 702. Philad. 1848.
[3] Ibid. p. 701.
[4] Calcutta Quarterly Journal, and Lond. Lancet, July 20, 1839, p. 606.
[5] Ibid. and Dict. des Sciences Médicales, xxxiv. 298.
[6] Formulaire pour la Préparation, &c., de plusieurs nouveaux Médicamens.

sleep; but it differed evidently from sleep; the animal's eyes were open; the respiration was not deep, as in sleep, and it was impossible to arouse it from its sluggish condition. Death generally took place in twenty-four hours. When combined with acetic acid, it produced quite different effects. Animals could bear a dose of even twenty-four grains without dying, and, whilst under its influence, they were agitated by convulsions like those which camphor induces—exhibiting the same signs of fright, the same backward motions, foaming at the mouth, convulsions of the jaws, &c. When morphia and narcotina were both given at the same time, the different effects of each occurred together. A grain of morphia, for example, and a grain of narcotina, dissolved in acetic acid, were placed in the pleura of a dog. The animal soon became drowsy, and fell asleep under the influence of the morphia; but a singular and remarkable strife appeared to go on for an hour and a half, between the stimulating effects of the narcotina and the anodyne effects of the morphia. At length, however, the animal slept soundly, being probably, Magendie suggests, under the influence of the morphia alone. His opinion is, that narcotina is injurious when not united with an acid, and very exciting when so united. M. Orfila—the celebrated toxicologist—has entertained, it appears, various views upon the action of narcotina; at one time considering it inert, at another to possess the same action as morphia; and at another, to concur, when combined with morphia, in the properties of opium, but to a slight degree—since opium, deprived of narcotina, is not less deleterious—and to possess a different *modus operandi* from opium, without, however, our being able to regard it as the exciting principle.[1]

Owing to all these uncertainties connected with it, narcotina is little if at all employed in medicine. It would seem, however, that the exciting properties of opium do not appertain exclusively to it; for, as has been elsewhere remarked, there are many persons who are as disagreeably affected by morphia alone as they are by opium, which contains both morphia and narcotina.

The salts of narcotina—the *muriate* and the *sulphate*—have been employed successfully as antiperiodics, especially in *intermittents*,[2] and Dr. O'Shaughnessy[3] has laid before the Medical Society of Calcutta the results of his experience with them. Sixty cases were treated, of which all but two were successful. He remarks farther, that, besides the sixty cases recorded, more than one hundred ague patients had been treated by his pupils and acquaintances with perfect success by the remedy.

[1] Mérat and De Lens, op. cit., and Orfila, Toxicologie Générale, ii. 69.
[2] Roots, London Lancet, Sept. 1832, and T. W. Jeston, ibid. Oct. 6, 1832, p. 41.
[3] India Journal of Medical Science, Sept. and Nov. 1838, cited in British and Foreign Medical Review, No. xv. for July, 1839, p. 263.

CXXVIII. NUX VOM'ICA.

Synonymes. Vomic Nut, Poison Nut, Bachelor's Buttons.
French. Noix Vomique.
German. Krähenaugen, Brechnuss.

EXTRACTUM NUCIS VOMICÆ ALCOHOLICUM.

Synonymes. Extractum Nucis Vomicæ Resinosum seu Nucis Vomicæ Spirituosum, Spirituous, Resinous or Alcoholic Extract of Nux Vomica.
French. Extrait Alcoolique de Noix Vomique.
German. Geistiges Extrakt der Krähenaugen.

In the year 1809, Magendie discovered that one entire class of vegetables—the bitter strychnos—has the power of exciting the spinal marrow without implicating, except indirectly, the functions of the brain.[1] Since then, many have confirmed the observations of Magendie, and have attended especially to its agency in various diseases. The preparation of the strychnos most used, if we except the active principle—has been the alcoholic extract of the nux vomica.

METHOD OF PREPARING.

Take any 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 less strength may be used, but, according to Magendie, the product will be proportionably less active. A dried alcoholic extract is made by dissolving in water the alcoholic extract made by means of alcohol at 36° (.837;) filtering and evaporating in appropriate dishes, as in making the dry extract of bark.

The Extractum Nucis Vomicæ of the Pharmacopœia of the United States is directed to be prepared as follows:—Take of *Nux vomica*, a pound; *Alcohol*, a sufficient quantity. Expose the nux vomica to steam till it is softened, then, having sliced and dried it, grind into powder. Introduce it into an apparatus for displacement, and pour alcohol upon it gradually until the liquid passes without bitterness. Distil off the greater part of the alcohol from the filtered liquor, and evaporate the residue to the proper consistence.[2]

EFFECTS ON THE ECONOMY.

According to Magendie, a grain 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, arrest respiration sufficiently long to induce complete asphyxia. When the dose is much stronger the animal

[1] Examen de l'action de quelques végétaux sur la moëlle épinière. Paris, 1809; and Formulaire, &c.
[2] Pharmacopœia of the United States, p. 352. Philad. 1842.

appears to die entirely from the action of the nux vomica on the nervous system.[1] If an animal be touched whilst under the action of the substance, it experiences a commotion similar to that of a strong electric shock, and this takes place each time the contact is renewed. On dissection, no morbid appearances exist which can account for death. When introduced into the frog's stomach, Dr. Lombard,[2] of Geneva, found, that it produced tetanic convulsions, which, in a few hours, caused death. The contractions of the heart were sometimes strong and complete, sometimes irregular, tumultuous and intermitting; always diminished in frequency. Applied to the heart itself, it slightly stimulated it, rendering the pulsations more energetic and frequent, whence Dr. Lombard concludes, that nux vomica cannot be used with advantage in any diseases of the heart; for, although it diminishes the frequency of the pulsations, it renders them irregular.

The action of the extract on healthy man is the same as that described by Magendie, and if the dose be sufficiently large, death speedily follows with the same symptoms.[3] In those that are affected with paralysis, the effect is also the same; but, what is singular, it is particularly manifested in the paralyzed parts by tetanic convulsions, and a feeling of creeping, which indicate the operation of the remedy; and a local perspiration is also often observed to break out on some parts of the body. When administered in cases of hemiplegia, the contrast between the two sides of the body is rendered striking: whilst the sound side remains at rest, the other may be violently agitated; tetanic shocks may supervene, and a copious perspiration break out. In a female, Magendie saw the affected side covered by a peculiar eruption, whilst the other side afforded no trace of it. There is a difference even between the two sides of the tongue, a decidedly bitter taste being occasionally perceived on the one, whilst the other exhibits nothing similar. If a much larger dose be given, both sides of the body participate, but unequally, in the tetanic spasms, so that the patient is sometimes thrown out of bed by the violence of the contractions. When given in very small doses, it has no perceptible effects immediately, and some days elapse before its advantageous or noxious properties can be appreciated.

According to Magendie,[4] the extract may be given in all *diseases that are attended with debility*, general or local, and in *paralysis of all kinds*, general or partial. He himself observed excellent effects from it in *debility of the genital organs*, *incontinence of urine*, &c. He also used it with advantage in several

[1] Ségalas, in Journal de Physiologie, par Magendie, Oct. 1822.

[2] Gazette Médicale de Paris, 18 Oct., 1835.

[3] See the details of two cases of poisoning by nux vomica, in Lond. Med. Rep. xix. 448 and 456; Christison on Poisons, and Brande, Dict. of Mat. Med. p. 375. Lond. 1839. See also, A. S. Taylor on Poisons, Amer. edit., by R. E. Griffith, p. 620. Philad. 1848.

[4] Formulaire pour la Préparation, &c., de plusieurs nouveaux Médicamens, &c.

cases of *partial atrophy of the upper and lower extremities.* As regards its administration in cases of *paralysis succeeding to apoplexy*, he remarks, that it should not be given until some time after the *coup de sang* in the brain, which occasioned the palsy; and that even then beneficial results can be expected only when no marked organic mischief exists: indeed, in the latter case, he considers the disease irremediable, and that bad effects might result from pushing the remedy. The efficacy of the alcoholic extract of nux vomica in various forms of *paralysis* has been confirmed by many observers. Even before Magendie had employed it, Fouquier[1] had given it in several cases, with the most satisfactory results. Since then, we have the testimony of Chauffart,[2] Gendron,[3] Perrussel, Récamier, Mauricet, Baxter,[4] Galli, Hauff, Wenneis, Burkard, Pétrequin,[5] Gellie,[6] Debreyne,[7] and numerous others in its favour. The author's own experience with it in cases of *hemiplegia* has not been limited; yet although he has succeeded in inducing tetanic movements in the limb, he has not been satisfied that much advantage was derived from it;[8] and in some cases, it appeared to induce serious encephalic excitement. After effusion has occurred into the encephalon, time is required for its absorption, and but little beneficial agency can be expected from any remedy. Nor are the results of the experiments and observations of Jahn by any means in accordance with those of the practitioners above mentioned. He tried it in numerous cases of paralysis, but affirms that he did not see any good effect from it; and, with the exception of two cases, did not notice the slightest action, although the extract was carefully prepared according to the formula given by Magendie. Yet, he remarks, he was by no means sparing in the dose. In the two cases in which a change seemed to be induced, there was an evident increase of the paralysis. This discrepancy, as well as other evidences of the same contrariety of experience, may doubtless have been partly owing to difference in the strength and quality of the preparation; and hence, according to some, the great value of strychnia—its active principle—which is not liable to so much uncertainty.[9] Dr. Christison,[10] however, affirms, that "there seems no particular reason why the powder and extract should have been displaced by the principle strychnia; for their effects are precisely the same; and the principle is not

[1] Bulletin de la Faculté de Médecine, &c., vol. v. 1818.
[2] Journ. Génér. de Méd. Oct. 1824. [3] Ibid. Nov. 1829.
[4] New York Medical Repos. vol. viii.
[5] Gazette Médicale de Paris, 27 Oct. and 3 Nov., 1838, and Bulletin Général de Thérapeutique, Mars, 1840. [6] La Lancette Française, 29 Août, 1837.
[7] Braithwaite's Retrospect, Amer. edit. x. 26. New York, 1845; cited from Med. Chir. Review, Oct. 1844, p. 384-396.
[8] See the author's Practice of Medicine, 3d edit., ii, 167. Philad. 1848. Also, Chauffart, in op. cit.
[9] Richter's Specielle Therapie, u. s. w. B. x. S. 352. Berlin, 1828.
[10] Dispensatory, p. 658. Edinb. 1842.

only troublesome to prepare, but likewise, being seldom pure, is liable to the objection of irregular strength, which is brought against the Galenical preparations of the drug.

In cases of *partial paralysis*, as in *colica pictonum, amaurosis,*[1] *palsy of the rectum*, &c., both the alcoholic extract of nux vomica and its active principle have been used with good effect. (See STRYCHNIA.) M. Barez[2] affirms, that he has succeeded in readily removing *prolapsus ani* in the young, after diarrhœa, &c., by means of an aqueous solution of nux vomica. Four scruples of salep are boiled for twenty minutes in three ounces and a half of water, and after straining, three-fourths of a grain of the aqueous extract of nux vomica are added. A spoonful of this mixture is given at intervals, so that the whole is taken in twenty-four hours. It need hardly be said that in the case of young children, this potent article should be used with great caution.

It has been given with good results by M. Duclos,[3] in *impotence* and *spermatorrhœa*. He divides seventy-five grains of the alcoholic extract into one hundred pills. During five days, he gives one every night; then, for five days more, one, morning and night; for five days more, two, night and morning; and for five days more, two at morning, and three at night, until four are taken night and morning. The liniment, for which a formula is given hereafter, rubbed on the loins, and on the inside of the thighs, is a useful auxiliary.

Dr. Cerchiari[4] treated two cases of *incontinence of urine* successfully with the extract. The first was that of a girl nineteen years of age—who, from her infancy, had passed her urine involuntarily every night in her sleep. She was ordered the third of a grain of the extract in pill, three times a day; and in eight days the cure was complete. The second case was that of a young married female, whose urine flowed involuntarily, day and night, after her first delivery. As there was no fistulous opening to account for the involuntary discharge, and it appeared to arise from weakness of the neck of the bladder, in consequence of contusion by the head of the child, the extract was administered in the same doses as in the preceding case, and in fifteen days the cure was complete. Mondière, in cases of incontinence of urine, dependent upon atony, prescribed it advantageously in association with black oxide of iron;[5] and M. Pétrequin[6] found, that *local*

[1] Pétrequin and Miquel, in Bulletin Général de Thérapeutique, Juillet, 1838. Defreyne, op. cit.

[2] Journ. de Médecine, July, 1845, cited in Edinb. Med. and Surg. Journ. July, 1846, p. 256.

[3] Bulletin de Thérapeutique, xxxvi. 529–33; cited in Brit. and For. Med. Chir., Oct. 1849, p. 564, and in Bouchardat, Annuaire de Thérapeutique pour 1850, p. 24.

[4] Gazette Médicale, 14 Avril, 1838.

[5] Bouchardat, Annuaire de Thérapeutique pour 1841, p. 8. Paris, 1841.

[6] Bulletin Général de Thérapeutique, Mars, 1840.

anæsthesia or *loss of sensibility* in a part yielded, in numerous instances, to embrocations of the tincture referred to hereafter.

Cazenave gave the extract successfully in a case of *St. Vitus's dance*, which had resisted every other remedy; and Professor Trousseau relates several cases of cure, from the employment of the alcoholic extract in the dose of about three-quarters of a grain; or of strychnia, in the dose of one-sixth of a grain. Sir Charles Scudamore, M. Roclants,[1] and Mr. Pidduck,[2] found it useful in *neuralgia*, the former in *neuralgia faciei* especially. Vogt gave it—not without advantage—in *cardialgia;* Hildenbrand, in *epilepsy:* by the Russian and Polish physicians it was administered advantageously in *cholera diarrhœa*, and by many it has been strongly advised in *chronic diarrhœa* and *dysentery*,[3] as well as in *dyspepsia*, in the varieties termed *pyrosis* and *gastrodynia*, especially when they appeared to proceed from *morbid irritability of the nerves of the stomach*,[4] as in the *vomiting of the pregnant female*.[5] The addition of a small portion of the extract has been suggested by M. Boult as a remarkably powerful adjuvant to cathartics. He generally prescribes it in pill, according to the formula given hereafter; and Dr. Ranking[6] affirms, that he has been in the habit of combining strychnia with an aperient extract, with considerable advantage, in *habitual constipation*. Two cases of obstinate *constipation* are recorded by M. Ossieurs,[7] which, after having resisted other means, yielded at once to nux vomica. Recently, Mr. C. F. Gream[8] employed it, at the suggestion of Mr. Hammerston, of St. George's Hospital, London, in the cure of *hay fever—summer bronchitis*, with the best effects. He gave the tinctura nucis vomicæ of the Dublin Pharmacopœia in doses of ten drops, gradually increased to twenty, three times a day; at the same time applying to the lining membrane of the nostrils, as high up as possible, an ointment composed of a dram and a half of *Goulard's extract*, two ounces of *spermaceti cerate*, and a few drops of *oil of bergamot*. (See the article STRYCHNIA.)

[1] Med.-Chir. Review, from Edinb. Med. and Surg. Journal, Oct. 1843.
[2] London Med. Gazette, Aug. 7, 1840.
[3] Most's Encyclopädie, 2te Auflage, art. Dysenteria, i. 573. Leipz. 1836. Geddings, N. American Archives, No. 2, Nov. 1834. Roots, in St. Thomas's Hospital Reports, No. iii. for April, 1836; Hufeland, in Bally, Bulletin Général de Thérapeutique. Fév. 1838; and Nevins, Lond. Med. Gaz., Dec. 15, 1848.
[4] Mellor, in Med. Gaz., March 4, 1837, p. 850. H. S. Melcombe, ibid. March 25, 1837, p. 964; cited in Amer. Med. Intel. July 1, 1837, p. 124; and M. Huss, in Zeitschrift für die gesammte Medicin. May, 1837, p. 393, cited in Amer. Med. Intelligencer, Aug. 1, p. 162.
[5] Kroyher, cited in Annuaire de Thérapeutique, pour 1842, par Bouchardat, p. 39. Paris, 1842.
[6] Half-Yearly Abstract, &c., from July to December, 1848, p. 215.
[7] Med. Times, May 26, 1849.
[8] Lancet, June 8, 1850.

MODE OF ADMINISTRATION.

The best form for exhibiting the alcoholic extract of nux vomica, according to Magendie, is in pill, when we are desirous of inducing the tetanic convulsions. Each pill may contain a grain. One or two pills may be given at first, and the dose be daily augmented until the required effect is induced. It may then be discontinued, to avoid accidents. It is better, he thinks, to give the pills in the evening, as night is the most favourable time for observing the phenomena we are desirous of inducing. It is sometimes necessary to increase the dose to twenty or thirty grains, before the tetanic effects supervene, but commonly from four to six grains are sufficient. Esquirol saw two cases, in one of which death took place after eighteen grains; in the other, after five: the stomach and bowels were found inflamed. Dr. Elliotson began with half a grain of a well prepared extract, and increased the dose every day, or every other day, by a quarter of a grain; but none of the patients bore a greater quantity than seven grains, and few more than four. If, from any cause, the administration of the remedy has been interrupted for some days, it is necessary to recommence with the small doses, and to increase them gradually as before. When it is desirable to produce only the slow effects of the remedy, a grain or half a grain daily is sufficient. M. Pétrequin[1] begins with one-eighth of a grain for a dose, and gradually increases it to two, three, and even five grains in the course of the day.

Magendie directs a tincture to be made from the extract—the *Tinctura Nucis Vomicæ, T. Strychnos, T. Nucum Vomicarum*, which has been introduced into some of the pharmacopœias. It is made by taking three grains of *dried alcoholic extract of nux vomica*, and dissolving it in an ounce of *alcohol* at 36° (.837.) It is given by drops, and in mixtures, in those cases in which the alcoholic extract itself is indicated. M. Pétrequin[2] also employs a tincture of nux vomica, which he prepares with four ounces of the *powder* and a quart of *brandy*. This is used altogether externally as an embrocation to, and around, *palsied parts*. The tinctura nucis vomicæ of the Dublin Pharmacopœia is made of two ounces of rasped *nux vomica* to eight ounces of *rectified spirit*, (alcohol.)

Tinctura nucis vomicæ composita.

Compound tincture of nux vomica.

℞. Extract. nuc. vomic. alcohol. gr. xxiv.
Camphoræ ʒj.
Tinct. pyrethri f ℥j. M.

Dose.—Twenty drops, four times a day, with arnica tea, in cases of *paralysis*. *Vogt.*

[1] Op. cit. [2] Op. citat.

℞. Tinct. nucis vomicæ,
—— cantharid.
Naph. phosphorat.[1] ℈ij. M.

Dose.—Thirty drops, three or four times a day, with arnica tea, in the *paralysis of torpid subjects.* *Vogt.*

Mistura nucis vomicæ.

Mixture of nux vomica.

℞. Extract. nuc. vomic. alcohol. gr. ij.—iv.—vj.
Mucilag. acac. f ℥ss.
Aquæ melissæ f ℥vj. M.

Dose.—Two spoonfuls, every two hours, in *epilepsy.*
Hildenbrand.

A similar form is recommended by Richter[2] in *dysentery.* Two table-spoonfuls every two hours.

℞. Tinct. nucis vomicæ gtt. ij.
Aquæ lauroceras. ℥j. M.

Dose.—Ten drops every morning and evening in the *vomiting of pregnancy.* *Kroyher.*

Pilulæ nucis vomicæ.

Pills of nux vomica.

℞. Ext. nuc. vomic. alcohol. ℈j.
Ext. glycyrrhiz. ℈vij.
Misce et fiant pilulæ lxxx.

Dose.—Two to six, two or three times a day, in *paralysis.*

Pilulæ nucis vomicæ ferruginosæ.

Ferruginous pills of nux vomica.

℞. Extract. nucis vomic. alcohol. gr. vj.
Ferri oxid. nigr. ℥j. M.
et divide in pil. xxiv.

Dose.—Three, daily, in *incontinence of urine dependent upon atony.* *Mondière.*

Pilulæ nucis vomicæ et quiniæ.

Pills of nux vomica and quinia.

℞. Ext. nucis vomicæ gr. xij.
Quiniæ sulphat.
Ext. hyoscyam. āā. gr. xxiv. M.
et fiant pil. xxiv.

Two to be taken an hour before meals, in *gleet.*
Ch. Johnson.

[1] *Naphtha phosphorata, Æther sulphuricus phosphoratus,* is made by dissolving twenty-eight grains of *phosphorus* in four ounces of *rectified ether.*

[2] Die Specielle Therapie, ii. 133. Berl. 1821. See, also, Joy, in Tweedie's Library of Medicine, v. 296. Lond. 1840; or 2d Amer. edit. Philad. 1842.

Pilulæ nucis vomicæ et aloes.

Pills of nux vomica and aloes.

℞. Nucis vomicæ gr. ss.
Aloes
Ext. rhei āā. gr. ¾. M.
et f. pilula.

Dose.—One at bed time, as a cathartic. To increase its cholagogue power, a grain of calomel may be added. *Boult.*

Pulveres nucis vomicæ.

Powders of nux vomica.

℞. Ext. nucis vomicæ alcohol.
Bismuth. sub-nitrat. āā. gr. ss.
Magnes. carbonat. gr. iij.
Sacch. gr. xv.
Ol. menth. pip. gtt. ij.
Misce, et fiat pulvis.

Dose.—One every three hours, in *cramp of the stomach.* *Vogt.*

℞. Nucis vomic. pulv. gr. iij.
Acaciæ,
Sacchar. āā. gr. xij. M. et fiat pulvis.

Dose.—One of these powders to be repeated according to circumstances during the twenty-four hours, in *diarrhœa* and *dysentery.* *Hufeland.*

Linimentum nucis vomicæ compositum.

Compound liniment of nux vomica.

℞. Tinct. nucis vomicæ
—— arnicæ seu
—— melissæ āā. partes lx.
—— lyttæ part. xv. M.

To be rubbed on the loins and inside of the thighs in *impotence* and *spermatorrhœa.* *Duclos.*

Embrocatio nucis vomicæ.

Embrocation of nux vomica.

℞. Tinct. nucis vomicæ f ℥j.
Liquor. ammon. f ℥ij. M.

To be rubbed on the *paralyzed limbs*, and on the surface, in *cholera.* See Strychnia, and its preparations.

CXXIX. OLEUM JECORIS ASELLI.

Synonymes. Oleum Morrhuæ seu Jecinoris Aselli, Codliver Oil, Cod Oil.
French. Huile de Morue, Huile de Foie de Morue.
German. Stockfischleberthran, Bergerthran, Gichtthran, Leberthran, Kabliauthran.

The animal fat, which appears under this name in commerce, is obtained from several of the fishes belonging to the genus *Gadus*,

order *Malacopterygii thoracici*, but especially from the codfish, (*Gadus morrhua;*) the Trosk, (*Gadus callarias;*) the Coalfish, (*Gadus Carbonarius,*) and the Burbot, (*Gadus lota.*) At Antwerp, it is said by M. Gouzee[1] to be prepared from the liver of a species of Ray—the *Raja Pastinaca*—and of the Skate. Skate-liver oil is by some preferred to cod-liver oil as a therapeutic agent. The disagreeable odour and taste of cod-liver oil led to the substitution of the oil obtained from the liver of the skate—*Raia clavata* and *R. Batis;* German, Rochenleberthran. In Holland and Belgium this oil is preferred to that of the cod, both as being less disagreeable to the taste, and also more efficacious in its therapeutic effects.[2]

Several varieties of the oil are met with in commerce, which, differ from each other by their brighter or darker hue, and by their greater or less transparency. The clearest sort is admitted, into the shops of continental Europe especially, under the name *Oleum jecoris aselli album* seu *depuratum:* as a remedial agent it is more used than the darker variety, although several physicians affirm, that they have found the latter more efficacious.[3]

METHOD OF PREPARING.

According to Riecke,[4] the oil is obtained by exposing to the sun the livers of the fishes above mentioned, cut in slices, and collecting the fixed oil that runs out. That which is first obtained resembles fine olive or poppy oil, and is called "yellow cod-liver oil"—*Oleum jecoris aselli flavum*, (German, Hellblanker Leberthran.) If the livers are running gradually to putrefaction, the oil becomes of a chestnut-brown colour—*Oleum jecoris aselli subfuscoflavum*—(German, Braunkblanker Thran:) and, again, after the oil has been obtained by the above methods, some can still be procured by boiling the livers, which constitutes the *Oleum jecoris aselli fuscum;*[5] but between the finest pale-yellow or almost colourless oil, and the dark-brown cod-oil used by curriers, there is an almost infinite variety of shades, so that no absolute difference can be founded on colour only.[6] At Newhaven, near Edinburgh, the fishermen simply boil the livers in an

[1] Bullet. Méd. Belge, Janvier, 1838.

[2] Edinb. Med. and Surg. Journal, Oct. 1842, p. 504, and Gobley, Archiv. Général. de Méd., Mai, 1842, p. 111.

[3] See Taufflied, in Gazette Médicale de Paris, 12 Août, 1837.

[4] Die neuern Arzneimittel, u. s. w. S. 351, and 2te Auflage, S. 538. Stuttgart, 1840.

[5] For the Analysis of the yellow and brown varieties, by Marder, see Riecke, op. cit. 2te Auflage, S. 541. Stuttgart, 1840; or Pereira, op. cit. p. 1865; and of the three varieties, see De Jongh, The Three Kinds of Cod-liver Oil, by E. Carey, Amer. edition, p. 79. Philad. 1849.

[6] Pereira, Pharmaceutical Journal, Feb. 1849. See, also, a full account of the different kinds of fish oils in Dierbach, Die neuesten Entdeckungen in der Materia Medica, 3er Band. 2te Abth. S. 1292. Heidelb. und Leipz. 1847.

iron pot, and then filter the oil through a towel containing a little sand.[1]

Mr. Donovan[2] recommends the following process. Take any quantity of *livers of cod;* throw them into a very clean iron pot; and place it on a slow fire; stir them continually until they break down into a kind of pulp: water and oil will have separated. When a thermometer plunged in the pulp shall have risen to 192°, the pot should be taken from the fire, its contents transferred to a canvass bag, and a vessel placed underneath. Oil and some water will run through: after twenty-four hours, separate the former by decantation, and filter through paper.

The properties of cod-liver oil are said to be different in the different varieties met with in commerce. The colour varies from a bright yellow to a reddish-brown; and the oil is sometimes clear, but, at others, more or less turbid. The bright has the consistence of poppy oil; the brown is thicker. The smell is weaker in the former; in the latter, it resembles that of old salt herrings. The taste of the brown is an empyreumatic bitter; and resembles train oil; is somewhat acrid, and remains for a time on the tongue; that of the clearer oil is much less disagreeable. Litmus paper is feebly reddened by the clear, considerably so by the brown variety. Both sorts are soluble in alcohol and ether. A good deal of the difference in the appearance, and other sensible properties of the different varieties would appear, from the observations of Mr. Donovan,[3] to be owing to the comparative freshness, or the contrary, of the oil, or of the livers from which it has been prepared.

To test its purity, Mr. Hockin[4] mixes, on a porcelain slab, four parts of the oil and one of strong sulphuric acid. If it be genuine, a rich violet hue is produced, which in a few minutes passes gradually to a dirty brown. This characteristic, he says, is not possessed by any other oil, either animal or vegetable. From the researches, however, of Dr. Pereira,[5] it would appear, that although sulphuric acid is a test for liver oils, probably owing to the presence in them of one of the constituents of bile, it does not distinguish one liver oil from another, neither does it distinguish good cod-liver oil from bad; for it produces its characteristic reaction both with common brown cod-oil and with the finest and palest qualities; but it serves to distinguish oil procured from the liver from oil obtained from other parts of the animal. In commerce it is said to be extensively adulterated with other fish oils;

[1] J. H. Bennet, cited by Pereira, Elements of Mat. Med. and Therap. ii. 1866; or 2d Amer. edit. by Carson. Philad. 1846.

[2] Dublin Journal of Medical Science, July, 1840, p. 363. See, also, for a full account of the article, Mr. Donovan, ibid. Sept. 1845.

[3] Op. cit. Sept. 1845.

[4] Pharmaceutical Journal, Sept. 16, 1848; cited in Ranking's Half-Yearly Abstract, July to December, 1848, Amer. edit. p. 213.

[5] Pharmaceutical Journal, 1848.

scarcely a tenth—it is believed—of what is sold under that name is genuine, being either refined whale or sea elephant oil.[1]

According to Messrs. Gouzee and Gmelin, the brightest oil ought to be employed internally; but MM. Trousseau and Pidoux[2] think that the limpid oil has no medical virtue. They prefer either the second, or that which is obtained by ebullition, and has a disagreeable acrid taste. Such, too, appears to be the opinion of Richter,[3] Delcour[4] and others. On the other hand, Dr. J. C. B. Williams[5] prefers the pale oil, as free from taste and smell as it can be procured. To obtain this he advises, that the livers of the fish should be obtained as fresh as possible, the pale plump livers being preferred. These should be beaten into a pulp, mixed with water at 120°, and filtered. After standing, the oil must be decanted, cooled to 50°, and again filtered. The process is to be performed quickly and in close vessels.

The oil, prepared by Mr. Donovan's process, is of a pale-yellow colour; its smell is weak, and resembles that of a cod boiled for the table when in excellent condition. Its taste is bland, by no means disagreeable, and totally devoid of rancidity. It is very liquid. Its specific gravity, in Mr. Donovan's trials, was 0.934, although in all the published tables of specific gravities it is stated to be 0.923.[6] In cold weather, it deposits much stearine, which ought not to be separated. Mr. Donovan has obtained as much as a gallon of pure oil from twenty-eight pounds of liver, the produce of fifty cods; and he concludes, that in preparing the oil for medical purposes, three great points are to be attended to,—1. The livers must be perfectly healthy; 2. they must be as fresh as possible, the least putrescency being injurious; and, 3. The heat at which the separation of the oil is effected must not exceed 192°. This pale oil is the only kind that Mr. Donovan[7] has supplied so abundantly to the profession for the last three years; and its efficacy, he says, has been in many cases most surprising.

Much of the oil used in this country is prepared in Boston.[8]

EFFECTS ON THE ECONOMY.

Cod-liver oil has long been used as a popular remedy in northern Germany, especially in Westphalia—as well as in Holland and England; it fell, however, into disuse in the British isles, but in Germany it has maintained its character to the present day. In England, it appears to have been first recommended by Perci-

[1] Report of the Committee on adulterated drugs, Dr. Huston chairman, in Transactions of the Amer. Med. Association, vol. iii. Philad. 1850.
[2] Traité de Thérapeutique, &c., 2d partie, p. 111.
[3] Medicinisch. Zeitung, No. 26, July, 1835.
[4] Bulletin Médical Belge, Juin, 1841, p. 249.
[5] London Journal of Medicine, Jan. 1849.
[6] Donovan, op. cit.
[7] Op. cit.
[8] Dispensatory of the United States, 8th edition, p. 1209. Philad. 1849.

val,[1] and in Germany by Schenck.[2] In Percival's time, it was so largely employed in Manchester, in the hospital of that town, that nearly a hogshead of it was consumed annually. When administered internally, it excites a disagreeable taste in the mouth, and nausea. Yet patients soon become accustomed to it; and children frequently take it without repugnance. When the nausea is once overcome, the oil does not oppress the stomach, except when the organ is *embarrassed*, or the digestive powers are greatly enfeebled. Nor does it seem to destroy the appetite by continued use. Yet many persons, especially adults—less so children—reject it immediately. It is necessary for the digestive powers to be energetic when it has to be given for any length of time. To those whose digestive organs are very irritable, Kopp recommends that Bourdeaux wine should be taken after it.

Cod-liver oil has no manifest effect on any of the secretions, except occasionally on the urinary and cutaneous depurations; and on the healthy organism it appears to excite no marked change. In *strumous affections*, however, its favourable influence is said to be striking, as well as in *rhachitic*, *rheumatic*, and *gouty disorders*. In such cases, it is said, by the German writers, to excite powerfully the reproductive or nutritive functions, when administered for a proper length of time.[3] The favourable effects are, in general, not rapidly exhibited; and to produce a cure, according to Kopp, the remedy must be persisted in for at least four weeks, and commonly for some months. Kopp suggested, that owing to the similarity of the effects of this oil to those of iodine, its efficacy might be owing to its containing the latter; and some chemical investigations made by him in the year 1836 confirmed the suggestion.[4] The quantity is extremely small, but—Kopp supposes—like iron in chalybeate waters, as the iodine is commingled naturally with the oil, it may exert a much greater effect than if it were added artificially in the like quantity. This is the opinion also of Dr. J. H. Bennet,[5] but Delcour[6] and Panck[7] think it very problematical. Experiments by L. Gmelin[8] seemed to show, that the genuine oil contains iodine, whilst the spurious does not. Iodine has likewise been detected in it by Hausmann, Bley, Brandes,

[1] Essays, Medical, Philosophical and Experimental. Warrington. 1790. Vol. ii.
[2] Hufeland's Journal, 1822 and 1826.
[3] Riecke, Die neuern Arzneimittel, S. 352, und 2te Auflage, S. 542. Stuttgart, 1840; also Klencke, cited in Brit. and For. Med. Review, Oct. 1842, p. 443.
[4] Hufeland und Osann's Journal, 1836; Annalen der Pharmacie, xxi. und xxii.; and Bulletin Général de Thérapeutique, No. xx. 30 Oct., 1837.
[5] Treatise on the Oleum Jecoris Aselli or Cod Liver Oil, &c. &c. Lond. 1841.
[6] Bulletin Médical Belge, Juin, 1841, p. 254.
[7] Zeitschrift für die gesammte Medicin, July, 1842, p. 282.
[8] Bulletin Général de Thérapeutique, Mai, 1840.

Springmühl,[1] and W. Stein.[2] Herberger[3] found both iodine and bromine in it, and analyses made by De Jongh[4] showed, that the light-brown oil contained the largest quantity of iodine.

Owing to skate-liver oil appearing to be more efficacious therapeutically than cod-liver oil, MM. Girardin and Prisser were induced to analyze it carefully, when they found it to contain a per centage more of iodide of potassium. They, consequently, recommend it as a valuable substitute for the more nauseous article in use.[5] On the other hand, Mr. Donovan[6] is of opinion, that every known fact impugns the notion that the curative principle is iodine. In the first place, he says, many patients who have been cured by the oil were not in the least benefited by a previous course of iodine,—as shown by Dr. Taufflied. *Secondly.* Chemical analysis has discovered only minute traces of iodine in some specimens, whilst others were entirely destitute of it. One analysis, indeed, referred to by Dr. Bennett, gave 0.324 per cent., and another, 0.162: others gave still less. *Thirdly.* "The tendency of iodine is to render the person thin who uses it, while the effect of cod oil is to fatten." *Lastly.* None of the oil prepared by them, when agitated with alcohol, communicated any impression of iodine, although the oil was eminently successful as a medicine, and its colour contra-indicated the presence of free iodine.

Again, it has been affirmed, that equally beneficial effects have followed the use of oil that contained no iodine. The author has for many years stated to his clinical classes, that such had been the result of his observation, and that vegetable oils had appeared to him to exert a similar action; and recently cases have been published confirming this view of the subject.[7] Testimony has also been afforded in favour of the good effects of other animal oils.[8] M. Bretonneau[9] regards common train oil to be equally efficacious. In a recent report (1849,) of the Hospital for Consumption and Diseases of the Chest, which is highly favourable to the use of cod-liver oil, it is stated, that other animal oils, not derived from the liver, and vegetable oils, were tried; but the experiments thus far made there had not shown them to possess the same powers: they had not, however, been sufficiently often repeated to warrant decided conclusions.

Dr. J. C. B. Williams[10] does not esteem it necessary to discuss the question whether the oil owes its efficacy to the iodine con-

[1] Riecke, op. cit. 2te Auflage, S. 541. Stuttgart, 1840.
[2] Journal für Praktische Chemie, B. xxi., or Journal de Pharmacie, Fév. 1841, p. 94.
[3] Pereira, op. cit. p. 1866.
[4] The three kinds of Cod-liver Oil, &c. by E. Carey, Amer. edit. p. 79. Philad. 1849.
[5] Edinb. Med. and Surg. Journ. Oct. 1842, p. 504. [6] Op. cit. Sept. 1845.
[7] Dr. P. M. Duncan and Mr. Nunn, London Medical Gazette, Feb. 1850.
[8] See Drs. Bagot and Stapleton, in Dublin Medical Press, March 6, 1850.
[9] Bulletin de Thérapeutique, cited in Medical Examiner, Sept. 1847, p. 579.
[10] London Journal of Medicine, Jan. 1849.

tained in it. "To suppose," he says, "that the minute proportion of this ingredient could be the curative agent would savour of the absurdities of homœopathy; and besides most of the patients had taken iodine in one form or other previously to taking the oil."[1]

The author has elsewhere remarked,[2] that the effect which cod-liver oil induces upon the system of nutrition, when cachexia exists, is similar to that of eutrophics in general. It doubtless furnishes a modified chyle, and of consequence a modified blood. This induces a new action in the tissues which it laves,—acting in these respects, like sugar, both dietetically and therapeutically; and probably its main action, as maintained by Dr. Bennett and by M. Bouchardat,[3] is that of a fatty aliment. Dr. Williams thinks "there is much reason to believe that it proves serviceable by supplying the fat molecules, which appear to be essential to healthy nutrition in forming the nuclei of the primary cells: thus supplying a fat, which is capable of being readily absorbed and converted into a better plasma, as well as more readily conveyed by the blood to the vicinity of the tubercular deposits, the absorption of which it favours by dissolving the irregularly concreted fat of which the masses are partly composed."

The following results of the use of cod-liver oil in the medical ward of the Pennsylvania Hospital, during six months, reported by Dr. Levick, one of the resident physicians, have been published by Dr. Gerhard.[4] *First.* The light coloured oil can be taken without difficulty by patients who have steadily rejected the brown oil. *Secondly.* A few of the patients took it without any thing to disguise its taste. Its nauseating properties are corrected by its administration with milk; but its taste is most effectually disguised by the froth of porter. *Thirdly.* As a general rule it was taken before meals; but in four cases where it was not tolerated before meals, it was readily taken after them. *Fourthly.* Patients have increased in flesh, weight and strength under its use: the cough and expectoration have diminished, and with some hectic and rigours have wholly disappeared. Six were so much benefited as to leave the hospital, and resume their former occupations. A patient, who entered the hospital with cough, copious purulent expectoration, extreme emaciation, inability to leave his bed, and with the physical signs of a cavity under the left clavicle, after six months' use of the oil left the hospital weighing 140 pounds, with little or no cough, no hectic nor rigors, and with an almost entire absence of expectoration; and the physical signs had greatly diminished.

[1] See Pereira, Pharmaceutical Journal, 1848.

[2] General Therapeutics and Materia Medica, 4th edit. ii. 316. Philad. 1850.

[3] Annuaire de Thérapeutique pour 1849, p. 253.

[4] The Diagnosis, Pathology, and Treatment of Diseases of the Chest, 3d edit. p. 241. Philad. 1850. See, also, Notes of Cases of Phthisis Pulmonalis, treated in the Pennsylvania Hospital, with Remarks on Cod-liver Oil and its uses in Tubercular Disease, by Dr. Levick, in American Journal of the Medical Sciences, Jan. 1851, p. 21.

Fifthly. The improvement of the physical signs was not coincident with that of the general symptoms. *Sixthly.* That in those cases which terminated fatally, the appetite, nutrition and strength appeared for a time to be decidedly increased: life appeared to be temporarily protracted; but for a few weeks immediately preceding dissolution the remedy seemed to have entirely lost its value; and *lastly,* To be of decided permanent benefit, its use must be steadily persevered in, even after the most striking symptoms of the disease have in a great measure disappeared.

As respects the administration of cod-liver oil in disease, it has been employed—especially in Germany—as a remedy in

Rheumatism, in which its reputation has been favourable. In the year 1782, it was highly recommended in *chronic rheumatism* by Dr. J. Percival,[1] and in 1807 by Dr. Bardsley,[2] who states, that it was in high repute in Lancashire. In the year 1835, Brefeld wrote a monograph on it, in which, resting upon numerous indigenous and foreign experiments, he maintained it to be a remedy of great and specific efficacy in every form of chronic rheumatism; and since then his testimony has been corroborated by that of Spiritus,[3] Möning,[4] Schütte,[5] Wesener,[6] Osberghaus,[7] Günther,[8] Volkmann,[9] Kopp, Rust,[10] Moll,[11] Panck, W. O. Chalk,[12] and Bradshaw.[13] By many, its use has likewise been advised in *gouty affections;* but Brefeld esteems it ineffectual in *actual gout;* and Taufflied[14] affirms, that it is of no avail in *gouty arthritis.*

Scrofula and Rickets.—In these diseases it would seem to be more efficacious than in rheumatism. Brefeld, indeed, asserts that he has found no remedy equal to it, in cases where the osseous tissue is permanently affected,—as in the different forms of *rickets, arthrocace, spina ventosa,* and *caries scrophulosa:*[15] and Kreebel[16] is of opinion that its efficacy is most marked in *scrofulous affections of the bones* and in *atrophia infantum.* Next to these, it has been extolled in *affections of the chyliferous vessels* and *internal glands,* especially when they present themselves under the chronic form of *atrophy.* In *affections of the external glands,* its efficacy was less striking and rapid; Taufflied, indeed, states, that it is of no avail in the swellings of any lymphatic glands excepting those of the abdominal cavity. Its action is

[1] Lond. Med. Journ. iii. 393.
[2] Reports from Hospital Practice, p. 18. Lond. 1807.
[3] Rust's Magazin, Band. xvi. 566.
[4] Ibid.
[5] Horn's Archiv. 1824 (July and August.)
[6] Hufeland's Journal, 1824, Heft 1. (May.)
[7] Ibid. 1825, Heft. iii. (September.)
[8] Ibid. 1824, Heft. ii. (August.)
[9] Ibid.
[10] Rust's Magazin, xx. 563.
[11] Richter's Specielle Therapie, x. 468. Berl. 1828.
[12] Lond. Med. Gaz. Dec. 29, 1843, p. 414.
[13] Provincial Medical and Surgical Journal, Dec. 31, 1845, p. 753.
[14] Gaz. Méd. Nov. 9, 1839.
[15] Sourzac, Journ. de Méd. et Chir. Prat. Mars, 1842, p. 110.
[16] Schmidt's Jahrbücher, u. s. w. No. 9, S. 287. Jahrgang 1849.

almost null in *scrofulous affections of the skin, ophthalmia, discharges from the ear*, &c., unless when applied externally, in which cases, as well as in *external glandular swellings of a scrofulous character*, it was especially useful. The slighter forms of *scrofulous eruptions* disappeared, without any unpleasant sequelæ, by simply smearing them with the oil; the more obstinate forms, by the simultaneous use of appropriate internal agents, of which Brefeld prefers æthiops antimonialis to all others. *Scrofulous inflammation of the eyes* disappeared frequently and rapidly by simply smearing the eyelids with the oil.[1] Where, in the case of scrofulous ophthalmia, there is *inflammation of the eyelid with photophobia*, Brefeld recommends, that the free edges of the eyelid should be anointed with pure cod-liver oil. Cunier advises it in association with the extract of belladonna, one part of the latter to two of the former. Introduced between the eyelids by means of a camel's hair pencil, it acts, he says, beneficially on *scrofulous ulcers of the cornea*, and hastens in a remarkable manner the absorption of the opacities of that membrane. In the *interciliary ulcerations*, it is likewise very useful. In such cases, as well as in *opacities of the cornea;* following *vascular pannus* in *cellular pannus*, *atonic ulcerations*, &c., Cunier found an ointment, the formula for which is given hereafter, very useful.[2] Mr. Wilde, of Dublin,[3] states, that in cases of *pannus* and long continued *chronic ophthalmia* attended with *granular lids*, &c., where the constitutional powers had fallen below par, as shown by diminution in volume, and increased quickness of pulse, pallor of countenance, coldness of the extremities, a clammy condition of skin during the day, and heat, and restlessness at night; together with loss of appetite, and "a large flabby, putty coloured tongue, which is usually attendant on such broken down strumous patients," he had found it a most useful remedy,—in fact, in all cases in which tonics and nutrients were indicated.

Kopp extols it in *scrofula* and *rickets*, both when internally and externally exhibited. Numerous trials with it by other physicians—as by Schenck, Schütte, Von dem Busch, Gumpert, Fehr, Rösch, Schmidt, Knod von Helmenstreit, Heineken, Münzenthaler, Beckhaus, Spitta, Günther, Roy, Gouzée,[4] Taufflied,[5] Jüngken,[6] W. O. Chalk,[7] Daumerie,[8] and others, confirm its great efficacy in

[1] Piffard, Bullet. Général de Thérap. Mai, 1840.

[2] Journal für Kinderhrankheiten, cited from Annales d'Oculistique, Mai, 1845, and in Braithwaite's Retrospect, xii. 234, Amer. edit. New York, 1846.

[3] Donovan, Dublin Journal, &c., Sept. 1845.

[4] Bulletin Médical Belge, Janvier, 1838, p. 6.

[5] Gazette Médicale de Paris, 12 Août, 1837; and 9 Nov., 1839.

[6] Lond. Med. Gaz. April 20, 1839, p. 126.

[7] Op. cit.

[8] Journ. de Brux., Févr. et Mars, 1847, cited in Schmidt's Jahrbücher, u. s. w. No. 5, S. 161. Jahrgang 1849.

scrofulous and rachitic affections.[1] Schenck,[2] indeed, esteems it as certain a remedy in scrofula and rickets as cinchona is in intermittent fever! In the Pennsylvania Hospital, in scrofulosis, when there was no reason to suspect the existence of pulmonary tubercles, the improvement in the patient's health was very decided.[3]

The efficacy of the oil in scrofula suggested its administration in cases of—

Tubercles;—and, accordingly, it was prescribed by Hankel, whose experiments led him to advise a further trial of it. Riecke[4] refers to a case of the kind, confirming Hankel's observations, which occurred to Dr. Pagenstecher, of Elberfeld; and Richter, of Weisbaden, Professor Alexander of Utrecht, and Häser, of Jena,[5] seem to have experienced equally satisfactory results. M. Tauffled,[6] however, considers its action to be doubtful or null in *scrofulous phthisis* when at all advanced. Both Kopp and Brefeld recommend it highly in *phthisis pulmonalis* of strumous origin, occurring especially in youth, and Rayé[7] speaks in the highest terms of its efficacy in *chronic inflammation of the lungs and stomach.*

Of late years, great attention has been given to it as a remedy in *tuberculous cachexia;* and the testimony in favour of it has been overwhelming. At the present day, there is no single article of the Materia Medica so fashionable; and hence it has been employed too indiscriminately. Of those who have recently given the strongest evidence in favour of its great efficacy in phthisis, may be mentioned, Drs. Madden,[8] Blakiston,[9] Ranking,[10] and Trumbull.[11]

Dr. J. C. B. Williams[12] prescribed it in above 400 cases of *tuberculosis of the lung* in its different stages, and of these he kept notes of 234. Of this number the oil disagreed and was discontinued in only 9. In 19 it appeared to do no good, whilst in the large proportion of 206 out of 234, its use was followed by marked and unequivocal improvement,—such improvement varying from a temporary retardation of the progress of the disease, up to a more or less complete restoration to apparent health. He found the most striking advantage from the oil in the third stage of phthisis, even when far advanced, where not only the lung was excavated,

[1] Riecke, op. cit. S. 356, und 2te Auflage, S. 542. Stuttgart, 1840. See, also, Tauffled, in Gaz. Médicale de Paris, Nov. 1839.
[2] Hufeland's Journal der Praktisch. Heilkunde, Mars, 1833.
[3] Levick, in Gerhard, op. cit. p. 242. [4] Op. cit. S. 356.
[5] Hufeland's Journal, B. lxxxvi. 1838. [6] Gazette Médicale, 9 Nov. 1839.
[7] Annales de la Société des Sciences, Nat. de Bruges in Encyclographie des Sciences Médicales, Mars, 1840, p. 100; and Sept. 1840, p. 10.
[8] Lond. Med. Gazette, Sep. 17, 1847.
[9] Practical Observations on certain Diseases of the Chest, Lond. 1848. Amer. edit. Philad. 1848.
[10] Half-yearly Abstract, &c., from July to Dec. 1848. Amer. edit. p. 213.
[11] Lond. Journ. of Med. Feb. 1850, cited in Amer. Journ. of the Med. Sciences, July, 1850, p. 182. [12] London Journal of Medicine, Jan. 1849.

but the body was rapidly wasting, with copious purulent expectoration, night sweats, colliquative diarrhœa, &c. Of the power of the oil in this stage of the disease he quotes several decided cases. The total number amounted to 62, in 34 of which the improvement was known to have continued up to a recent period. Eleven, after temporary improvement, relapsed, and terminated fatally. From the report of the physicians of the Hospital for consumption and diseases of the chest, for 1849, it appears that 542 cases were treated with it. In about 63 per cent. the symptoms improved; in 18 per cent. the disease was arrested; and in 19 per cent. it went on unchecked.

Chronic cutaneous diseases.—In these affections, cod-liver oil has been given with advantage by Richter; and it is suggested, that the greater success obtained by him than by Brefeld may have been owing to his having administered the remedy in much larger doses. Richter's trials were numerous, and were made through a period of three years; they are, therefore, highly deserving of attention. He says;—that the impure, yellowish-brown, and odorous oil should be selected, as it is the most active;—that at least six, and never more than ten spoonfuls should be administered daily to adults;—that it must be continued for a long time, as the first traces of a favourable impression are generally somewhat late in presenting themselves,—commonly four weeks, and, in very obstinate cases, later;—so that usually from six to twelve weeks are required for a cure; and, lastly, that the diet must be regulated, and every thing difficult of digestion, flatulent, fatty, strongly salted, or acid, be carefully avoided. In this manner, he treats *tetter*, *inveterate itch*, and *tendency to the formation of boils*. Kopp's experiments agree with those of Richter, as to the internal use of the oil in *tetter;* he esteems it to act by "improving the humours." He found it, also, of use in cases of *dry tetter*, when rubbed on the part, and in *porrigo*. A severe case of *lupus* in a young female was successfully treated by M. Gibert[1] with the oil. The face was eaten away by *tuberculous ulceration*, the fleshy parts of the nose being completely destroyed. Independently of this, *scrofulous abscesses* existed in the neck, with *caries of the malar bone*, and *white swelling* of the wrist. Cod-liver oil was prescribed both internally and externally with success, after iodine had been used in the same manner without effect. The treatment was, however, continued for more than a year. But the strongest testimony in its favour in *lupus* is given by M. Emery.[2] In a severe case, which had resisted other remedies, he gave it in large doses—from a pint to a pint and a half in the day. In two months a cure was effected. He subsequently employed it in a

[1] Bulletin de l'Académie, Nov. 1844.

[2] Revue Méd. Chirurgical, Août, 1848; cited in Ranking's Half-yearly Abstract, July to Dec. 1848, p. 77.

great number of cases, commencing every one with one hundred *grammes*—nearly 25 drams—and quickly increasing it to fifteen or twenty ounces in the day. If vomiting supervened, its use was suspended for a few days, and then re-commenced as before Sixty-four cases were treated in this manner, the majority of which received essential benefit, and twenty-four were completely cured. M. Devergie,[1] however, is of opinion, that M. Emery has overestimated the beneficial effects of the oil in lupus, and properly regards it as a great error to depend upon any one agent for the cure of diseases, especially of the skin, which may be single or complicated, and yet bear the same name.

In some *troublesome affections of the skin*, especially of the hands, conjoining the characters of *impetigo, with erysipelatous redness and swelling*, and inducing the most severe suffering, Dr. Marshall Hall[2] speedily succeeded in restoring the textures to a healthy condition by the external use of cod-liver oil, after all other remedies had been tried fruitlessly. For *rhagades* and *chaps*, he says, it is a preventive, and a speedy cure; and it is productive of great benefit in *eczema*, and other diseases inducing *excoriation and fissures of the skin*.[3]

Carron du Villards[4] extols cod-liver oil in *opacities of the cornea*, whether resulting from slight ulcerations, or from interlamellar effusion. It is only applicable after the inflammation has disappeared. A drop or two of the oil is then placed on the cornea with a camel's hair pencil. Sometimes, even the white oil is too stimulating: it is then necessary to dilute it with oil of sweet almonds: in other cases, the white oil is not sufficiently stimulating, and the brown must be used.

In cases of *tumours of the mammæ* in young females Kopp found the oil useful, when administered for some time, conjoined with the application of leeches to the affected part.

In the Charité, at Berlin, the oil was given with advantage in *coxarthrocace*, in doses of four ounces every morning;—the mouth being rinsed afterwards with peppermint tea, followed by a cupful of this tea, or of coffee.

Kopp also affirms, that he cured a case of *chorea* by it, which had supervened an attack of gout.

Lastly.—Dr. Day[5] states, that he has used cod-liver oil extensively for several years, his attention having been first directed to it by Dr. Bennet, in 1840; and he can confidently bear out the statement of Mr. Donovan, that it "is a most useful addition to our Materia Medica; that it produces effects of which no other

[1] Bulletin de Thérapeutique, xxxv. 466, cited in British and Foreign Med. Chirurg. Rev. April, 1849, p. 538.
[2] Lond. Med. Gaz. Sept. 1832.
[3] W. O. Chalk. op. cit.
[4] Bullet. Génér. de Thérap. 30 Oct., 1835.
[5] Report on Materia Medica, &c., in Ranking's Abstract of the Med. Sciences, pt. 2, p. 340, Amer. edit. New York, 1846.

known remedy is capable; and that it is well worthy of the attention of the medical profession."

MODE OF ADMINISTRATION.

The dose of cod-liver oil for an adult is from half a spoonful to three spoonfuls, two or three times a day. To children, it is given in tea-spoonfuls. Dr. Williams begins, in adults, with a tea-spoonful, gradually increasing to a table-spoonful; and he advises it to be taken about an hour and a half after each meal. The author has always been in the habit of directing it to be given midway between breakfast and dinner, and between dinner and supper; the first dose being taken in the morning on rising; so that three doses are taken in the day. He begins with a dessert-spoonful. Its unpleasant taste can scarcely be corrected by admixture with other agents; for which reason, many prefer to give it in the pure state, taking afterwards some peppermint lozenges. It is also recommended to be given united with coffee, or with lemon juice, or in the form of emulsion, or in thin flaxseed tea flavoured with lemon peel; and M. Fredericq[1] states, that a simple and effectual means is to masticate a morsel of dried orange peel just before and just after swallowing the dose. Kopp prescribes it in the pure state, advising that the mouth should be rinsed with water, and that some dry bread should be eaten after it.

Dr. Ure[2] has suggested the adoption of cod-livers as a diet for patients who are advised to take the oil. In order to prevent the loss of oil during the process of cooking, he recommends the livers to be immersed entire in boiling water, to which a sufficient quantity of salt has been added to raise the boiling point to about 220° Fahr. The sudden application of this high temperature coagulates the albumen of the liver, and prevents the escape of the oil. When the liver is cut, the oil exudes, and mashed potatoes may be used as a vehicle. Dr. Ure states that, having been advised to take cod-liver oil, he found the nauseous flavour very objectionable, until he contrived this plan, which answered extremely well. It would appear, from the observations of Dr. Stapleton,[3] that amongst the Norwegian fishermen the liver of the cod has been found peculiarly efficacious in rheumatism.

Mistura olei jecoris aselli.

Mixture of cod-liver oil.

℞. Ol. jecor. aselli f ℥ss.
Liquor potassæ gtt. xl.
Aq. menth. pip. f ℥ss. M. et fiat haustus.

The draught to be washed down with a tea-spoonful of lemon juice to liberate the oil in the stomach. *Percival.*

[1] Revue Méd. Chirurg. v. 114: cited in Brit. and For. Medico-Chirurg. Rev., July, 1849, p. 299. [2] Pharmaceutical Journal, Nov. 1, 1842, p. 361.
[3] Dublin Medical Press, Mar. 6, 1850,

℞. Ol. jecor. asell. f ℥j.
Liq. potass. carb. f ʒij.
Ol. calami gtt. iij.
Syrup. cort. aurant. f ℥i. M.

Dose.—One or two tea-spoonfuls, morning and evening, in cases of *rickets*. *Fehr.*

℞. Ol. jecor. aselli,
Syrup. cort. aurant.
Aquæ anisi, āā. f ℥j.
Ol. calam. aromat. gtt. iij. M.

Dose.—A spoonful, morning, noon, and night, in *gouty swellings*, *rickets*, &c. *Rösch.*

Emulsio olei jecoris aselli.

Emulsion of cod-liver oil.

℞. Ol. jecor. asell. alb.
Vin. Hungaric. (vel Malag.) āā. f ℥iv.
Acac. ℥j.
Fiat emulsio, cui adde
Syrup. cort. aurant. f ℥j.
Elæosacchar. menth. pip. f ʒij.[1]

Dose.—Two table-spoonfuls, two or three times a day; shaking the mixture. *Brefeld.*

Sapo olei jecoris aselli.

Soap of cod-liver oil.

℞. Ol. jecoris aselli part. cxx.
Sod. caust. part. xvj.
Aquæ part. iv. M.

To be given in the form of pill; or made into a kind of opodeldoch with an equal quantity of alcohol. *Deschamps.*[2]

Syrupus olei jecoris aselli.

Syrup of cod-liver oil.

℞. Ol. jecor. asell. f ℥viij.
Acac. pulv. ℥v.
Aquæ f ℥xij.
Syrup. commun. f ℥iv.
Sacchar. ℥xxiv.

Make an emulsion of the first four ingredients; dissolve the sugar at a moderate heat; clarify, and add

Aq. flor. aurant. f ℥ij.

Duclou.[3]

Unguentum olei jecoris aselli.

Ointment of cod-liver oil.

℞. Olei jecoris aselli f ʒi.
Hydrarg. oxid. rubr. gr. iv.
Cerat ℈ij. M.

Cunier.

[1] The *elæosaccharum* or *oleosaccharum menthæ piperitæ* is officinal in the Pharmacopœias of Austria, Denmark, Hanover, Oldenburg, Prussia, &c. It is made by triturating eight drops of the essential oil of peppermint with an ounce of sugar.

[2] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 135. Erlangen, 1848.

[3] Journal de Pharmacie, Sept. 1837.

Linimentum olei jecoris aselli.

Liniment of cod-liver oil.

℞. Ol. jecor. aselli f ℥ss.
Plumbi acetat. ʒij.
Vitell. ovor. (seu adipis,) ʒiij. M.

For external use in cases of *ulcers, fistulæ*, &c. *Brefeld.*

CXXX. O'LEUM SINA'PIS.

Synonymes. Oleum Æthereum seu Volatile Seminum Sinapis, Oil of Mustard Seed.
French. Huile Volatile de Moutard.
German. Ætherisches Senföl.

This preparation has been recommended to the notice of practitioners in Germany, by Dr. Meyer, of Minden, especially; at whose suggestion numerous experiments were made with it at the Charité in Berlin, the favourable results of which have been published by Dr. Wolff.[1]

METHOD OF PREPARING.

M. Fauré, in France, and M. Hesse, in Germany, found that if bruised mustard seed be placed in a still with cold water, much more essential oil is obtained than if hot water or steam had been at once employed. M. Hesse, indeed, advises, that the seed should be macerated with cold water for several hours before the distillation is commenced. It would seem, too, that acids, alcohol, &c., exercise the same influence in preventing the separation of the oil.

EFFECTS ON THE ECONOMY IN HEALTH.

Volatile oil of mustard is of a yellowish-white colour. It exhales so strong a smell of mustard, that the attempt to test its odour instantaneously excites a violent pungent sensation in the nose, and tears in the eyes. Its acridity is so great, that its application to the sound skin immediately occasions a sense of burning, and intense redness and vesication in the parts with which it comes in contact.

EFFECTS ON THE ECONOMY IN DISEASE.

Mustard seed oil may be applied either externally or internally. For the first object, Dr. Meyer advises a solution in alcohol (twenty-four drops to the ounce,) or in oil of almonds (five or six drops to the dram.) In Berlin, the former of these is used. Even this solution exhales so strongly the characteristic odour of mustard, that simply smelling it induces a sense of pungency in the nose, as well as tears in the eyes. Owing to the great volatility of this oil, its property and efficacy is soon lost; and the strength of the spirituous solution becomes less and less when the fluid is

[1] Schmidt's Jahrbucher, 1837.

preserved for a long time in vessels that are not accurately closed or are frequently opened for the administration of the remedy, and afterwards not carefully attended to. It is therefore advisable in practice, that only small quantities should be prescribed at a time, and that these should be kept in well-closed vials, and in a cool place.

The modes of external administration may be one of two—according to the sensibility of the skin, and the effect it may be desirable to induce. It may consist either in rubbing the liquid on a part of the surface, or in applying strips of linen wetted with it. The first method is advisable where the skin is delicate—as in the case of women and children, and in those whose healthy sensibility has not been diminished—as by paralytic affections. The fluid, when rubbed on the surface, very quickly evaporates, and excites a vivid sensation of burning, with bright redness of the surface, which disappears in the course of a few hours at the farthest. The augmented sensibility, produced by friction with the solution of the oil, continues generally for a longer period; and, consequently, if a fresh application be needed at a short interval—say in from four to six hours—it must be made on the neighbouring parts, avoiding those first implicated. It is sufficient to use the remedy in this manner two or three times a day.

The application of the oil by means of strips of linen is adapted for skins, such as those of men, which are thicker, and less sensible, as well as for morbid cases in which the healthy sensibility has been depressed. The size and shape of the strips must be determined by circumstances. The linen, dipped in the oil, is placed upon the prescribed portion of the skin, and suffered to dry, which generally happens in about eight minutes. Burning pain immediately succeeds, and is often so insupportable, that the patients object to wait until the linen is dry, and it has, therefore, to be removed earlier. Besides the more violent pain produced by this mode of applying the oil, the redness of the skin is much greater, and in many cases vesication succeeds. If the application be made twice a day, morning and evening, this is sufficient for the treatment of chronic diseases; but friction cannot be made on the same part of the surface on the same day, on account of the severe pain and vesication which would be induced. This method of applying the oil is considered to be especially proper in the case of the trunk and the extremities; whilst the first method is generally to be preferred, where it is desirable to use it upon the face, behind the ears, or on the neck.

The Oleum sinapis is indicated wherever a counter-irritant or local excitant is demanded. Riecke[1] advises it in *chronic cases unaccompanied by fever*, as well as in *light febrile affections*,

[1] Die neuern Arzneimittel, S. 341; und 2te Auflage, S. 519. Stuttgart, 1840.

where a gentle excitant may be needed; and in such fevers as are conjoined with a torpid state of the system, and which require the use of excitants. He regards its powerfully excitant action as constituting it a most useful article in our lists of antagonizing or derivative, as well as of excitant agents. In the first relation, Wolff employed it with advantage both in *sub-inflammatory diseases*, and in *nervous affections* not of an inflammatory character —as in *subacute rheumatism* of the joints, aponeuroses and muscles, and in *chronic rheumatism* of those parts, where blisters would be serviceable; and for which it may be substituted with advantage, in consequence of its not being attended with the inconveniences occasionally produced by the latter on the urinary organs. He employed it, likewise, in *rheumatic neuralgia, otalgia, odontalgia, prosopalgia,* and *ischias,*—blood-letting being prescribed or not, according to circumstances; and, also, as a palliative in *chronic neuralgia, colic of the hysterical kind,* and *gastrodynia.*

As an excitant to arouse the vital activity in debilitated parts, Wolff used the solution of the oil in *paralysis,* in the *sequelæ of protracted rheumatism,* and in *neuralgia,* which was probably the result of exsudation into the neurilemma, &c. He gave it, also, internally several times with good effect, in *disorders of the stomach,* accompanied by too great a secretion of mucus, (Verschleimung des Magens,) and producing complete loss of appetite. Two drops were formed into a mixture of six ounces, by the aid of gum Arabic and sugar; and of this a table-spoonful was given every two hours.

In cases of *atonic dropsy,* it has been conceived that advantage might, in many cases, be derived from the internal use of this oil; as in the majority of those to whom it was given internally, the urinary secretion was largely augmented by it.[1] Kuhn,[2] indeed, exhibited it with signal benefit in a case of *atonic dropsy,* the *sequel of intermittent fever.*

The oleum sinapis has been received into the Hamburg Pharmacopœia.

CXXXI. O'LEUM TIG'LII.

Synonymes. Oleum Crotonis seu Seminis Crotonis, Croton Oil.
French. Huile de Pignon d'Inde.
German. Krotonöl, Crotonöl, Granatillöl.

The seeds of Croton Tiglium or purging croton—a tree indigenous in the Molucca Isles, Ceylon, Java, &c., which belongs in the Sexual System to Monœcia Monadelphia, and to the

[1] Riecke, op. cit. S. 343, and 2te Auflage, S. 520. Stuttgart, 1840.
[2] Medicinische Zeitung, No. 38, Sept. 21, 1836, S. 191.

Natural Family Euphorbiaceæ—are characterized by their acrid drastic properties—which, indeed, belong to the whole family. These seeds were carried by the Dutch to Europe, two centuries ago, and were admitted into the old Pharmacopœias under the names *Grana Tiglii*, *G. Tilii*, *G. Moluccæ*, &c., being prescribed as a drastic cathartic, but owing to their too violent operation, which frequently induced unpleasant results, they fell subsequently into entire disuse. The oil of croton was also introduced into Europe about the same period, and was occasionally used internally. It had, however, sunk into total neglect, when attention was recalled to it by Dr. Conwell, a physician in the English East India Company's service at Madras, by whom its employment was reintroduced into Europe; and, in a short time, it acquired so much repute as an active cathartic, that it was received into various pharmacopœias.[1]

Croton oil is a thickish fluid, of a honey-yellow colour, has a disagreeable smell, and a very acrid burning taste, so that it excites inflammation of the tongue and fauces. It is a fixed oil, having a very acrid matter associated with it, which appears to possess acid qualities—*crotonic acid*. In ether and turpentine it is wholly soluble; in alcohol, partially so. It is imported chiefly from Madras, but partly from Bombay, and is prepared like castor oil, being strained, however, instead of being boiled. It is likewise expressed in England.[2] About fifty *per cent.* may be obtained in this way; and ten *per cent.* more may be removed by the solvent action of sulphuric ether, which is afterwards expelled by a gentle heat.[3] Being an expensive article and readily adulterated, it is often found impure and comparatively inert. The adulteration generally consists in mixing it with a large proportion either of olive oil, or of oil of almonds.[4]

According to Dr. Pereira,[5] two kinds are found in the London market, one imported from India and Ceylon; the other, expressed in London, which differ somewhat from each other.

EFFECTS ON THE ECONOMY.

Croton oil holds a distinguished place amongst cathartics, inasmuch as it can be given in small doses; and in cases of great torpor of the intestines, its action is very certain. Even a drop commonly produces eight or ten fluid evacuations; but, at times, in unusual torpor of the canal, as many as four or five drops, and

[1] Recherches sur les Propriétés Médicinales et l'Emploi de l'Huile du Croton Tiglium, &c. Paris, 1824.

[2] Pereira, Elements of Mat. Med. and Therap. ii. 1116. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.

[3] Christison, Dispensatory. Edinb. 1842.

[4] Report of the Committee on Adulterated Drugs, Dr. Huston, Chairman, in Transactions of the American Medical Association, vol. iii. Philad. 1850.

[5] Elements of Mat. Med. and Therap. 3d edit., vol. ii. p. 1279. Lond. 1850.

even more, have been given in the course of ten or twelve hours. Like most of the drastic cathartics, it occasions tormina, but these are less distressing than the burning sensation which it commonly excites in the pharynx, and which is least felt when the oil is given in the form of pill or lozenge. Not unfrequently, also, it causes nausea, often ending in vomiting, in delicate persons, or where the dose has been large, but without interfering materially with the cathartic effect. At times, it is formed into a soap with caustic soda—*Sapo olei tiglii*—which is given in doses of from one to three grains. This soap is said to be less excitant, and to occasion less pain than the pure oil, and it has the advantage, that the dose can be better apportioned.

As with other cathartics, the incautious employment of croton oil may occasion inflammation of the intestinal canal, and, therefore, it need scarcely be said, its use during inflammation of the canal, is contraindicated. It does not appear to affect any other secretory organs than those of the bowels, although some physicians affirm, that they have remarked an increase of the urine after its use. Occasionally, when rubbed, in the quantity of four or five drops around the umbilicus, it would seem to have acted as a cathartic, and even its odour has been known to produce the same effect.

Like other active cathartics, it has been employed as an anthelmintic, especially in cases of *tape-worm*, by Poccinotti, and others, and with success.[1]

It has been recommended in *dropsy* by Dr. Geo. Fife[2] as possessing one very decided advantage over elaterium; viz.:—that even when its extreme action is manifested, "it is not followed by the depression inseparable from the effective action of the latter; but that where the greatest vis inertiæ has prevailed, accompanied by absolute incapacity for exertion, a sensible amelioration in these respects has followed its continued employment."

Croton oil has been used externally as a revellent or counter-irritant, and at times to induce a cathartic effect; but in this respect it is uncertain.[3]

Rubbed on the surface in small quantity, it induces inflammation of the skin, which gradually disappears of itself. When the friction is longer continued, pustules are caused, which, when they are numerous, run together or are confluent, and around the spot where the confluent eruption is seated, papulæ or pimples appear over a wider extent, which are transformed into pustules, and are surrounded by a red base or areola. When the pustules are discrete, they dry up more rapidly than when they run to-

[1] Richter's Specielle Therapie, B. x. S. 248. Berlin, 1828.
[2] Provincial Med. and Surg. Journ. Sept. 25, 1844, p. 397.
[3] See a case of ileus cured in this manner, by Dr. Susewind, in Casper's Wochenschrift. für die gesammte Heilkunde, June 24, 1837, S. 404.

gether; and in the latter case they commonly form scabs. Friction readily excites pustulation on the head, face, neck, chest, and on those parts of the extremities where the skin is thin. Where it is thicker, the effect is of course induced with more difficulty. Commonly, the eruption is perceptible in twelve hours after the first friction, but at times not till a later period; very rarely is the second friction ineffectual. In the course of from three to six days, the eruption again disappears. The pain usually commences in about an hour after the rubbing, being at first nothing more than a slight itching and burning, which gradually, but decidedly, augments; yet the eruption is never so painful as that caused by the ointment of tartarized antimony, or by the plaster of the same agent, with which it is capable of fulfilling like indications. These frictions with croton oil are adapted for all cases in which local counter-irritation is required. It is important, however, to bear in mind, that it may in this manner act on the bowels, and hence, that it may not be adapted for intestinal disorders, in which it is not desirable to produce such an effect. Frictions with it have been recommended by many physicians—as by Andral,[1] Elliotson, Hutchinson,[2] Short, Landsberg, Romberg, and others, in the following affections:—in *chronic inflammations*, and such as have a tendency to exsudation; in *chronic rheumatic*, and *gouty diseases*, in *aphonia*[3] and *chronic hoarseness*,[4] in *phthisical affections*, especially in *incipient phthisis;* and in the *neuroses*—as *spasmodic asthma*, *hooping-cough*, *paralysis*,[5] &c. Günther[6] advises them as almost specific in *rheumatic odontalgia* and in *otalgia*.

In *neuralgia faciei*, the cause of which is considered by Sir Charles Bell[7] to be seated primarily in the intestinal canal, and remotely in the fifth pair of nerves, croton oil has been recommended as a superior purgative, and this, as well as other forms of *neuralgia*[8] would seem to have been removed by it,—doubtless by the revulsion it excites upon the intestinal nerves. But it need scarcely be said, that it possesses no specific virtue, as has been imagined by some. The same remark applies to its employment as a purgative in *acute rheumatism* by Dr. Geo. L. Upshur, of Norfolk, Virginia,[9] who is disposed to believe "that the efficacy of Croton oil does not depend entirely upon its cathartic properties.

[1] Gazette Médicale, Jan. 1832, and Archives Générales, Août, 1833.

[2] London Lancet, May, 1833, and Sauer, in Medicin. Zeitung, Aug. 10, 1836, S. 158, cited in Amer. Med. Intel. Nov. 1, 1837, p. 286.

[3] Romberg, in Wochenschrift. für die gesammte Heilkunde, 1835. [4] Sauer, op. cit.

[5] Boileau, (Paralysis of the Facial Nerve,) Bulletin Médical du Midi. Avril, 1839.

[6] Berliner Medicin. Central-Zeitung, Nov. 19, 1838.

[7] Practical Essays. Edinb. 1841, p. 101. See, also, Allnatt on Tic Douloureux. London, 1841.

[8] J. Cochrane, Lond. and Edinb. Monthly Journ. of Med. Science, July, 1841; J. A. Easton, London Lancet, Jan. 29, 1841; and Newbigging, Edinb. Med. and Surg. Journ. Jan. 1841, cited in Amer. Journ. Med. Science, Jan. 1841, p. 209.

[9] Medical Examiner, Oct. 1850, p. 580.

It possesses—he thinks—a power over the disease beyond these, and apparently not dependent upon them; for other cathartics, which act as powerfully and as promptly, producing similar watery stools, do not bring a like amount of relief to the patient. "I do not say," he adds, "that it is a specific, for I am not a believer in the doctrine of specifics in medicine: that doctrine has put more stumbling-blocks in the way of medical progress than all the open quackery of the past half century. I merely desire to state, that after a fair trial, in a number of cases accurately observed, where there was scarcely a possibility of falling into error, I believe that the croton oil is the *best* single remedy in the treatment of acute rheumatism; and I am thoroughly convinced, that it is as justly entitled to the term *specific* in this disease, as is quinine in miasmatic fever." Yet the cases reported by Dr. Upshur, in which other favourite anti-arthritic remedies—as colchicum and sulphate of quinia—were also prescribed, are far from impressing the author as strongly as they do him. In the only case of genuine *tic* in which Dr. Christison tried it, no benefit whatever was derived. In *delirium tremens* it has been advised by Dr. Prankerd[1] as an efficacious remedy, in which disease it acts, he conceives, as a direct sedative to the nervous system. The testimony is, however, inadequate to establish the position: and but little reliance ought therefore to be reposed in it.

Croton oil has likewise been used as a direct excitant. Campanelli[2] gives a case of *paralysis of the upper eyelid*, which was promptly relieved by the application of four drops to the affected lid, and to the eyebrow. It has been employed also, as proposed by M. Lafargue,[3] by Mr. A. Ure,[4] in the way of inoculation for the removal of a *nævus* or *erectile tumour*, at the inner angle of the right upper eyelid. Several minute punctures were made, with a cataract needle besmeared with oil, over the surface of the nævus. These gave rise to redness and swelling, which lasted a few hours; and subsequently to small points of suppuration. The operation was repeated at the interval of a week. A rapid diminution, with withering of the tumour, took place. A common lancet may be used for the purpose as in vaccinating.

MODE OF ADMINISTRATION.

Internally, the dose is from one-fourth or one-half a drop to two drops, given every three or two hours, or more frequently if necessary. The dose is rarely carried higher, except in desperate cases, and in *mental affections*, for which it is peculiarly appropriate. It may be prescribed either in the form of emulsion or of pill. Hahnemann[5] and Hufeland recommended it as a substitute

[1] Provincial Med. and Surg. Journ. April 29, 1846.
[2] Annali Universali di Medicina, July, 1835.
[3] Cited in Provincial Med. and Surg. Journal, Feb. 17, 1844, p. 393.
[4] London Med. Gaz., March 21, 1845, p. 786.
[5] Apotheker Lexicon, B. ii. Apth. 1, S. 203.

for castor oil, which is expensive in Germany,—advising that a drop of croton oil should be added to an ounce of oil of poppies, and that the mixture should be called *Oleum Ricini Officinale*. This preparation is well adapted for emulsions.

In *apoplexy*, or other *comatose diseases*, it may be given on a piece of sugar, which may be introduced into the throat, or be simply placed on the back of the tongue. When applied externally to excite an eruption, from four to six drops, or even more, may be rubbed in twice a day. For women and children a single application may be sufficient; but if the skin be thick and insensible, it will be well to rub it previously with flannel, or to apply first a rubefacient, especially when it is desirable to produce the effect speedily. On the other hand, where the skin is excitable, the croton oil should be mixed with from one to four or five parts or more of olive oil, oil of turpentine, or soap liniment.[1]

Pilulæ olei tiglii.

Pills of croton oil.

℞. Olei tiglii gtt. iv.
Micæ panis q. s. ut fiant pilulæ viij.

Dose.—One, or two, or more.

℞. Olei tiglii gtt. v.
Saponis,
Acaciæ pulv. āā. ℈j.
Misce et fiant pilulæ xx.

Dose.—One to three. *Sundelin.*

℞. Olei tiglii gtt. ii.
Micæ panis
vel
Saponis ℈j.
M. et divide in pilulas viij.

Dose.—One to four.

Pilulæ olei tiglii compositæ.

Compound pills of croton oil.

℞. Olei tiglii gtt. x.
Ext. colocynth. comp. ʒi.
Ol. menthæ piper. gtt. viij. M.
et fiant pil. xviii.

Two for a dose—to be repeated at short intervals, in cases of *obstinate constipation*.

Haustus olei tiglii.

Draught of croton oil.

℞. Tinct. ol. tiglii f ʒss.
Syrup.
Mucil. acaciæ, āā f ʒij.
Aquæ destill. f ℥ss. Fiat haustus.

After swallowing a little milk, this draught must be taken very quickly, and be washed down with the same diluent.—*Nimmo*.

[1] See the Author's Gen. Therap. and Mat. Med. 4th edit. ii. 262. Philad. 1850.

Emulsio olei tiglii.

Emulsion of croton oil.

℞. Olei tiglii gtt. iij.
Olei amygdal. f ℥ss.
Acac. pulv. ʒij.
Misce sensim terendo cum
Syrup. flor. aurant. f ℥j.
Aq. anthemid. f ℥v. M.

Dose.—A spoonful every two hours until it operates—shaking the vial. *Phöbus.*[1]

℞. Olei tiglii gtt. i.—ij.
——anthemid. gtt. ij.
Terendo misce cum
Mucilag. acaciæ
Syrup. amygdal. āā f ℥ss. M.

Dose.—A tea-spoonful every two hours—shaking the vial. *Lockstädt.*

Mistura olei tiglii.

Mixture of croton oil.

℞. Olei tiglii gtt. ii.
Mucilag. acac. f ʒij.
Aquæ f ℥j. M.

Dose.—A fourth part, every two hours, until the desired effect is induced.

Mistura olei tiglii saponacea.

Saponaceous mixture of croton oil.

℞. Olei tiglii gtt. viij.
Potassæ gr. vj.
Aquæ destillat. f ʒij. M.

This is a substitute for the *Sapo Olei Tiglii*, which is troublesome in the preparation.

Dose.—Three to six drops.[2]

℞. Ol. tiglii gtt. ij.
Sacchar. ʒij.
Acaciæ pulv. ʒss.
Tinct. card. f ʒss.
Aquæ destillat. f ʒx. M.

Dose.—Two dessert-spoonfuls, to children; to be repeated every three or four hours, if necessary.

Trochisci olei tiglii.

Lozenges of croton oil.

℞. Olei tiglii gtt. ij.
Sacchar. ʒj.
Mucilag. acaciæ q. s. ut fiant
trochisci, non torrendi No. viij.

Dose.—One every two hours, until the desired effect is induced. *Seiler.*[3]

[1] Handbuch der Arzneiverordnungslehre, Th. ii. Berlin, 1836.
[2] Ellis's Medical Formulary, 8th edit. by Dr. S. G. Morton, p. 58. Philad. 1846.
[3] Hufeland's Journal, B. lix. St. 4, S. 134; und Rust's Magazin, B. xviii. St. 2, S. 358.

Sapo olei tiglii.

Soap of croton oil.

Sapo crotonis.

℞. Olei tiglii partes ij.
Liquor. potassæ partem j.

Triturate in the cold, and when the mixture has acquired the proper consistence, run it into moulds of pasteboard, and, in the course of a few days, remove it by slices.

Dose.—Two or three grains in water, or in the form of pill.

Caventou.

Linimentum olei tiglii.

Liniment of croton oil.

Linimentum crotonis.

℞. Ol. tiglii p. i.
— olivæ p. v. M.

To be rubbed on the skin night and morning, until pustulation is induced.

℞. Olei tiglii
Liq. potassæ āā. f ʒss.

Mix intimately by agitation.

℞. Soluti hujusce ♏xxx.
Aquæ rosæ f ʒi. M.

To be rubbed on the part night and morning, or even three times a day, until the peculiar eruption is induced.

James Allen.[1]

The Linimentum Crotonis of the Dublin Pharmacopœia[2] consists of one part of *croton oil* to seven of oil of turpentine.

Embrocatio olei tiglii cum antimonii et potassæ tartrate.

Embrocation of croton oil with tartrate of antimony and potassa.

℞. Ol. tiglii ♏xx.
Antim. et potass. tartrat. ℈j.
Liq. potassæ f ʒi.
Aquæ f ʒvij. M.

Used to keep up a mild rash upon the skin. *Morris.*

Unguentum olei tiglii.

Ointment of croton oil.

℞. Olei tiglii ♏x.—xxx.
Adipis ʒss. M.

A little of this to be rubbed on the part so as to excite the peculiar eruption.

Emplastrum olei tiglii.

Plaster of croton oil.

Sparadrap de croton.

M. Bouchardat melts, over a very gentle fire, four parts of

[1] Provincial Medical and Surgical Journal, Oct. 28, 1843, p. 75.

[2] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850, p. 77. Dublin, 1850.

diachylon plaster; and when it is in a semi-fluid state, he mixes with it one part of *croton oil.* This he spreads upon linen, so as to form an adhesive and irritating plaster.

M. Caventou prefers the following form, as he considers the degree of heat employed in the process of M. Bouchardat may interfere with the powers of the oil.

℞. Adipis p. iiss.
Ceræ p. ss.
Ol. tiglii p. i.

The wax and lard must be melted, and when nearly cold the oil be incorporated.[1]

A stronger plaster is also advised by M. Bouchardat.[2] He melts over a gentle fire eight parts of *diachylon plaster*, and when it is semi-fluid mixes it with twenty parts of *croton oil.* The resulting plaster must be spread thickly on muslin. It produces considerable irritation of the skin, and may be employed in all cases in which revellents are required. It does not, he says, cause such severe pain as many other counter-irritants, and may be applied over an extensive surface, if desirable.

Pope[3] recommends a TINCTURA GRANORUM TIGLII, or a *tincture of the seeds*, to be made of two ounces of the *seeds* from which the rinds have been carefully removed, to one ounce of *alcohol.* This is allowed to digest for six days, and is then filtered. The smallest dose for an adult is twenty drops. This preparation, he says, has the advantage of excluding the more acrid drastic matter contained in the epidermis and husk, whilst the kernel affords cathartic material enough to act powerfully and certainly.

CXXXII. PAULLINIA.

SYNONYMES. Guarana, Guarana Pasta, Pasta Seminum Paullinieæ.
French. Pâte ou Extrait de Guarana ou Paullinia.
German. Guarana-Samenteig.

Paullinia is an extract from the plant of the same name, a native of Brazil. It is prepared by the Indians, and seems to possess considerable excitant powers. M. Gavrelle presented a specimen of it to the *Société de Médecine* of Paris, as well as a new alkali, which had been separated from it by two chemists of Paris. Both Paullinia and the alkali are very bitter, and somewhat resemble cafein. M. Gavrelle states, that Paullinia is obtained from Paullinia sorbilis; Guarana officinalis, FAMILY, Sapindaceæ. M.

[1] Bulletin Général de Thérapeutique, Mars, 1842, or Journ. de Pharm. Avril, 1842, p. 453.
[2] Annuaire de Thérapeutique, &c., pour 1844, p. 210. Paris, 1844.
[3] Medico-Chirurgical Transactions, vol. xiii. p. 1.

de Chastetus found it to be composed of a gum, starch, a resinous matter of a reddish-brown colour, a fat oil, tannic acid, and a crystallizable substance possessing the chemical properties of cafein.

EFFECTS ON THE ECONOMY IN DISEASE.

In Brazil and the neighbouring countries, it is given in the form of tisane—the powder being mixed with cocoa—in *diarrhœa* and *dysentery;* and in the same affections it has been administered, in France, by Lallemand. As a tonic, M. Gavrelle has employed it successfully in *chlorosis*, *tedious convalescence*, *paralysis*, the *colliquative diarrhœa of phthisis*, and *hemicrania*.

According to Von Martius, an extract is prepared in Brazil from Paullinia sorbilis, which is known there under the name of *Guaraná*, and is administered in similar pathological cases.[1] It is probably the same substance.

MODE OF ADMINISTRATION.

M. Gavrelle has given formulæ for *Lozenges*, *Syrup*, *Pills*, *Powder*, *Tincture*, and *Ointment* of Paullinia.[2]

Trochisci paullinіæ.

Lozenges of paullinia.

℞. Paullinіæ ʒvss.
Sacchar. (vanillâ odorizat.) ℔iss.

Make into lozenges each containing ten grains.

Syrupus paullinіæ.

Syrup of paullinia.

℞. Paullin. ʒiiss.
Syrup. Oij.

Half a fluidounce may be given in the 24 hours.

Pilulæ paullinіæ.

Pills of paullinia.

℞. Paullin. q. s.

To be made into pills, each containing a grain and a half.

Pulveres paullinіæ.

Powders of paullinia.

℞. Paullin. in pulv. ʒi.
Sacchar. aromatizat. ℥ss. M.

For a dose.

[1] See art. Guarana, in Dict. Univers. de Mat. Méd. par Mérat et De Lens, tom. ii., p. 365. Bruxelles, 1838; Journ. de Pharmacie, cited in Amer. Journ. of Pharmacy, Jan. 1841, p. 340; Dechastetus, Journ. de Pharm. Août, 1840; J. J. Virey, ibid.; Von Schlechtendal, Encyclopäd. Wörterb. der Medicin. Wissenschaft. xxvi. 433. Berlin, 1841; and A. Richard, Eléments d'Histoire Naturelle Médicale, 4ème édit. iii. 511. Paris, 1849.

[2] Journal de Chimie Méd., cited in American Journal of Pharmacy, Oct. 1840, p. 208.

Tinctura paullinіæ.

Tincture of paullinia.

℞. Paullin. ℥i.
Alcohol. (22°) Oi. M.

Unguentum paullinіæ.

Ointment of paullinia.

℞. Paullin. ℥ij.
Adipis ℥ij. M.

CXXXIII. PHLORIDZI'NA.[1]

SYNONYMES. Phloridzinum, Phloiorrhizinum, Phlorrhizinum, Phloiorrhyzinum, Phlorrhizin, Phloridzia, Phloridzine, Phlorizin, Phloridzin. *German.* Phloridzin, Phloiorrhizin.

This bitter principle exists in the bark of both the trunk and the root of the apple, pear, cherry, and plum tree.

METHOD OF PREPARING.

The following plan is recommended by M. de Koninck, its discoverer (1834 or 1835.)—The *fresh bark of the root of the apple tree* is to be boiled for two hours with sufficient *water* to cover it: the decoction is to be decanted, and a second one made by the addition of more *water*. On uniting the two decoctions, and permitting them to stand for twenty-four hours, a deposition of phloridzin, in granular crystals, takes place. These are to be treated with *distilled water* and *animal charcoal* to purify them. An additional quantity is obtained by evaporating the mother waters to one-fifth. At this degree of concentration, all the phloridzin is deposited. This method affords about one part in three hundred. Another plan yields five *per cent*. It consists in digesting the *fresh root* in *weak alcohol*, at a temperature of 120°, for about eight or ten hours, distilling off the greater part of the alcohol, and crystallizing the residue.[2]

Phloridzin crystallizes in silky spicula of a dead-white colour when in masses, or in long slender prisms or tables when crystallized with care. One thousand parts of water, at a temperature from 32° to 71°, only dissolve about one part; but at from 71° to 212°, water dissolves it in all proportions. It is also very soluble in pure alcohol at ordinary temperatures, although but slightly so in ether, even when boiling. It has no action on test papers. S. g. 1.429.[3]

[1] From φλοος, inner bark, and ριζα, root.

[2] Journal de Pharmacie, xxii. 78, cited in Amer. Journ. of Pharmacy, vol. ii. new series, p. 240. See, also, M. Boullier, in Gazette Médicale de Paris, 17 Juin, 1837, and Marchand, Journ. de Chim. Méd., Avril, 1841.

[3] For some elaborate chemical researches on Phloridzine, see M. J. S. Stass, Annales de Chimie et de Physique, Dec. 1838.

EFFECTS ON THE ECONOMY IN DISEASE.

M. de Koninck found, that from ten to fourteen grains given for a dose, with a dram of sugar, produced the most marked effect in *intermittent fever*, where sulphate of quinia had failed.[1] In four cases, reported by Van Mons,[2] of Bruxelles, the disease was arrested by the first sixteen grains: other cases required sixteen grains a few hours before the first paroxysm; twelve grains before the second; six before the third; and four before the fourth. Five successful cases are likewise given by M. Mathysen,[3] *élève interne* at the Hospital St. Pierre, Bruxelles; and M. Lebaudy[4] affirms, that its efficacy is so decided, that we cannot hesitate to class it with the most powerful febrifuges; and that it has this advantage over quinia, that it never induces gastralgia; yet M. Leonhard[5] is satisfied, from his various trials, that phloridzin does not possess any febrifuge virtue!

MODE OF ADMINISTRATION.

It may be given in the form of pill or powder, like the sulphate of quinia. It was administered at the hospital at Bruxelles, in one case, in the way of *lavement;*—twenty-four grains being given in three *lavements*. The paroxysm returned, but was less violent. In two days afterwards, the same quantity was administered in the same manner, and the fever did not recur.

CXXXIV. PIPERI'NA.

Synonymes. Piperinum, Piperium, Piperine, Piperin.
French. Pipérin.
German. Piperin, Pfefferstoff.

This substance was discovered by M. Oerstädt, in the year 1819, in black pepper, *Piper nigrum*.[6] It is found, also, in *Piper longum*, and it has been presumed to be the same, or an analogous principle, with the *cubebin* of *Piper cubeba*. It has been affirmed, that it exists only in black, and not in white pepper; but this is an error. Dr. Christison[7] invariably obtained it from the latter in larger quantity than from the former, and more easily, because it is combined with less resin. M. Oerstädt at first regarded it as

[1] See, also, Prince Louis Lucien Bonaparte, cited in Bouchardat, Annuaire de Thérapeutique pour 1843, p. 203. Paris, 1843.
[2] Bulletin Médical Belge, Mai, 1836.
[3] Ibid. Oct. 1835.
[4] Journal des Connaiss. Méd. Chirurg. cited in Braithwaite's Retrospect of Medicine and Surgery, No. 5, p. 129, Lond. 1842, where it is termed erroneously *Phloridrine;* and whence it is copied into the Amer. Journ. of the Medical Sciences, and the Amer. Journ. of Pharmacy, for Jan. 1843, under the name *Phloridine.*
[5] Encyclographie des Sciences Médicales, Mai, 1838.
[6] Journ. de Physique, No. 2, 1820, and Gazette de Santé, 25 Mai, 1820.
[7] Dispensatory, p. 698. Edinb. 1842.

a vegetable alkali, but M. Pelletier subsequently analyzed it, and proved it not to be such, but to bear a considerable analogy to resins.[1]

METHOD OF PREPARING.

Let two pounds of *black pepper*, bruised, be digested, at a gentle heat, in three pounds of *alcohol* at 36° (.837.) This mixture must afterwards be raised to ebullition, then suffered to remain at rest, and grow cold; when it must be decanted, and the operation be repeated with fresh *alcohol*. The two solutions must then be mixed together, and two pounds of *distilled water* and three ounces of *muriatic acid* be added. The liquor becomes turbid, and a precipitate, of a deep gray colour, is thrown down, which is composed in a great measure of fatty matter. The deposit being separated, crystals may be collected on the filter and sides of the vessel. These are piperin. On adding *water*, until the liquor is no longer rendered turbid, a fresh quantity is obtained.

The above process, which is that of Meli, is the same as one described by M. Pelletier. He has likewise procured it by the following method:—After having exhausted *pepper* by *alcohol*, and evaporated the alcoholic tinctures, a fatty or resinous matter is obtained: this must be subjected to the action of *boiling water*, which must be added again and again, until it passes off colourless. By dissolving this fatty matter—thus purified by washing—in *alcohol*, by the aid of heat, and leaving the solution to itself for some days, a multitude of crystals are obtained, which may be purified by solution in *alcohol* and *ether*, and by repeated crystallization. The alcoholic mother waters, left to themselves, will furnish fresh crystals. This crystalline matter is piperin.

Piperin presents itself in the form of four-sided prisms, two of which—parallel to each other—are evidently broader than the others. In the pure state, it is of a white colour, and translucent: it is frequently, however, coloured yellow by portions of resin being combined with it. It has been affirmed, that when piperin is quite pure, it is bland;[2] but Dr. Christison[3] states, that the very whitest crystals he was able to obtain were as acrid as those which are brownish, and they emitted an intensely irritating vapour when thrown on a heated iron plate. It is inodorous, and of a feeble taste of pepper; fuses readily by heat; is not volatile, and is scarcely soluble in cold water, but somewhat more so in hot. In respect to its solubility in alcohol, testimony is discordant. According to Magendie, it dissolves very readily therein; according to C. G. Gmelin, it is soluble only in small quantity in cold, but in tolerable proportion in hot alcohol, as well as in ether and in the volatile oils. The solutions taste acrid and peppery, and do not react on

[1] Examen Chimique du Poivre, par J. Pelletier, 8vo. Paris.
[2] Dispensatory of the United States of America, 4th edit. p. 512. Philad. 1839.
[3] Op. cit. p. 697.

vegetable colours;—which shows that it is not an alkaloid, as the discoverer conceived. With acids it forms no intimate chemical combinations; acetic acid, indeed, dissolves it in considerable quantity; it is, however, in great part, precipitated by water, and by evaporation the whole of the acid escapes. It is related to the resins.

EFFECTS ON THE ECONOMY.

Piperin has been exhibited chiefly by the Italian physicians for the cure of *intermittent fever*. Its employment was doubtless suggested by the use of pepper-corns as a popular remedy in that disease. According to Riecke,[1] the antiperiodic virtue of pepper is exhibited upon the healthy economy,—a few pepper-corns, taken before the expected appearance of the menses, arresting them for several days. Of this, he himself has had no experience; but he affirms, that the females in a district of southern Germany have great confidence in their virtues.

Meli,[2] who treated many cases of intermittent with piperin, considers it the best of all febrifuges, quinia not excepted. He forms twenty grains into ten pills, and gives these at intervals during the apyrexia. He ascribes the efficacy of the *oleum acre piperis* in the same complaint to the piperin it contains.

The febrifuge virtue of piperin has been confirmed by many other Italian physicians,—by Brandolini, Bertini, Gordini, Torelli, and others. According to Brandolini, from forty to fifty grains are generally required to effect a cure. Bertini gave it in three doses during the apyrexia, to the extent of a scruple, made into pills with a bitter extract: after two or three doses, the fever was generally arrested. Gordini affirms, that relapses occurred less frequently after the use of piperin than after that of the sulphate of quinia. On the other hand, in the hospital at Turin, Christin was disappointed in it, and such seems to have been the result of the trials made by Chiappa.[3] In the year 1823, he administered it in ten or twelve cases, but was unable to detect any great antiperiodic property; not more than a fourth part of the sick experienced benefit, whilst on the others cinchona acted like a charm. In general, a burning sensation was experienced in the stomach after taking it, as well as in the throat, with the same kind of feeling occasionally in the rectum, and in the whole abdomen; and in two young individuals, the eyes were made red, and the eyelids, nose, and lips were swollen.

Piperin has been employed by others besides the Italian physicians. Dr. Blom, of Utrecht, has given it in intermittents, but not with as much success as quinia. According to him, the remedy,

[1] Die neuern Arzneimittel. S. 361; und 2te Auflage, S. 522. Stuttgart, 1840.

[2] Nuove Esperienze, &c. Milan, 1823, 8vo.; and Annali Universali di Medicina, xxvii. 161, and xxviii. 22.

[3] Riecke, op. cit. S. 361; und 2te Auflage, S. 553. Stuttgart, 1840.

soon after it is taken, particularly in very impressible persons, occasions a sense of internal heat, especially in the epigastric region, and not unfrequently it causes perspiration, especially on the upper lip. Blom is, however, doubtful whether these effects be ascribable to the piperin, or to a portion of the resin of the pepper remaining united with it. He is of opinion, that both in general debility and in debility of the digestive apparatus, piperin merits a preference over sulphate of quinia, both because it can be better borne by the stomach, and because it acts more tonically upon it. It has been given in *intermittent fever*, with great success, by Dr. Hartte,[1] Port of Spain, West Indies. He prescribed it as soon as the sweating stage was established, until 18 grains had been taken, and, on the following day, when the intermission was complete, he directed the same quantity every three hours. It succeeded, in every case, in checking the paroxysm, and as soon as this was accomplished he gave, for some days, pills composed of Pilulæ Hydrargyri, Piperin, and Sulphate of Quinia, the formula for which is given below.

In inflammatory intermittents, as well as in those with gastric complications, piperin is to be avoided.

Magendie suggests that it should be given in *blennorrhœa*, in place of cubebs.

METHOD OF ADMINISTERING.

Pilulæ piperinæ.

Pills of piperin.

℞. Piperin. gr. xij.
Extract. gentian. q. s. ut fiant pilulæ xij.

Dose.—One every hour, during the *apyrexia of fever.*

Pilulæ piperinæ compositæ.

Compound pills of piperin.

℞. Pil. hydrarg. gr. i.
Piperin. gr. ij.
Quiniæ sulphat. gr. ij.
Syrup. q. s. ut fiat pilula.

One to be taken morning, noon, and night. *Hartte.*

CXXXV. PLATI'NI PRÆPARA'TA.

Synonymes. Preparations of Platinum or Platina.
French. Les Préparations de Platine.
German. Platinpräparate.

EFFECTS ON THE ECONOMY.

The preparations of platinum have not been much used in medicine. Experimental researches were undertaken by M. F.

[1] Edinb. Medical and Surgical Journal, Jan. 1841, p. 98.

Höfer,[1] in regard to their employment as physiological and therapeutical agents; and the following were the main results. Experiments were made on rabbits, dogs, and on himself, with the view of discovering the physiological action of the *perchloride of platinum* or *chloroplatinic acid*, of the *chloroplatinate of sodium* or the *double chloride of platinum and sodium;* of the *chloroplatinate of potassium*, and the *chloroplatinate of ammonium*. He found—*First*. That the chlorides of platinum are poisonous,—the perchloride in the dose of 15 grains; the chloroplatinate of sodium in that of ʒss. *Secondly*. The chlorides of platinum are less poisonous than the chloride of gold and corrosive sublimate. *Thirdly*. The perchloride of platinum, in concentrated solution, produces violent itching or irritation of the skin, followed by a slight eruption on the part to which the solution has been applied. Taken internally, it first of all irritates the mucous membrane of the stomach, occasions headache, reacts on the nervous centre, and through it exerts a special alterative action on the fluids of the economy. *Fourthly*. The chloroplatinate of sodium produces no local irritation on the skin. Taken internally, it does not react on the nervous centres in as manifest a manner as the simple perchloride. It more especially increases the urinary secretion. *Fifthly*. The perchloride of platinum is a very efficacious remedy in the treatment of *syphilitic diseases*, and especially in those that have been of long duration, and are inveterate. *Sixthly*. The chloroplatinate of sodium is more proper for the treatment of *recent syphilitic diseases*. It is also very efficacious in the treatment of *rheumatic affections*. *Seventhly*. Platinum ought to be ranked in the class of alterative remedies, by the side of gold, iodine, and arsenic. It differs from mercury in previously inducing excitement, whilst its administration is not followed by any of the disagreeable consequences induced by mercury. *Eighthly*, and *lastly*. Platinum is preferable, as an alterative, to mercury and gold.

The preparations of platinum have been used by others in *syphilitic affections* with success, but the observations of Fricke were unfavourable to them: by Cullerier, they were given in *gonorrhœa* and *leucorrhœa*.

Mr. Tuson[2] remarks, that from what he was led to believe of the effects of the chloride of platinum on *scirrhous tumours*, as stated to him by a medical gentleman whom he met in consultation, he fully expected some most striking results from it, but that he had been disappointed on every occasion where it had been prescribed. Still it was his intention to watch carefully its effects on some future opportunity. From what he had seen, he had little faith in its use, either as a local application or as an internal remedy.

[1] Gazette Médicale de Paris, No. 48, 1840; or Journ. de Pharmacie, Avril, 1841, p. 213.
[2] The Structure and Functions of the Female Breast, p. 428. Lond. 1846.

The preparations of platinum have been prescribed by Duttenhofer and Prevost in *scirrhus of the stomach;* and by the latter in *epilepsy*.[1] They are, however, but little employed at the present day.

CXXXVI. PLATINI BICHLORIDUM.

Synonymes. Platini Perchloridum, Platina Muriatica, Platinum Bichloratum, Chloridum Platinæ, Bichloride or Perchloride or Chloride of Platinum.

French. Bichlorure ou Perchlorure de Platine.

German. Chlorplatin, Platinchlorid, Salzsaures Platinoxyd.

This preparation is made by dissolving *platinum* in *aqua regia*, and evaporating the solution to dryness. A very gentle heat ought to be used; otherwise the bichloride may be decomposed; and the protochloride, or even reduced platinum, be the result.

Bichloride of platinum in concentrated solution or in the solid state is of a deep red colour. It is very deliquescent, very soluble in water, and soluble also in alcohol.

Mistura platini perchloridi.

Mixture of perchloride of platinum.

(*Potion platinique.*)

℞. Platin. perchlorid. sicc. gr. iss.
Mucilag. acac.
Aquæ āā. f ℥iij.

To be taken by table-spoonfuls in the course of the 24 hours.

Pilulæ platini perchloridi.

Pills of perchloride of platinum.

(*Pilules Platiniques.*)

℞. Platin. perchlorid. gr. viij.
Guaiac resin. ʒi.
Glycyrrhiz. pulv. q. s. ut fiant pil. xx.

Dose.—One, two, three, or four, morning and evening.

Unguentum platini perchloridi.

Ointment of perchloride of platinum.

(*Pommade platinique.*)

℞. Platin. perchlorid. gr. xv.
Extract. belladon. ʒss.
Adipis ℥i.

To be applied to *indolent ulcers*.

[1] Dierbach, Die neuesten Entdeckungen in der Materia Medica, 2er Band. S. 1173. Heidelberg und Leipzig, 1843; and Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 226. Erlangen, 1848.

CXXXVII. SO'DII CHLOROPLAT'INAS.

Synonymes. Platina Muriatica Natronata, Chloroplatinate of Sodium, Double Chloride of Platinum and Sodium.
French. Chloroplatinate de Sodium, Chlorure Double de Platine et de Sodium.
German. Chlorplatinnatrium, Natriumplatinchlorid.

The chloroplatinate of sodium is prepared by dissolving *bichloride of platinum* and very pure *chloride of sodium* in proper proportions in *water*, evaporating and crystallizing. It is soluble in water and in alcohol, and crystallizes in beautiful transparent prisms of an intensely yellow colour.

Mistura sodii chloroplatinatis.
Mixture of chloroplatinate of sodium.
(*Potion de chloroplatinate de sodium.*)

R. Platin. perchlorid. gr. v.
Sodii chlorid. pur. gr. viij.
Mucilag. acac.
Aquæ ää. f ℥iij.

To be taken by spoonfuls in the 24 hours.

Injectio sodii chloroplatinatis.
Injection of chloroplatinate of sodium.
(*Injection de chloroplatinate de sodium.*)

R. Sodii chloroplatinat. crystalliz. ʒss.
Decoct. papaveris Oss.

The experiments of M. Höfer with the salts of platinum have not been numerous; but they confirm the assertions of Magendie, that they possess properties analogous to those of the salts of gold.

CXXXVIII. PLUMBI IO'DIDUM.

Synonymes. Plumbi Ioduretum seu Iodatum seu Hydriodas seu Hydroiodas seu Iodhydras, Plumbum Iodatum seu Hydroiodicum, Iodide or Ioduret of Lead.
French. Iodure de Plomb, Iodure plombique.
German. Bleiiodid, Iodblei, Bleiiodür, Einfach Iodblei, Hydroiodsaures oder Iodwasserstoffsaures Blei.

METHOD OF PREPARING.

This preparation may be made by adding a solution of one hundred parts of *iodide of potassium* to a solution of seventy-five parts of *acetate of lead.*

The London Pharmacopœia of 1836, gives the following form: —Take of *acetate of lead*, nine ounces; *iodide of potassium*, seven ounces; *distilled water*, a gallon (imperial measure:) dissolve the acetate of lead in six pints of the water, and filter:

to these add the iodide of potassium, previously dissolved in two pints of the water: wash the precipitate and dry it.

In the Edinburgh Pharmacopœia, it is directed to be prepared by the double decomposition of *nitrate of lead* and *iodide of potassium*. Dr. Christison[1] considers, that the nitrate is preferable to the acetate of lead, as being more uniform in composition, and free from any excess of oxide of lead, which interferes with the purity of the product.

Iodide of lead is of a bright yellow colour. According to Soubeiran,[2] it is soluble in 1235 parts of cold water; and is somewhat more soluble in boiling water, which, on cooling, deposits the iodide in minute, shining, yellow, crystalline scales. Riecke[3] says it is soluble in 1200 parts of cold water, and in 200 of hot. When heated it melts, and is dissipated in vapours, which are at first yellow, and afterwards violet.

EFFECTS ON THE ECONOMY.

Iodide of lead is not an irritant, when applied even to a denuded surface.[4] M. Paton[5] administered twelve grains of it to a cat of moderate size. In four hours the animal did not appear to experience any inconvenience; twelve more grains were then given; in twelve hours, the animal became uneasy, and constantly refused every kind of food. It appeared to suffer in the kidneys. Subsequently, it was attacked with violent colic, which caused it to jump to great heights. Three days after taking the iodide, it died, suffering dreadfully. The dissection was made twelve hours afterwards, when no traces of irritation were perceptible. M. Paton examined the exterior of the stomach chemically, but was unable to detect any of the iodide, nor could any portion of it be discovered in the fæces. He then boiled the intestines and their contained matters in distilled water; the liquid was filtered and decolourized by charcoal, but no effect was induced by the tests for lead. The matter remaining on the filter was digested in dilute nitric acid: the solution was filtered, and a precipitate obtained on pouring in a solution of chromate of potassa. The liquid was evaporated; the residue calcined along with what was left by the evaporation of the water, and the whole brought in contact with dilute nitric acid. Nitrous gas was disengaged, and the solution responded to re-agents like the solutions of the salts of lead. M. Paton infers, that iodide of lead introduced into the stomach is partly absorbed, and that it is this portion which causes death,—the remainder passing into the intestines, and admitting of detec-

[1] Dispensatory, p. 711. Edinb. 1842.
[2] Traité de Pharmacie, cited in Dispensatory of the United States of America, 6th edit. p. 1076. Philad. 1845.
[3] Die neuern Arzneimittel, u. s. w. 2te Auflage, S. 563. Stuttgart, 1840.
[4] Eager, Dublin Journal for 1834.
[5] British Annals of Medicine, Mar. 3, 1837.

tion by the method described. When given internally, in the dose of a quarter or half a grain, Velpeau thought, that it occasioned, in one instance, irritation in the alimentary canal; but Dr. O'Shaughnessy thinks that this result must have been owing to idiosyncrasy, as ten-grain doses can be borne with perfect impunity. The experiments of Dr. Cogswell[1] show, that it is by no means an active agent, and that its physiological operations do not correspond with its therapeutical effects; as, in continued doses, it produced the constitutional action of lead, and not at all that of iodine.

Owing to its not exciting cutaneous irritation—like iodine and iodide of potassium—iodide of lead has been applied externally. Velpeau[2] treated three cases of *enlarged glands* with very gratifying success, although the patients had used frictions with other preparations of iodine ineffectually. Similar good effects were observed by Guersent, Roots, Cottereau, Baudelocque, Delisle, and others.[3] Dr. Pereira,[4] however, used it in two cases of *enlarged cervical glands* without benefit. Dr. Christison[5] has seen it repeatedly useful to appearance in *obstinate ulcers*, especially when "consecutive to mercurio-syphilitic eruptions in strumous habits." The dose is three, four, or more grains. Bally has given 30 grains at a dose.

Pilulæ plumbi iodidi.

Pills of iodide of lead.

R. Plumbi iodid. gr. iv.
Confect. rosæ ℈j. M. et divide in pilulas xij.

Dose.—One, night and morning, in *scrofulous affections of the glands, joints*, &c. The dose may be gradually increased to three or four pills, or more. *Cottereau* and *Joy*.[6]

Unguentum plumbi iodidi.

Ointment of iodide of lead.

R. Plumbi iodid. ʒj.
Adipis ʒviij. M.

Applied to *scrofulous* and *other indolent swellings* in the form of friction.[7] *Lond. Pharm.*

CXXXIX. PLUMBI TANNAS.

Synonymes. Plumbum Tannicum seu Scytodepsicum, Tannate of Lead.
French. Tannate de Plomb.
German. Gerbestoffblei, Bleitannat.

[1] Essay on Iodine, p. 142. Edinb. 1837.
[2] Lugol, Essays on Iodine, &c. by O'Shaughnessy, p. 206.
[3] Riecke, Nachträge zu ersten Auflage der neuern Arzneimittel, S. 78. Stuttgart, 1840, and Aschenbrenner, Die neueren Arzneimittel u. s. w. S. 229, Erlang. 1848.
[4] The Elements of Mat. Med. and Therap. 3d edit. i. 744. Lond. 1849.
[5] Dispensatory, p. 712. Edinb. 1843.
[6] Tweedie's Library of Medicine, v. 320. Lond. 1840, or 2d American edit. vol. iii. Philad. 1842.
[7] Trousseau and Pidoux, Traité de Thérapeutique &c. 3ème edit. i. 142. Paris, 1842.

METHOD OF PREPARING.

Tannate of lead is formed by precipitating an infusion of *oak bark* by *acetate of lead*, according to the following formula: "Take of *oak bark*, in coarse powder, an ounce; boil in eight ounces of *water*, until, when strained, four ounces remain: add *acetate of lead* as long as any precipitate falls; filter the liquor through bibulous paper, and dry the precipitate remaining on the paper to the consistence of a thin ointment."

EFFECTS ON THE ECONOMY.

Autenrieth[1] has strongly recommended tannate of lead in cases of *paratrimma ad decubitum* or *sores produced by lying*, and its advantages have been confirmed by others; and Dr. Tott has advised it in cases of *decubitus gangrænosus* or *sloughing sores produced by lying*.[2] In one case, in which it appeared to be inefficacious, he took two drams of the dried precipitate, mixed it with an ounce of unguentum rosatum, and used this UNGUENTUM PLUMBICO-TANNICUM with success. M. Ossieur has spoken highly of it in the same affection.

As a means of preventing *chapped nipples* it has been highly extolled by M. Léon.[3] He advises every pregnant woman, who has reason to fear this painful affection, to apply the following ointment, during the month preceding delivery, over the nipple once a day, washing it previously with warm water. Should the ointment be too irritant, the oil of roses may be left out, as it is only employed to "aromatize" it.

Unguentum plumbi tannatis.
Ointment of Tannate of lead.

℞. Plumbi tannat. ʒj.
Cerat. ℥j.
Ol. ros. gtt. ij. M.

Léon.

CXL. POTAS'SÆ CHLORAS.

SYNONYMES. Kali Chloricum seu Oxychloricum seu Chlorinicum seu Oxymuriaticum seu Muriaticum Hyper-oxygenatum, Chloras Kalicus Depuratus seu Potassicus, Alcali Vegetabile Salito-dephlogisticatum, Chloruretum Potassæ Oxidatum, Haloidum Oxygenatum, Murias Potassæ Hyper-oxygenatum seu Oxygenatum, Oxygeno-chloruretum Potassii, Potassæ Euchloras, Chlorate of Potassa, Chlorate of Protoxide of Potassium, Oxymuriate or Hyperoxymuriate of Potassa.
French. Chlorate de Potasse.
German. Chlorsaures Kali', Oxydirt oder Hyperoxygenirt Salzsaures Kali.

METHOD OF PREPARING.

In the chemical manufactories, chlorate of potassa is usually

[1] British Annals of Medicine, June 2, 1837; and Journ. de Chim. Méd., Mars, 1837.
[2] Gräfe und Walther's Journal der Chirurgie, B. xxiv. S. 676. Berlin, 1836; and Gazette Médicale, Jan. 1837.
[3] Gazette Médicale, cited in Abeille Médicale, 1 Octobre, 1848, p. 217.

prepared by passing *chlorine gas* into a solution of *carbonate of potassa*. In this way, chlorate of potassa is obtained mixed with more or less chloride of potassium. The salt prepared in the laboratories, before it is adapted for medical use, should be purified by recrystallization.[1] It is to be observed, that when the adequate quantity of chlorine gas is not employed in the preparation, the resulting compound is analogous to chlorinated soda and chlorinated lime, and in action it agrees rather with those preparations than with true chlorate of potassa. This may tend to explain the discrepancy in the experience of different physicians.

Chlorate of potassa crystallizes in white leaves having the splendour of mother-of-pearl, or in four or six-sided tables having a specific gravity of 1.989. It is permanent in the air, and has a cool, saline, disagreeable taste, similar to that of saltpetre. Six parts are soluble, at the ordinary temperature, in 100 parts of water. When exposed to heat, oxygen escapes, and chloride of potassium remains. When beaten forcibly in a mortar, it crackles, and emits light and sparks. Rubbed lightly with inflammable substances, or when struck, it inflames readily, and hence its well known employment in the formation of matches.

EFFECTS ON THE ECONOMY.

These have not been completely tested,—in the opinion of some at least.[2] L. W. Sachs, who has frequently administered it, is of opinion, that in this salt the direct effect of the alkali is rendered milder by the chloric acid, whilst the alkali modifies that of the acid: in this manner, the caustic property of the alkali is destroyed; and the liquifying or resolvent (fluidisirende) property is moderated, but not removed. On the other hand, by the union of the chloric acid with the alkali, the powerful excitant action on the nerves, which the former exerts, is at the same time manifestly moderated, although certainly not destroyed: the mode in which it is exerted, he thinks, is probably changed. By such a union, a medicine has been supposed to be formed, which acts chiefly on the nervous system, and which is capable of mitigating and probably of removing any morbid erethism therein, with hyperæsthesia thereby induced.

Such is the opinion of certain therapeutists. Others imagine, that it is capable of purifying the mass of blood in consequence of the chlorine it contains; but a salt of chloric acid is not possessed of the same properties as chlorine; and, accordingly, when the author has found occasion to administer it, he has never witnessed any of the effects ascribed to it; nor has he seen any evidence of the *modus operandi* on the nervous system mentioned above, or of

[1] For various forms of preparation see Pereira, Elements of Materia Medica and Therapeutics, 3d edit. i. 490. Lond. 1849.

[2] Riecke, Die neuern Arzneimittel, S. 300, und 2te Auflage, S. 451. Stuttgart, 1840.

its imparting oxygen to the blood as supposed by some.[1] The saline powder given below, which was considered by Dr. Stevens to be so useful in many febrile affections, is affirmed by Mr. Braithwaite[2] to have been very beneficial in *typhous cases*, marked by dry, parched, brown or black tongue; dark sordes on the teeth and gums, &c., &c. In almost every case, he found the dark appearances in the mouth altered in an incredibly short time.

From its excitant properties, and under the notion that it may act upon the blood, and through the blood on the function of nutrition as an excellent alterative, chlorate of potassa has been recommended in *chronic cutaneous diseases* in general, as well as in *hepatic* and *syphilitic affections*. It has also been occasionally *administered* in *chronic asthenia*.

Köhler[3] employed it in several cases of *tubercular phthisis*, and notwithstanding the general results of his experiments were unfavourable, he thinks it ought to be admitted into the number of those remedies that are useful in phthisis, although its stimulating action on the circulating and pulmonary systems cannot be denied. Its use is contraindicated where the fever runs high, and where there is any sign of inflammation of the lungs, or tendency to hæmoptysis. Dr. Christison[4] states, that he has tried the effects of seven-grain doses three times a day in phthisis, but could not observe any physiological or therapeutical action whatever.

Sachs, in accordance with the views before mentioned in regard to its antineuropathic properties, has advised it in cases of *prosopalgia*. He affirms, that, in a great many instances, it afforded essential relief. Chisholm appears to have been one of the earliest to prescribe it in *neuralgia faciei;* and, after him, Herber, and subsequently, B. Schäffer, Jos. Frank, Meyer, and others, employed it both as a curative and palliative agent in that disease. It has likewise been advised in obstinate *rheumatism of the nervous kind* by Knod von Helmenstreit; and Eyr has extolled it in *ulceration of the mouth after violent salivation*.

In *cancrum oris* and *phagedæna of the cheek*, both of which Dr. Henry Hunt[5] regards as identical, varying only in the degree of severity, and proceeding from a cachectic condition of the system, he has found chlorate of potassa, freely given, followed by the best results,—the beneficial influence of the salt being generally apparent within 48 hours after its first administration: and it seldom failed to arrest the progress of the disease, and to effect a cure, if administered before the patient was much exhausted. He gave it

[1] See Stevens on the Blood, p. 296. London, 1832; and Pereira, Elements of Mat. Med. and Therap. 2d edit. i. 514. Lond. 1842; or 2d Amer. edit. by Carson, Philad. 1846.

[2] Retrospect of Practical Medicine and Surgery, July to December, 1840, p. 275.

[3] Rust's Magazin, B. xlvi. [4] Dispensatory, p. 739. Edinb. 1842.

[5] Lond. Med. Gaz. April 7, 1843, p. 76, and Medico-Chirurgical Transactions, xxvi. 142.

in the dose of from ℈j. to ℈ij., according to the age of the child, in twelve hours. It appears to have been employed successfully in the same affection in Romberg's Poliklinik, in Berlin. For children, some years old, eighteen grains were dissolved in three ounces of water, with half an ounce of syrup; and of this mixture a table-spoonful was given three times a day. A few days were sufficient for the cure.[1]

Dr. Watson[2] affirms, that he has been in the habit of directing a solution of chlorate of potassa in water (*Potass. chlor.* ʒj. *Aq.* Oj) as a drink for patients *in scarlet fever*, and in the *typhoid forms of continued fever;* a practice which was suggested to him by Dr. Hunt, who informed Dr. Watson that he had long employed it with advantage. Under the use of a pint or a pint and a half of the solution daily, he noticed, in many instances, a speedy improvement of the tongue, which, from being furred, or brown or dry, became cleaner and moist. Dr. Scruggs, of Germantown, Te.[3] extols it both as an internal remedy and a collutory in the *erysipelatous inflammation of the mouth and fauces*, which occurs in the '*black tongue*' of the Western States; and Mr. J. Allison[4] speaks highly of it as an internal remedy in cases of *mercurial salivation*. He cautions the practitioner, however, to watch its effects; for if its exhibition, he says, be not discontinued at the proper time, a state of the system may be induced characterized by the phenomena of true inflammation.

MODE OF ADMINISTRATION.

Sachs prescribed it in the dose of from three to six grains, three or four times a day, but some give it in much larger quantity. It may be administered either in the form of powder or of solution.

It would appear, as Dr. Pereira[5] has properly remarked, that most of the uses of this salt have been founded on certain views of chemical pathology, some of which are now considered untenable. It passes through the kidneys unchanged, and consequently the notion that it furnishes oxygen to the system must be discarded. From the results of the author's numerous trials with it, he is disposed to accord with Dr. Christison,[6] that no evidence has yet been published of such a nature as to entitle it to admission into the pharmacopœias: yet it is officinal in the London Pharmacopœia.

[1] Mittheilungen des badischen ärzlichen Vereins. Karlsruhe, Nr. 5, März 13, 1850; cited in Nordamerikanischer Monatsbericht für Natur und Heilkunde, Dec. 1. 1850, S. 216.

[2] Lectures on the Principles and Practice of Physic, 2d Amer. edit. p. 1024. Philad. 1845.

[3] Medical Examiner, for April, 1849.

[4] London Med. Gazette, cited in Amer. Journ. of the Med. Sciences, for Jan. 1847, p. 169.

[5] Op. cit. 3d edit. i. 493, Lond. 1849.

[6] Ibid. p. 738. Edinb. 1842.

Pulvis potassæ chloratis compositus.

Compound powder of chlorate of potassa.

(*Stevens's saline powder.*)

℞. Potassæ chlorat. gr. viij.
Sodii chlorid. gr. xx.
Sodæ bicarbonat. gr. xxx. M.

One of these to be given every two or three hours in *low febrile cases.* *Stevens.*

Liquor potassæ chloratis.

Solution of chlorate of potassa.

Solutio muriatis potassæ oxygenati, Liquor ad ulcera atonica.

℞. Potassæ chlorat. ʒj.
Aquæ destillat. f ℥xij. M.

To be applied to *indolent ulcers*, by means of lint, or of a camel's hair pencil, dipped in it, to excite the tissues.—*Swediäur.*[1]

Potus potassæ chloratis.

Drink of chlorate of potassa.

Potus oxygenatus.—French: *Tisane oxygénée.*

℞. Liquor. potass. chlorat. Oij.
Aquæ Oiv. M.

Given internally in cases of *general asthenia.*

Dose.—One or two pints a day. *Swediäur.*

Mistura potassæ chloratis.

Mixture of chlorate of potassa.

℞. Potassæ chlorat. ʒiss.
Aquæ destill. f ℥iv.
Solve.

Dose.—A spoonful, every two hours. *Von Helmenstreit.*

Eyr dissolves twenty-five grains of the *chlorate* in four fluid-ounces of *distilled water*, and administers a spoonful three times a day.

℞. Potass. chlorat. ʒj.
Syrup. althææ f ℥j.
Aquæ destill. f ℥iv. M.

Dose.—A table-spoonful four times a day. *Köhler.*

CXLI. POTAS'SII BRO'MIDUM.

Synonymes. Kalium Bromatum, Bromuretum Potassicum, Brometum Kalii, Brometum seu Bromuretum Potassii, Bromide of Potassium. In solution, Potassæ Hydrobromas, Kali Hydrobromicum, Bromhydras Potassæ, Hydrobromate of Potassa.

French. Bromure de Potassium.

German. Bromkalium, Kaliumbromid, Kaliumbromür, Bromwasserstoffsaures oder Hydrobromsaures Kali.

[1] Pharm. Med. Pract. Bruxelles, 1817, 2d edit.

METHOD OF PREPARING.

According to Liebig, this preparation can be readily made by dissolving *bromine* in *alcohol*, and adding *potassa* until the spirit begins to change colour, then evaporating and heating to redness. In the London Pharmacopœia, it is directed to be made by adding first an ounce of *iron filings*, and afterwards two ounces of *bromine*, to a pint and a half of *distilled water*. The mixture is set aside for half an hour, and frequently stirred with a spatula; a gentle heat is then applied, and when a greenish colour is produced, two ounces and a dram of *carbonate of potassa*, dissolved in a pint and a half of *water*, are poured in. What remains is filtered and washed with two pints of *boiling distilled water*, and again filtered. The mixed solutions are then evaporated, that crystals may form.

Liebig says it crystallizes in four-sided shining tables; but according to Ballard,[1] commonly in cubes, and at times in long rectangular parallelopipedons. It has a pungent taste like that of common salt, but more acrid; and is devoid of odour. By heat, it crepitates, and melts into a red-hot flux, without experiencing change. It is more soluble in hot than in cold water; producing, during its solution, evident cold, and becoming converted into hydrobromate of potassa. It is also soluble in alcohol, although in small quantity. The solution of bromide of potassium dissolves no more bromine than pure water.

EFFECTS ON THE ECONOMY.

Bromide of potassium excites the same phenomena as bromine, but with less certainty and intensity.[2] From a dram and a half to two drams is needed to kill a dog. The animal appears to suffer; is restless, and gradually falls into a state of prostration. In smaller doses, it appears to act powerfully on the human stomach. The bromide, like bromine, seems first to have been applied to therapeutical purposes by Pourché.[3] Two cases of *scrofulous tumours* are reported by him to have been removed by friction with an ointment composed thereof, and a cataplasm sprinkled with an aqueous solution. In a third patient, *chronic otorrhœa* and *scrofulous tumefaction of the testicle* yielded to the same agency, combined with the internal use of bromine. A very large *goître* was reduced two-thirds by it. Pourché prescribed it internally in the form of pill, in the dose of four to eight grains in the day.

Magendie[4] employed the preparations of bromine in *scrofula*, in *amenorrhœa*, and in *hypertrophy of the ventricles of the heart*.

[1] Annales de Chimie, tom. xxxii.
[2] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 237. Paris, 1847.
[3] Journ. de Chimie Médicale, iv. 594; see, also, Bulletin Général de Thérapeutique, No. 14, 30 Juillet, 1837.
[4] Formulaire, ed. cit.

Prieger recommended an ointment of "*Kali bromicum*" in inveterate *porrigo favosa* as well as in *obstinate and malignant tetter*, and with good success; and Dr. Williams[1] in cases of *enlarged spleen*. The last gentleman suggests, that it possesses "unusual, if not specific (?) powers in the cure of diseases of the spleen." It was owing to these results that the bromide was introduced into the London Pharmacopœia of 1836.[2] Dr. Williams also gave it with success in a case of *ascites*.

The low price of the bromide compared with that of the iodide of potassium induced M. Ricord to substitute it in the treatment *of secondary syphilitic affections*. He gave it in the same dose. The therapeutical effects were found to be identical, but induced more slowly. The results of the experience of others has, however, been less satisfactory. Dr. Egan, from extensive observation, has satisfied himself, *first*, that the iodide of potassium exerts, in the majority of instances of *secondary* and *tertiary syphilis*, an instantaneous, decided, and always beneficial action, contrasted with the bromide; the effects of which are slow, unsatisfactory, and frequently unsuccessful. And, *secondly*, that the iodide seems to act favourably not only upon the disease for which it is prescribed, but also upon the constitution in general, increasing the appetite and improving the powers of digestion, thereby enabling the patient to gain flesh when under its influence; whilst the bromide not unfrequently produces nausea, impairs the appetite, and deranges the digestive organs; and, *lastly*, that every form of secondary and tertiary syphilis, with the exception of iritis, is amenable to the action of the iodide, whilst that of the bromide is extremely circumscribed.

Similar views to those of Dr. Egan are maintained by Drs. Stapleton and Geoghegan.[3]

MODE OF ADMINISTRATION.

Liquor potassii bromidi.

Solution of bromide of potassium.

℞. Potassii bromidi gr. vi.—viij.—x.
Aquæ lactucæ f ℥iij.
Syrup althææ f ℥i. M.

To be given in the course of twenty-four hours, in table-spoonfuls. *Magendie.*

Unguentum potassii bromidi.

Ointment of bromide of potassium.

℞. Potass. bromid. gr. xxxiv.
Adipis ℥j. M.

[1] Elements of Medicine, i. 338.

[2] Pereira, Elements of Mat. Med. and Therap. 2d edit. i. p. 499. Philada. 1842; or 2d Amer. edit. by Carson. Philad. 1846; and Brande's Dict. of Mat. Med. p. 126. Lond. 1839.

[3] Dublin Medical Press, May 19, 1847; cited in Amer. Journal of the Med. Sciences, July, 1847, p. 206.

From half a dram to a dram to be rubbed on *scrofulous swellings*. *Magendie.*

M. Pourché employs ʒj. of the *bromide* to the ounce of *lard*.

Unguentum potassii bromidi compositum.

Compound ointment of bromide of potassium.

℞. Bromini gr. vi. ad xij.
Potassii bromid. gr. xxiv.
Axung. ℥j. M.

Magendie.

CXLII. POTAS'SII CYANURE'TUM.

Synonymes. Potassii Cyanidum, Kali Hydrocyanicum seu Cyanogenatum seu Cyanatum seu Borussicum, Kalium Cyanogenatum, Cyanuretum seu Cyanidum Potassicum seu Kalii, Cyanidum seu Cyanetum Kalii, Hydrocyanas seu Cyanhydras Potassæ seu Kalicus, Cyanide or Cyanuret of Potassium.

French. Cyanure de Potassium.

German. Cyankalium, Blaustoffkalium, Kaliumcyanür, Kaliumcyanid Hydrocyansaures Kali, Cyanwasserstoffsaures Kali, Blausaures Kali.

This preparation was proposed by MM. Robiquet and Villermé,[1] as a substitute for hydrocyanic acid. It is, in their opinion, far more certain in its effects than that.

METHOD OF PREPARING.

Cyanuret of potassium is formed whenever *potassa* is calcined with an *animal matter*, as in the preparation of Prussian blue. It is commonly prepared after the process of Robiquet, by exposing to long continued heat the ferrocyanuret of potassium. The cyanuret of iron is completely decomposed, and that of potassium remains. The residuum, after this strong calcination, constitutes a solid, blackish mass, which consists wholly of cyanuret of potassium, soiled by the iron and the charcoal belonging to the cyanuret of iron. The mass is dissolved in water, when the iron and charcoal are deposited; the cyanuret of potassium dissolves, and is transformed into hydrocyanate of potassa. When the process has been well conducted, the solution is perfectly colourless, and retains no portion of iron. M. Chevallier[2] prepares the salt by calcining the *ferrocyanuret of potassium*, and then separating the cyanuret from the quadricarburet of iron by pure *alcohol*: on distilling this, the cyanuret is obtained very pure. Dr. Hamilton and Mr. Mackenzie, of Baltimore,[3] recommend the following process as most convenient and simple:—Expose—say—four ounces of the dried *ferrocyanuret of potassium* in a common Hessian crucible to a red heat, until nitrogen ceases to pass over; (this gene-

[1] Bulletin de la Société Médicale d'Emulation, Juillet, 1823. See, also, James Hamilton and Thos. G. Mackenzie, in Maryland Med. and Surg. Journ., April, 1840. p. 201.
[2] Journ. de Chimie Médicale, and Journ. of Philad. College of Pharmacy, 1832.
[3] Op. cit. p. 203.

rally takes from one and a half to two hours;) then, breaking the crucible, powder the black mass quickly, and add—say—sixteen fluidounces of *alcohol*, stirring the mixture repeatedly, until it acquires the temperature of about 150° Fahr.; then filter, and evaporate by a sand or water bath, regulated so as to be below the boiling point of alcohol; for if heated above this temperature, oil of wine is formed, which is gradually decomposed during the process, and carbon is deposited, which blackens the mixture. The evaporation should be carried on so as to have as great an extent of surface exposed as possible. The ferrocyanuret will be found to have yielded six or seven drams of the cyanuret, which is dry, inodorous, and perfectly white.

The following process is directed in the last edition of the Pharmacopœia of the United States, (1842:)—Take of *ferrocyanuret of potassium*, in powder, ℥viij.; *Distilled water*, f ℥vj. Expose the ferrocyanuret to a moderate heat until it becomes nearly white, and is wholly deprived of its water of crystallization. Put the residue in an earthen retort, with the beak loosely stopped, and expose it to a red heat for two hours, or till gas ceases to be disengaged. Withdraw the retort from the fire, close the orifice with lute, and then let the whole remain until quite cold. Break the retort; remove the black mass, and reduce it to coarse powder, introduce it into a bottle of the capacity of twelve fluidounces, and then add the distilled water. Agitate the mixture occasionally for half an hour, throw it on a filter, evaporate the filtered solution rapidly to dryness, and keep the dry mass in a closely stopped bottle.

Pure cyanuret of potassium is white and transparent: it may be fused in the fire without being decomposed, and keeps for an indefinite period, provided it be preserved dry. It is very soluble in water, but sparingly so in alcohol. All acids decompose it, even the carbonic: hence the solution, when exposed to the air, emits the smell of hydrocyanic acid; and carbonate of potassa is formed, in the place of the hydrocyanate of potassa. It has a sharp, somewhat alkaline, and bitter almond taste, and an alkaline reaction.

EFFECTS ON THE ECONOMY.

MM. Robiquet and Villermé performed some experiments on animals in the presence of Magendie.[1] A tenth of a grain destroyed a male linnet in a minute; less than a grain killed a guinea-pig in two or three minutes: a small drop of the hydrocyanate of potassa, containing only the hundredth part of a grain of the cyanuret in solution, caused a linnet to drop down dead in half a minute. Half a dram, containing five grains of the cyanuret, killed a dog of large size in a quarter of an hour; and three grains

[1] Formulaire pour la Préparation, &c., de plusieurs Nouveaux Médicamens, &c.

proved fatal to a man in three quarters of an hour.[1] Dr. Letheby[2] states, as the result of his experiments on animals, that with the exception of hydrocyanic acid, of the strength of four per cent., cyanuret of potassium is the most virulent and active of all the compounds into which cyanogen enters.

Magendie proposes, that the cyanuret of potassium should be dissolved in eight times its weight of distilled water, when it becomes transformed into hydrocyanate of potassa. To this solution he gives the name *medicinal hydrocyanate of potassa*, and advises that it should be given under the same circumstances, and in the same doses, as the *medicinal hydrocyanic acid*, (see pages 24 and 35.) He farther suggests, that to render it wholly independent of the action of the small portion of alkali contained in the cyanuret, a few drops of some vegetable acid may be added, or it may be prescribed with an acid syrup.

The dose of the cyanuret is a quarter of a grain at first, gradually increased to a grain and more. M. Bally gave it to fifty-two individuals labouring under different diseases: it produced no effect on thirty-five; and, on the others, the result was neither constant nor salutary, so that he is not inclined to place more reliance upon the cyanuret than upon hydrocyanic acid.

By M. Lombard,[3] of Geneva, it has been applied externally, with success, in some cases of *facial neuralgia*. He uses it by friction, in the form of watery solution, or of ointment, according to circumstances. The watery solution is in the strength of from one to four grains to the ounce of water; and the ointment is composed of from two to four grains of the cyanuret to an ounce of lard. The aqueous solution, however, is considered by Dr. Lombard to be the most prompt in its effects. He regards the cyanuret to be contraindicated where the nervous affection is complicated with inflammatory action. He has found it a useful remedy, also, in *chronic rheumatism*. In *sciatic neuralgia*, it was not successful. In *white swelling*, attended with acute pains, poultices, moistened with the solution, gave great relief. Dr. Lombard, indeed, affirms, that the soothing properties of the cyanuret are superior to those of any remedy known. Lotions of hydrocyanic acid are not to be compared with it,—the acid being decomposed with facility, and not devoid of danger.

In a case of *acute rheumatism* attacking the articulations of a chlorotic young female, M. Malherbe,[4] after leeching, applied compresses over the joints affected, moistened with a solution of the cyanuret—ten grains to the ounce of distilled water. In forty-eight hours the pain ceased. It is probable, however, that

[1] See Christison on Poisons, first Amer. edit. p. 593. Philad. 1845.
[2] London Medical Gazette, Jan. 9, and Feb. 4 and 17, 1845.
[3] Gazette des Hôpitaux, and Lond. Med. Gaz., Sept. 1831.
[4] Journal des Connaissances Médico-Chirurgicales.

much of the good effect was owing to the compression. MM. Trousseau and Rullier[1] also recommend the cyanuret, in the proportion of four grains to an ounce of water, as a local application in various forms of *neuralgia*. In the quantity of nine grains to eight ounces of water, it is employed by M. Cazenave,[2] as a lotion in *pruritus ani et vulvæ*.

M. Andral[3] employed it with complete success in a case of *intense cephalalgia*, which, for ten months, had resisted the most powerful remedies, as bleeding, a seton in the neck, blisters and sinapisms. It was given in solution, in the proportion of from six to eight grains to the ounce of distilled water; and compresses, wet with the solution, were applied, for eight days, to the forehead and temples.

When nitrate of silver has been long used in *affections of the eye*, it turns the conjunctiva of a dark olive colour, and greatly disfigures the patient. Mr. Guthrie[4] states, that a solution of the cyanuret, (*Potass. cyanur.* gr. vj.; *Aquæ* f ℥j.,) applied by drops, every other day, is an admirable remedy. It is also equally effective in removing the *stain made by iodine* on the skin.

MODE OF ADMINISTRATION.

Mistura potassii cyanureti.

Mixture of cyanuret of potassium.

Mixture of hydrocyanate of potassa.

Pectoral mixture of Magendie.

℞. Potass. hydrocyan. med. f ʒi.
Aquæ destillat. Oj.
Sacchar. ℥iss. M.

Dose.—About five drams (a table-spoonful,) night and morning.

(*Pectoral potion.*)

℞. Potass. hydrocyan. med. gtt. xv.
Infus. heder. terrestr. f ℥ij.
Syrup. althææ f ℥j. M.

Dose.—Five *grammes* (a tea-spoonful,) every three hours.

Magendie.

℞. Potass. cyanur. gr. ½.
Syrup. althææ f ℥j.
Aquæ lactucæ f ℥ij. M.

Dose.—Five drams (a table-spoonful,) every two hours.

Magendie.

℞. Tinct. castor.
Moschi,
Potassæ nitrat. āā. gr. iv.
Potassii cyanuret. gr. ij.
Aquæ flor. tiliæ seu
—— cinnamom. f ℥viij.

[1] Lond. Med. and Surg. Journ. Dec. 15, 1832; cited in Amer. Journal of the Medical Sciences, May, 1833, p. 238.

[2] Ranking's Half-Yearly Abstract, July to Dec. 1846, p. 198.

[3] Gazette Médicale, Jan. 1832.

[4] Cited in Amer. Journ. of the Med. Sciences, Oct. 1844, p. 517.

To be taken in the course of the twenty-four hours, in *chorea*.
Fouquier.

Syrupus potassii cyanureti.
Syrup of cyanuret of potassium.

℞. Potass. hydrocyanat. medic. f ʒj.
Syrupi Oi.

This syrup must be added to pectoral draughts, and may be substituted for other syrups, in appropriate cases.

Pilulæ potassii cyanureti.
Pills of cyanuret of potassium.

℞. Potassii cyanur.
Amyli āā. gr. iv.
Syrup. q. s. ut fiat massa in pilulas viij. dividenda.

Dose.—A pill, night and morning, in *convulsions*, *dyspnœa*, &c.
Hospital of La Pitié.[1]

Lotio potassii cyanureti.
Lotion of cyanuret of potassium.

℞. Potass. cyanuret. gr. xij.
Mist. amygdal. f ℥vj. M

To be used in *lichen*, and other *chronic eruptions attended with much itching*. *Louis.*

℞. Potass. cyanur. gr. vj.
Solve in
Aquæ destillat. f ʒj. M.

Compresses to be wetted with this, and applied in cases of *neuralgia faciei*, *hemicrania*, &c.
Recamier, Trousseau, Blouquier.[2]

Unguentum potassii cyanureti.
Ointment of cyanuret of potassium.

℞. Potass. cyanur. gr. ij.—iv.
Adipis ʒi. M.

The size of a hazelnut to be rubbed in, in cases of *neuralgia*.
Lombard.

CXLIII. POTAS'SII HYDRAR'GYRO-IO'DIDUM.

Synonymes. Potassii Iodo-Hydrargyras, Hydrargyro-iodidum Potassii, Hydrargyrum Biiodatum cum Kalio-Iodato, Kali Iodatum Hydrargyratum, Kalium Hydriodatum Hydrargyratum, Iodo-Hydrargyrate of Potassium, Iodhydrargyrate of Ioduret of Potassium, Hydrargyro-iodide of Potassium, Hydrargyro-biniodide of Potassium, Dihydrargyro-biniodide of Potassium.
French. Iodhydrargyrate de Potassium.
German. Quecksilberiodidkalium.

[1] Ryan's Formulary, 3d edit. p. 392. Lond. 1839.
[2] Lincke, Vollständiges Recept-Taschenbuch, ii. 91. Leipz. 1841.

Dr. A. Channing,[1] who has highly extolled this preparation in various diseases, affirms, that this, with other new salts, was discovered by Bonsdorff, of the University of Finland, in 1826; and it is a fact well known to the chemist, that iodine, chlorine, &c., enter into combinations so as to form both acids and bases. By experiment, Dr. Channing ascertained, that a solution of eight grains of *pure iodide of potassium*, in ten or fifteen minims of *water*, would combine with a fraction less than eleven grains of *red iodide of mercury*, and maintain the combination in solution, when diluted with water or alcohol to any extent. If more than eleven grains of red iodide be added, although a small excess may be dissolved in the concentrated solution, on diluting with water, it is promptly precipitated. It would appear, therefore, as Dr. Channing has remarked, that in preparing this salt for administration, the labour of crystallizing it, in order to obtain a solution of a definite strength, is wholly unnecessary; inasmuch as a solution, combining a fraction more than eight grains of the iodide of potassium with eleven grains of the iodide of mercury, may be used as containing twenty grains of the hydrargyro-iodide of potassium.

If it be desirable to obtain the preparation in a crystallized form, it is important that the definite proportions of the two iodides should be observed, and particularly, that there be no excess of iodide of mercury; for the saturated solution of eight grains of iodide of potassium will dissolve, and enter into combination with, more than thirteen grains of iodide of mercury, forming similar crystals soluble in alcohol, but in water precipitating more than two grains of iodide of mercury.

This double salt may also be formed by dissolving one equivalent of *bichloride* or of *pernitrate of mercury* in a solution of four equivalents of *iodide of potassium*, evaporating to dryness, and dissolving the double iodide from the chlorohydrate or nitrate of potassa by means of *alcohol*. When made from the pernitrate of mercury, it is liable, however, to contain nitre, which may be detected by its insolubility in strong alcohol.[2]

EFFECTS ON THE ECONOMY.

These are similar to those of the iodides of mercury, but, according to Dr. Channing, in a less degree. The hydrargyro-iodide is not, however, much employed, experience seeming to have shown, that it possesses no essential, if, indeed, any advantages over those preparations. It has been highly extolled by Dr. Charles C. Hildreth,[3] of Zanesville, Ohio, in several diseases in which a combination of iodine and mercury might be expected to be beneficial. In *ordinary dyspepsia*, his faith in its remedial powers is so strong

[1] American Journal of the Medical Sciences, Feb. 1834, p. 388.
[2] Ambrose Smith, American Journal of Pharmacy, Jan. 1841, p. 271.
[3] American Journal of the Medical Sciences, Aug. 1840, p. 314.

that he had prescribed but little else for the previous four or five years. He speaks highly of it, also, in *enlargement of the spleen, amenorrhœa, dysmenorrhœa, leucorrhœa, dropsy*, and *glandular enlargements of a scrofulous character*. In these last cases, he combines the internal use with the external, according to the form of ointment given below.

Puche[1] has recommended it as not being so subject to produce salivation or pains in the bones, as the other combinations of mercury and iodine.

MODE OF ADMINISTRATION.

Mistura potassii hydrargyro-iodidi.

Mixture of hydrargyro-iodide of potassium.

℞. Hydrarg. iodid. rubr. gr. iv.
Potassii iodid. ℈j.
Aquæ destillat. f ℥j. M.

Dose.—Five drops, three times a day. *Channing.*

℞. Hydrargyri iodid. rubr.
Potassii iodid. āā. gr. iv.
Aquæ f ℥i. Solve.

The dose of this is from two to six drops, equivalent to from about the thirteenth to the twelfth of a grain of the double salt.[2]

℞. Hydrarg. iodid. rubr. gr. viij.
Potassii iodid. gr. viij.
Aquæ destillat. f ℥viij. M.

Dose.—f ℥ij. to f ℧ij. in twenty-four hours. *Puche.*

Tinctura potassii hydrargyro-iodidi.

Tincture of hydrargyro-iodide of potassium.

℞. Potass. hydrargyro-iodid. gr. j.
Alcohol. dilut. f ℥j. M.

Dose.—Ten drops, three times a day. *Channing.*

Pilulæ potassii hydrargyro-iodidi.

Pills of hydrargyro-iodide of potassium.

℞. Hydrarg. iodid. rubr. gr. viij.
Potassii iodid. gr. viij.
Sacchar. lact. gr. lxiv.
Mucil. acac. q. s. ut fiant pilulæ xxxij.

Dose.—One to eight, daily. *Puche.*

[1] Journal des Connaissances Médicales, Oct., Nov. 1838, Janvier, 1839; and Annales de Chimie, Oct. 1838.

[2] Ambrose Smith, American Journal of Pharmacy, Jan. 1841, p. 270.

Unguentum potassii hydrargyro-iodidi.

Ointment of hydrargyro-iodide of potassium.

R. Hydrarg. iodid. rubr. gr. vij.
Potass. iodid. ℈ij.
Adipis —— ℥j.

To be applied to *tumours*, two or three times a day. Should it prove too irritating, the proportion of lard must be increasd.

Hildreth.

CXLIV. POTAS'SII IO'DIDUM.

Synonymes. Kalium Iodatum, Iodidum Kalii, Kali Hydroiodinicum, K. Hydroiodicum, Hydroiodas Kalicus seu Lixiviæ, Ioduretum Potassicum, Iodhydras Kalicus seu Potassæ, Potassii Ioduretum, Iodide or Ioduret of Potassium. In solution—Potassæ Hydriodas, Potassii Proto-hydriodas seu Protoxidi Hydriodas, Hydroiodas Kalicus seu Lixiviæ, Iodhydras Kalicus seu Potassæ, Hydriodate of Potassa.

French. Hydriodate de Potasse, Iodure de Potassium.

German. Iodkalium, Iodwasserstoffsaures Kali, Kaliumiodüre, Iodinwasserstoff Kali, Hydriodsaures oder Hydriodinsaures Kali, Kalihydroiodat.

METHOD OF PREPARING.

The process of Dr. Turner is, to take any quantity of solution of *caustic potassa*, and to add to it gradually, at a gentle heat, *iodine* sufficient to neutralize the alkali; then evaporating to dryness, calcining strongly, dissolving in water, and crystallizing. Dr. William Gregory[1] suggested an improvement on this process, which has been regarded as one of the simplest.[2] He adds *iodine* to a hot solution of *potassa* until the fluid assumes a yellowish-brown colour; then evaporates, and heats the residuum to low redness in a platinum crucible. The mass, which at first consists of iodide of potassium and iodate of potassa, thus loses all its oxygen, and becomes converted into iodide of potassium.

The formula of Caillot and Baup is to take ten parts of *iodine* and fifty of *distilled water;* put them into a matrass, and add, in small successive portions, of pure *iron filings*, five parts,—shaking the vessel each time. The liquor is then heated until it loses its colour, is filtered, and the substance on the filter is washed with boiling water, until the liquid is tasteless; the liquor and the various liquids used in the washings are united, and the whole is heated in a sand bath. When the temperature approaches that of ebullition, enough of a solution of *carbonate of potassa* is added to precipitate all the oxide of iron as carbonate; it is then filtered, and the substance on the filter washed until it is completely exhausted. All the liquors are then united, tested by reddened litmus paper, and if there be any excess of base, a little *hydriodic acid* is added. It is then evaporated in a sand bath,

[1] Edinb. Med. and Surg. Journ., xxxvi. 369. for Oct. 1831.
[2] Cogswell on Iodine, p. 85.

until a slight pellicle forms; the fire is now discontinued, and the salt is suffered to crystallize. Lastly, the crystals are washed with a little *water*, and dried.[1]

Iodide of potassium is in white or transparent crystals. These are readily fused, and are volatilized at a red heat. They do not decompose, even when heated, with access of air. They are readily soluble in water, and in alcohol, and the addition of the iodide facilitates greatly the solution of the iodine in water. The odour is slightly that of iodine, from the salt containing a little of that element uncombined. Taste acrid and saline.

It would seem that a slight contamination of iodide of potassium with carbonate of potassa is exceedingly common, as it can with difficulty be avoided in the manufacture of the salt; but Dr. Christison[2] affirms, that he has examined specimens, where the carbonate, with its accompanying water, amounted to 90 parts in the 100. "Can we wonder, then," he asks, "that practitioners should complain of the iodide of potassium, that they have given it for months, nay, even for years, without observing any effect either on the constitution, or on the disease for which it was administered?" It is sometimes adulterated, too, with nitrate of potassa, and the chlorides of potassium and sodium.[3]

EFFECTS ON THE ECONOMY.

As respects the action of iodide of potassium, and its administration in disease, it is scarcely necessary to do more than refer to what has been said under the head of iodine. On the whole, its effects appear to accord with those of iodine; at least no difference is perceptible on the organism. It has been supposed, that it is better than pure iodine, where the object is to act especially on the urinary organs.[4] For external use, iodide of potassium is usually preferred to iodine. It is constantly given internally, and often in combination with the latter; the solubility of which, as was before remarked, is aided by it. Many of the subjoined formulæ contain both one and the other. As remarked under iodine, it is now administered in very large doses in a multitude of diseases of different nature, and often, doubtless, where it can render little or no service.

Dr. Buchanan asserts, that he has given it in doses of ℥ss., and the only precaution he observed was to make the patient drink

[1] Jourdan's Pharmacopée Universelle, i. 662. Paris, 1828; also the London Pharmacopœia, and Brande's Dictionary of Materia Medica, p. 317. Lond. 1839. This is essentially the process of the Pharmacopœia of the United States (1842.)

[2] Edinb. Med. and Surg. Journal, April, 1838; and Dispensatory, p. 253. Edinb. 1842; also, Pereira, Elements of Mat. Med. and Therap. 2d edit. i. 491. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.

[3] Report of the Committee on adulterated drugs, Dr. Huston, chairman, in Transactions of the Amer. Med. Assoc. iii., 291. Philad. 1850.

[4] Riecke, Die neuern Arzneimittel, u. s. w. S. 306. See, also, Cogswell on Iodine, p. 96.

freely of diluents. It was chiefly to determine some physiological questions that he administered it in such large doses. Two drams of it were taken by a young man affected with gonorrhœa, and as soon as the medicine made its appearance in the urine, blood was drawn from the arm. On examining the blood, both the serum and crassamentum were found deeply impregnated with iodine.[1] On the other hand, Dr. Lawrie, of Glasgow,[2] considers it very uncertain, and at times dangerous, although he esteems it by far the best of the recent remedies, and prescribes it more frequently than any other medicine; and Mr. Mayo[3] affirms, that no medicine, where it does good, produces amendment, in *constitutional syphilis*, so speedily as it. Lugol and others appear to have used it mainly as a solvent to iodine, and Lugol considers it inferior to the latter as a therapeutical agent; but no chemical or other prepossession can set aside the testimony just cited; or that of such observers as Ricord,[4] C. J. B. Williams,[5] Joy, and a host of others. In the author's hands, it has appeared to afford as much benefit as any of the preparations of iodine, and M. Dorvault[6] regards it as embodying all the excellencies of iodine without its defects. For the testimony in regard to its beneficial and injurious effects, see Iodine, page 454.

Cases of *salivation* from its use have been published by Sir Francis W. Smith.[7]

According to the experiments of Magendie,[8] iodide of potassium is one of the substances that promote the coagulation of the blood.

MODE OF ADMINISTRATION.

Liquor potassii iodidi.

Solution of iodide of potassium.

Potio resolvens ex Iodio, Solution de Coindet, Coindet's Solution.

℞. Potassii iodidi gr. xxxvj.
Aquæ destillat. f ℥j. Solve.

Dose.—The same as that of the tincture of iodine.

Coindet & Magendie.

℞. Potassii iodidi ʒj.
Aquæ destillat. f ℥j. Solve.

Dose.—Fifteen drops three times a day, gradually increased to forty-five, in cases of *ovarian dropsy*,—frictions with iodine ointment being used at the same time. *Elliotson.*

[1] London Medical Gazette, July 2, 1836. [2] Ibid. July 3, 1840, p. 591.
[3] A Treatise on Syphilis, by Herbert Mayo, F. R. S. Lond. 1840.
[4] Practical Treatise on Venereal Diseases, translated by Drummond, Amer. edit. Philad. 1843. Parker, Modern Treatment of Syphilitic Diseases, Amer. Med. Lib. edit. p. 77, Philad. 1840; and Bulletin Général de Thérap. Juillet, 1840.
[5] Lectures on the Physiology and Diseases of the Chest, Bell's Medical Library edit. p. 246. Philad. 1839.
[6] Iodognosie ou Monographie Chimique, Médicale et Pharmaceutique, des Iodiques en général, et en particulier de l'Iode et de l'Iodide de Potassium. Paris, 1850; cited in Brit. and Foreign Med. Review, Jan. 1851, p. 92.
[7] Dublin Journal of Medical Science, July, 1840, and Jan. 1841.
[8] Leçons sur le Sang; and translation in Lancet, for Jan. 26, 1839, p. 636.

Liquor potassii iodidi compositus.

Compound solution of iodide of potassium.

(*Lugol's solution.*)

℞. Iodin. ℈j.
Potassii iodid. ℈ij.
Aq. destillat. f ℥vij. Solve.

Dr. Bache[1] remarks, that "in the original it is *seven ounces*, but from the context of the author, this is evidently a misprint for *seven drams.*" It is proper, however, to observe, that many of the successful cases were treated by the weaker solution, six drams of which contain only $\frac{1}{28}$ of a grain, whilst six of the other contain $\frac{3}{7}$ths of a grain.

Dose.—Six drops early in the morning, and in the middle of the day, in a glass of sugared water, in *tetter*, *scirrhus*, &c.

Lugol.

Lugol has a solution of three strengths for internal use:

		I.	II.	III.
℞.	Iodin.	gr. ¾.	gr. i.	gr. 1¼.
	Potass. iodid.	gr. iss.	gr. ii.	gr. iiss.
	Aq. destillat.	f ℥viij.	f ℥viij.	f ℥viij.

Dose.—Two-thirds, daily, at first; afterwards, the whole.

Lugol recommends this threefold solution in the same cases as his threefold solution of iodine; the *first* being continued from fourteen days to three weeks; the *second*, from the fourth or fifth week of the treatment to its termination; the *third*, the strongest, he did not often use. As Riecke has observed, it would be better to have in the hospitals but one solution, which might be prescribed in varied doses.

℞. Iodin. gr. v.
Potass. iodid. gr. x.
Aquæ destillat. f ℥xx. M.

Dose.—f ʒij. to f ʒvj. *London Pharmacopœia.*

Liquor iodini compositus.

Compound solution of iodine.

(*Lugol's solution.*)

℞. Iodin. ʒvj.
Potass. iodid. ℥iss.
Aquæ destillat. Oj.

Dissolve the iodine and iodide of potassium in the water.

Dose.—Ten to twenty drops, three times a day.

Pharm. United States.

℞. Potassii iodid.
Iodin. āā. gr. 78. (5 *gram.*)
Alcohol. at 90° C. ʒxiij. (50 *gr.*)
Aquæ destillat. ℥iij. (100 *gr.*)

[1] Dispensatory of the United States, 4th edit. p. 374. Philad. 1839.

Rub the iodine and iodide of potassium in a mortar with a little of the water. Add the alcohol and the remainder of the water.

This has been proposed as a substitute for the mixture of tincture of iodine and water, used by M. Velpeau, with so much success, in the surgical treatment of dropsies.[1] *Guibourt.*

Tinctura iodini composita.

Compound tincture of iodine.

℞. Iodin. ℥j.
Potass. iodid. ℥ij.
Alcohol. Oij. M.

Dose.—Ten minims. *Lond. Pharmacopœia.*

The Pharmacopœia of the United States adopts the same quantities; but the pint Imperial measure contains about one-fourth more than the pharmacopœial pint of the United States.

(*Iodine paint.*)

℞. Iodin. gr. lxiv.
Potass. iodid. gr. xxx.
Alcohol. f ℥j. M.

Applied in *rheumatic affections of the joints*, by painting the parts freely with a camel's hair pencil. *King's College Hospital.*

Mistura potassii iodidi composita.

Compound mixture of iodide of potassium.

℞. Iodin. gr. ss.
Potass. iodid. ʒss.
Syrup. papav. f ℥ss.
Aq. destillat. Oss.

Dose.—Two table-spoonfuls, three times a day, in cases of *complication of syphilis with scrofula.* *Tyrrel.*

℞. Iodin. gr. iss.
Potassii iodid. gr. iij.
Solve in
Aquæ menth. pip. f ℥iv.

Dose.—A spoonful two or three times a day;—to children, a tea-spoonful. In cases of *cancrum oris;* also, in *dropsy, gleet,* and *leucorrhœa.* On renewing the prescription, the dose of the iodine may be increased one-half, and of the iodide one grain, each time. *Coster & Freidrich.*

℞. Potass. iodid. ʒiv.
Syrup. althææ f ℥j.
—— menth. pip. f ʒij.
Aquæ lactucæ f ℥viij.

Dose.—A spoonful, morning and evening, in a little water, increasing the dose to two spoonfuls. In cases of *hypertrophy of the ventricles of the heart.* *Magendie.*

[1] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 244. Paris, 1847.

℞. Potass. iodid. ʒiv.
Tinct. digit. f ʒj. ad f ʒij.
Syr. althææ f ℥ss.
Aq. lactuc. f ℥viij.
—flor. naph. f ʒij. M.

Dose.—Morning and evening, a spoonful, in a little water. In *hypertrophy of the ventricles of the heart* with *quickening of the heart's action.* *Magendie.*

℞. Quassiæ,
Gentian. āā. ʒj.
Aquæ bullient. f ℥xvj.
Macera per horam et cola.
Liquor colat. add.
Potass. iodid. gr. xxxvj.
Potassæ carbonat. ʒij. M.

Dose.—A table-spoonful, three times a day, in a glass of water. *Cumming.*

Pilulæ potassii iodidi.

Pills of iodide of potassium.

℞. Potass. iodid. gr. xv.
Aq. destillat. q. s.
Spong. ust.
Ext. dulcamar. āā. ʒij.
Glycyrr. pulv. q. s.
Fiant pilulæ clxxx.

Dose.—Six, two or three times a day, in *scrofula, goître,* &c. *Vogt.*

Unguentum iodini compositum.

Compound ointment of iodine.—Iodurretted ointment.

℞. Iodin. ʒss.
Potass. iodid. ʒj.
Alcohol. f ʒj.
Adipis ℥ij.
Rub the iodine and iodide with the alcohol, and mix with the lard. *Pharm. Lond. & United States.*

Unguentum potassii iodidi.

Ointment of iodide of potassium.

℞. Potass. iodid. ʒss.
Adipis ℥iss. M.

Half a dram at first, and subsequently a whole dram, to be rubbed in, in *goître, scrofulous glandular affections,* &c.

This ointment is generally too weak, unless combined with the internal use of iodine in some form. *Magendie.*

℞. Potass. iodid. ℈j.
Adipis ℥ss. M.

The parts to be smeared with it two or three times a day, in *moist tetter—serpigo.* Between the applications to be dressed with dry lint. *Tünnermann.*

In *dry tetter,* the ointment applied is formed of ʒj. to ʒiss. of the *iodide* to ℥j. of *lard.*

(*Unguentum kali hydroiodici.* Pharmacop. Borussic.)

℞. Potass. iodid. ʒj.
Magnes. carb. gr. vj.
Aq. destillat. guttas nonnullas.
M. terendo cum
Ung. rosat. ℥j.

Or,

℞. Potass. iodid.
Sodæ carbon. depur. sicc. āā. ʒss.
Ung. rosat. ʒiv. ad ʒvj. M.

A piece, of the size of a small bean, to be rubbed in, morning and evening, in *chronic enlargement of the testis.*

Walther.

Messrs. T. and H. Smith,[1] of Edinburgh, having found it impracticable to make a neat ointment of iodide of potassium by the ordinary method, have recommended the following: Dissolve the requisite quantity of the *iodide* in its own weight of *distilled* or *some perfumed water*, and then mix thoroughly in a mortar with the proper quantity of *lard*. The two will incorporate perfectly with a very little heating, and form a smooth ointment.

℞. Potass. iodid. ʒss.
Ext. opii ℈ss.
Cerat. ℥j. M.

As a dressing to *malignant cancerous ulcers.*

Unguentum potassii iodidi compositum.

Compound ointment of iodide of potassium.

℞. Iodin. gr. xij.
Potass. iodid. ℈iv.
Adipis ℥ij. M.

In *scrofulous ophthalmia, ulcers, &c.* *Lugol.*

℞. Iodin. gr. xv.
Potass. iodid. ʒj.
Tinct. opii f ʒij.
Adipis ℥ij. M.

In *painful scrofulous ulcers, white swellings, &c.* *Lugol.*

Unguentum potassii iodidi et hydrargyri.

Ointment of iodide of potassium and mercury.

℞. Potassii iodid. gr. xij.—xv.
Ung. hydrarg. ciner. ℥ss. M.

In *herpes exedens.* *Blasius.*

Unguentum potassii iodidi anodynum.

Anodyne ointment of iodide of potassium.

(*Pommade iodée calmante.*)

R. Potass. iodid. gr. xv.
Morphiæ muriat. ʒss.
Adipis ʒx. M.

[1] London and Edinburgh Monthly Journal of Medical Science, Oct. 1841.

Applied to *painful tumours of the mammæ*, night and morning. *Chomel.*

Emplastrum potassii iodidi compositum.

Compound plaster of iodide of potassium.

℞. Iodin.
Potass. iodid. āā. ℈ss. ad ℈j.
Emplastr. hydrarg. seu
——— saponis. ℥ij. M.

Applied in *syphilitic* and *gouty swellings of the bones.* *Ebers.*

Linimentum potassii iodidi.

Liniment of iodide of potassium.

(*Baume hydriodaté.*)

℞. Potassii iodid. ℥j.
Alcohol. (20°) f ℥iv. M.

℞. Sapon. ex oleo animal. confect. ℥iss.
Alcohol. (20°) f ℥iv. M.

Mix these two solutions together; aromatize with a small quantity of *oil of lavender*, and before the mixture congeals pour it into wide-mouthed vials.[1] This liniment has been much used at Lausanne under the name *Gelée pour le goître.*

Lotio potassii iodidi composita.

Compound lotion of iodide of potassium.

℞. Iodin. gr. i. ad ij.
Potassii iodid. gr. ij. ad gr. iv.
Solve in
Aquæ destillat. f ℥viij.

This solution was commonly used by Lugol externally, injected under the eyelids in *strumous ophthalmia, fistulæ*, &c. *Lugol.*

℞. Iodin. ℥ss.
Potassii iodidi ℥j.
Solve in
Aq. destillat. f ℥vj.

This "*rubefacient solution of iodine*," may be used two or three times a week, when the last prescription loses its effect, or when it is desirable to stimulate more actively. It is also added to baths—three or four ounces to an ordinary bath—as well as to poultices, being mixed with an ordinary cataplasm. *Lugol.*

℞. Iodin. ℥j.
Potass. iodid. ℥ij.
Solve in
Aquæ destillat. f ℥ij.

This "*caustic iodine solution*" may be used when the last

[1] F. Boudet, Journal de Pharmacie, Avril, 1842, p. 335; and Duhamel, in Amer. Journal of Pharmacy, July, 1842, p. 102.

loses its efficacy. It occasions a crust on the parts. Lugol employs it chiefly when the skin on the edges of the *ulcers* is greatly hypertrophied, red, and fungous, as well as in *phagedenic or spreading tetters*. It may be applied two or three times a week, or daily, should the case require it. *Lugol.*

Collyrium potassii iodidi compositum.
Compound collyrium of iodide of potassium.

℞. Iodin. gr. ss. ad gr. i.
Potassii iodid. ℈ss.
Solve in
Aq. rosæ f ℥iij. M.

To be applied, four times a day, in cases of *scrofulous ophthalmia*, with *ulceration of the conjunctiva* and *cornea*.
Magendie

QUINIA ET EJUS SALES.

Synonyme. Quinia and its Salts.

CXLV. QUINIA.

Synonymes. Quinina, Quina, Quininum, Quinium, Chininum, Chininium, Chinium, Kinium, Sal Essentiale Corticis Peruviani.
French. Quinine, Kinine.
German. Chinin, Quinin, Chinastoff.

Quinia is a most important gift from modern analytical chemistry to medicine. About thirty years have elapsed since the discovery of this substance, and, by general consent, it is regarded as one of the most valuable remedies in the catalogue of the materia medica. The honour of the discovery—which had been facilitated by the investigations of other chemists, as to the composition of the cinchona barks—belongs to Pelletier and Caventou, (1820,[1]) and so rapidly and extensively was its efficacy promulgated, that in the year 1826, in two laboratories in Paris for the preparation of quinia, fifty-nine thousand ounces of the sulphate—the form best known, and most frequently prescribed—were prepared. For this discovery, the Royal Academy of Sciences of Paris awarded MM. Pelletier and Caventou the Monthyon prize of ten thousand francs.

It would appear, from the observations of Henry and Plisson, that cinchonia and quinia exist in cinchona bark in combination with kinic acid and also with cinchonic red, which is an insoluble red colouring matter.[2]

[1] Annales de Chimie et de Physique. xv. 289 and 337.
[2] Jour. de Pharmacie, xiii. 269 and 369. and Pereira, Elem. Mat. Med. and Therap. ii. 1397. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.

Quinia is obtained from yellow bark by a similar process to the one described for the separation of cinchonia.[1] In the pure state, it is of a white colour, and commonly appears in the form of powder; it crystallizes, however, in silky, shining tufted needles. In both cases, it contains from three to four *per cent.* of water. By a gentle heat this escapes, and quinia melts into a transparent fluid, which, on cooling, is translucent, and similar to resin. When melted *in vacuo* it has a crystalline appearance. In a strong heat it is decomposed. It has a very bitter taste, and is soluble in 200 parts of boiling water; a portion being precipitated on cooling. It requires a much larger proportion of cold water to dissolve it. In alcohol it is far more soluble than in water. It is, likewise, soluble in ether, and somewhat so in oils. It exhibits an alkaline reaction,—restoring the colour of reddened litmus paper, and neutralizing acids.

Impure quinia (*quinine brute*) is prepared by treating *cinchona* with *muriatic acid*, *lime* and *alcohol*, as in the preparation of sulphate of quinia; but instead of acidulating the alcoholic liquor, it is distilled without this addition. The product is a plastic mass, of firm consistence, which is formed of a mixture of quinia, cinchonia, and fatty and colouring matters. It is not sensibly bitter. 500 *grammes*, or about 11 ounces, of good Calisaya bark, yield nearly 16 *grammes* or about four drams of *quinine brute*.[2]

The observations of Piorry and Lavollée[3] and of Quévenne,[4] show, that quinia, as well as its sulphate, passes into the urine of patients who use it in any considerable quantity.

EFFECTS ON THE ECONOMY.

Of the effects of quinia we shall speak at length under the head of SULPHATE OF QUINIA, with which it seems to accord entirely in medicinal agency. Several physicians, who have experimented in regard to the efficacy of pure quinia and its salts, have found the first in no respect inferior to the last. Such was the experience of Niewenhuis and Elliotson, the latter of whom exhibited quinia in large doses—as much as five grains every four hours. A French physician, M. Blegnie,[5] even gives the preference to pure quinia, because it possesses, he thinks, equal efficacy, is cheaper, easier taken, and better borne than the sulphate. He advises, that after each dose an acidulous drink should be taken, to render its solution in the stomach more rapid. Wutzer[6] and Harles[7] have also recommended the more frequent use of pure

[1] See p. 216.
[2] Trousseau and Pidoux, Traité de Thérapeutique, &c. i. 298. Paris, 1847.
[3] Gazette Médicale, 1836, p. 73. [4] L'Expérience, Juillet, 1838.
[5] Riecke, Die neuern Arzneimittel, S. 118. See, also, Bally, in Magendie's Journal de Physiologie, ii 236. [6] Isis, p. 441, 1829.
[7] Heidelberg Klinisch. Annalen, B. v. H. 4, 573.

quinia: and M. Bouchardat[1] states, that he has often administered impure quinia, and has been satisfied with the excellent effects it produces in a small dose. It is likewise highly extolled by M. Trousseau,[2] who thinks it more active than the sulphate; and, owing to its being insoluble in the saliva, and almost devoid of taste, he prefers it in the diseases of children. He esteems it, indeed, the most useful of the preparations of cinchona.

After the administration of quinia and its salts, quinia may be detected in the blood and in the excrements.[3] It may be given either in the form of powder or pill, or in alcoholic solution. The dose of impure quinia is from 10 to 30 grains.

Tinctura quiniæ.

Tincture of quinia.

℞. Quiniæ ℈j.
Solve in
Alcohol. f ℥ss.

Dose.—Twenty to forty drops every two hours. *Wutzer.*

℞. Quiniæ impur. ℥vij℈ (30 *gram.*)
Alcohol.
Aq. destillat. āā. ℥xj℈ (350 *gram.*)
Misce et cola.

Two spoonfuls of this solution are considered to represent fifteen grains of sulphate of quinia. In this dose it has been administered in many cases of *hypertrophy of the spleen;* and it is affirmed, the spleen diminished under its use with greater rapidity than under that of the sulphate of quinia.[4] *Piorry.*

For some observations on AMORPHOUS QUINIA, see the appendix to the SALTS OF QUINIA.

CXLVI. QUI'NIÆ ACETAS.

SYNONYMES. Quininæ Acetas, Chinium Aceticum, Chininum Aceticum, Acetas Chinii seu Chinini seu Chinicus seu Quinicus, Acetas Quiniæ seu Quinæ seu Quinini seu Quinii seu Kinini, Quina Acetica, Acetate of Quinia or of Quinine.
French. Acétate de Quinine.
German. Essigsaures Chinin.

This preparation is not much employed. It is made by saturating quinia with pure *acetic acid* diluted with water, and evaporating the neutral solution, by gentle heat, to crystallization. It appears in the form of very delicate, needle-shaped, snow-white, satiny, and shining crystals; tastes very bitter; and is with difficulty soluble in cold water, but readily so in hot.

[1] Nouveau Formulaire Magistral, 3d édition, p. 264. Paris, 1845.
[2] Cited in British and Foreign Medical Review, Oct. 1842, p. 560.
[3] Landerer, Chem. Gazette, i. 147.
[4] Bouchardat, Annuaire de Thérapeutique, pour 1847, p. 179. Paris, 1847.

Wutzer and Sundelin[1] assert, that it acts like the other salts of quinia, but merits no preference.

CXLVII. QUINIÆ ARSENIAS.

Synonymes. Quininæ seu Quinæ Arsenias, Chininum Arsenicosum seu Arsenicicum, Arseniate of Quinia or of Quinia or of Quinine.
French. Arséniate de Quinine.
German. Arseniksaures Chinin.

METHOD OF PREPARING.

To obtain the salt, dissolve half an ounce of *sulphate of quinia* in barley water, and precipitate by *liquid ammonia*, which will produce upwards of two drams and a half of very pure quinia when washed and dried. Dissolve 46 grains of *arsenic acid* in about three ounces of *distilled water*. The quinia is insoluble in water, but under the influence of arsenic acid and ebullition it becomes soluble. A combination takes place, and, on cooling, crystals of arseniate of quinia are formed. The crystals are then dissolved in distilled water, and recrystallized by evaporation, in order to obtain the salt pure, and free from any excess of acid.

Well prepared arseniate of quinia is a white, light salt, crystallized in silky, brilliant needles. It is soluble in water; but in greater proportion in boiling water than in cold; it is soluble in weak alcohol; dissolving less readily in alcohol. It is insoluble in ether.[2]

EFFECTS ON THE ECONOMY.

Arseniate of quinia has been employed by M. Bourières in *obstinate intermittents*, in the dose of from three quarters of a grain to a grain and a half in the 24 hours. M. Bodin[3] has instituted some trials to determine the relative value of this salt and arsenious acid. He did not exceed from one to two-fifths of a grain of the arseniate for a dose, taken at once or in two doses; and could detect no superiority of action in this salt of quinia, whilst it had the inconvenience of being excessively bitter. He infers, therefore, that so far arsenious acid ought to have the preference.

It may be given in solution in distilled water, to which a little simple syrup may be added.

[1] Isis, p. 441, 1829; also, Heidelb. Klinisch. Annal. B. v. H. 4, 575.
[2] Journal de Chimie Médicale, xi. 283.
[3] Bouchardat, Annuaire de Thérapeutique pour 1846, p. 208. Paris, 1846.

CXLVIII. QUI'NIÆ AR'SENIS.

SYNONYMES. Quiniæ Di-arsenis, Arsenite of Quinia.
French. Bi-arsenite de Quinine.

This salt has been lately proposed by Dr. Kingdon.[1]

METHOD OF PREPARING.

Dissolve sixty-four grains of *arsenious acid*, and thirty-two grains of *subcarbonate of potassa*, in four ounces of *distilled water*, by boiling it for about half an hour, and making the quantity four ounces, by the addition of water; so that each dram may contain two grains of arsenic. To five drams of this solution add two scruples of *disulphate of quinia*, previously dissolved in boiling *distilled water*. A white curdy precipitate is immediately formed, which is the di-arsenite. This is poured on a filter and dried. It is uncrystallizable, and insoluble in water, but soluble in alcohol.

EFFECTS ON THE ECONOMY.

Arsenite of quinia has been highly extolled by Dr. Kingdon as a eutrophic in *chronic cutaneous affections* especially; and he has no doubt that it would be equally efficacious in *ague* and the various forms of *neuralgia*. It possesses the medicinal qualities of a mineral and a vegetable tonic; and when the system has become habituated to either one or the other, the former action is kept up by its administration, whilst, at the same time, a new one is introduced into the system.

The dose is one-third of a grain twice a day, and gradually three and four times a day, in the form of pill or powder, mixed with a little sugar or gum.

CXLIX. QUI'NIÆ CITRAS.

SYNONYMES. Quininæ seu Quinini seu Quiniæ seu Quinæ seu Quinii seu Chinini seu Kinini Citras, Citras Chinii seu Chinicus seu Quinicus, Chinium seu Chininum Citricum, Quina Citrica, Citrate of Quinia or of Quinine.
French. Citrate de Quinine.
German. Zitronsaures Chinin, Citronsaures Chinin, Citronensaures Chinin.

METHOD OF PREPARING.

This preparation is formed, like the acetate, from an aqueous solution of *citric acid*, and pure *quinia;* or by the decomposition of a hot solution of *sulphate of quinia*, by means of an *acid citrate of soda.*[2] It forms needle-shaped prisms, of a white colour, which are by no means readily soluble in water.

[1] Provincial Medical and Surgical Journal, August 25, 1847.
[2] Guleani, in Annali Universali di Medicina. Luglio, 1832, and Heidelb. Klinisch. Annal. B. x. H. i. S. 34. Heidelb. 1834.

EFFECTS ON THE ECONOMY.

The acetate and the citrate of quinia have been highly esteemed; and are considered to be adapted for those excitable persons with whom the sulphate does not seem to agree. The citrate has been prescribed by many Italian physicians, and found to be very efficacious.[1] The author is not aware that it is ever prescribed in this country. Magendie considers it, when it contains an excess of acid, advisable for those cases where the union of a tonic with an antiseptic property is indicated. He considers, that the following syrup may be substituted, in certain cases, for the *syrupus antiscorbuticus*, which is directed by the *Codex Medicamentarius* of Paris to be prepared in the following manner:—Take of the fresh leaves of *cochlearia*, *water trefoil*, *cress*, *horse-radish*, and *bitter oranges*, cut, of each one pound; *cinnamon*, an ounce and a half, *white wine*, four pints. Macerate for two days in a tin cucurbit, covered with a well luted capital. Distil, in a sand-bath, a pint of fluid; to which add two pounds of white sugar and make into a syrup. Pass through a cloth, without straining, what remains in the cucurbit; let the liquor rest; decant; and boil to the consistence of syrup, with two pounds of white sugar. When cold, clarify, and mix with the other.

Syrupus quiniæ citratis.

Syrup of citrate of quinia.

R. Syrup. Oi.
Quiniæ citrat. acid. gr. xxxvj. M.

Dose.—Two spoonfuls in the twenty-four hours.

A CITRATE OF QUINIA AND IRON is referred to elsewhere, (p. 345.)

CL. QUI'NIÆ FERROCY'ANAS.

SYNONYMES. Quininæ Ferrocyanas, Chinium Ferrocyanogenatum seu Ferrohydrocyanicum, Ferrocyanas Chinii, &c., Ferrocyanate or Hydrocyanoferrate of Quinia or of Quinine.
French. Ferrocyanate de Quinine.
German. Eisenblausaures Chinin.

METHOD OF PREPARING.

This is obtained by the decomposition of *sulphate of quinia*, by means of a solution of *ferrocyanuret of potassium;* after which the impure salt is treated with *warm alcohol*, and the clear solution is evaporated.[2] It forms needle-shaped, confused crystals, of

[1] Beraudi, in Bulletin Général de Thérapeutique, Nov. 1840.
[2] See Bertozzi's method, in Journal de Pharmacie, xix. 45, and Philada. Journal of Phrmacy, vol. ii. new series, p. 82. Philad. 1837. See, also, Donovan, in Dublin. Journ of Med. Sciences July, 1840, p. 440,

a greenish-yellow colour, and very bitter taste, recalling that of hydrocyanic acid. It dissolves readily in alcohol, not so in water; and is decomposed by hot water.

EFFECTS ON THE ECONOMY.

In this combination, the antifebrile properties of the quinia are said to be even superior to those of the other preparations; yet the remedy has not got into much use. It has been employed mainly by a few of the French practitioners. Cerioli[1] and Zaccharelli, Italian physicians, speak in high terms of its efficacy in *periodical diseases*, even where the sulphate has failed. Cerioli gave it in the dose of from two to eight grains in the day. Gouzee[2] details the history of three cases completely cured by the administration of a single grain, half an hour before the paroxysm; and Dr. H. V. Wooten,[3] of Alabama, affirms, that he has prescribed it in about fifty cases, and has found it, when pure, "act uniformly without those unpleasant effects which generally arise from the use of the sulphate;" and in cases in which there is febrile excitement or inflammation he uses it altogether; and, he adds, with full confidence, in all cases where he wishes to exert "a sedative and alterative or regulating power upon the nervous system."

MODE OF ADMINISTRATION.

The following formulæ have been recommended:

Haustus quiniæ ferrocyanatis.

Draught of ferrocyanate of quinia.

℞. Quiniæ ferrocyanat. gr. iv.
Alcohol. f ʒj.
Solve et adde
Aquæ camphor. f ʒvij. M.
et fiat haustus.

To be taken as occasion may require, first shaking the vial.

Donovan[4].

Pilulæ quiniæ ferrocyanatis.

Pills of ferrocyanate of quinia.

℞. Quiniæ ferrocyanat. gr. xxiv.
Mucilag. acaciæ q. s.
ut fiat massa in pilulas xij. dividenda.

Two for a dose. *Donovan.*

[1] Annali Universali de Medicina, Luglio, 1832, cited in Archives Générales de Médecine, Dec. 1832.
[2] Observateur Médical Belge, Jan. 1834.
[3] Southern Medical and Surgical Journal for April, 1846.
[4] Op. citat.

CLI. QUI'NIÆ HYDRI'ODAS.

Synonymes. Chininum Hydroiodicum, Hydriodate or Iodhydrate of Quinia; called also Ioduretum seu Iodidum Quiniæ, Ioduret or Iodide of Quinia.
French. Hydriodate ou Iodhydrate de Quinine, Iodure de Quinine.
German. Iodwasserstoffsaures Chinin.

Hydriodate of quinia may be formed by precipitating sulphate of *quinia* by means of *iodide of potassium.* The precipitate is of a yellow colour, soluble in alcohol, and crystallizes from this solution in quadrangular prisms.[1]

Dr. Kingdon[2] employs an "IODIDE" and a "BINIODIDE of QUINIA." The *former* is made by dissolving equal weights of *sulphate of quinia* and *iodide of potassium* in *boiling distilled water,* and allowing the mixture to cool, when beautiful fasciculi of needle-shaped crystals are deposited, which are insoluble in cold water, but soluble in alcohol. The *latter* is made by mixing twice the weight of *iodide of potassium* with *sulphate of quinia* in *boiling distilled water,* evaporating to one-third in a sand-bath, and allowing the residue to cool,—when a resinous substance is deposited, of a light straw colour, which, by exposure to the air, becomes darker, and of a greenish hue, not crystallizable, sparingly soluble in cold water, readily soluble in alcohol, and then not precipitated when mixed with water. He has given this preparation in several cases of *scrofulous enlargement of the glands* with very great benefit. In the case of a child between three and four years of age, when the glands of the neck were in a state of suppuration, half a grain was given twice a day, and at the end of six months the swellings were wholly removed, and the general health much improved.

More recently, Prof. A. T. Thomson has prepared an "IODIDE OF QUINIA," and an "IODIDE OF CINCHONIA;" the former made by triturating together, in a mortar, 164.55 grains of pure *quinia,* and 126.3 of *iodine;* the latter being added to the former until the whole is intimately mixed, and then boiling the mixture in a moderate quantity of distilled water at first, adding more by degrees, until as much is added as will give one grain of the iodide for each fluidram of the solution. During the boiling, a deep brown resinoid substance is formed, apparently insoluble in water, which subsides to the bottom when the solution cools. This substance is brittle, tasteless, inodorous, and affords no indication of the presence of either iodine or quinia. It is partially soluble in boiling alcohol. Dr. Thomson has not been able to ascertain its nature. It shows, however, by the appropriate tests, that it contains both iodine and quinia.

[1] Journal de Chimie Médicale, Mars, 1836. [2] Med. Times, July 29, 1843.

Iodide of cinchonia is prepared in the same manner, taking 156.55 grains of the alkaloid. The quantity of the resinoid matter is less than in the case of iodide of quinia; but it closely resembles it in its physical characters, insolubility in water, and solubility in alcohol. The solution is nearly inodorous, and has the bitter taste of cinchona. It answers to the same tests as the iodide of quinia.

Dr. Thomson had not crystallized either of the salts, nor does he seem to have administered them. He thinks the tonic influence of the quinia or cinchona may prevent iodism.[1]

An Iodide of Iodhydrate of Quinia, (French, *Iodure d'Iodhydrate de Quinine,*) is prepared by pouring into an acid solution of *quinia*, a solution of *iodide of iron*, containing a slight excess of *iodine*. The precipitate which forms is treated with *boiling alcohol*. The liquor is filtered, and, on cooling, the iodide of iodhydrate of quinia is deposited, which is in beautiful scales of a deep greenish colour. It is insoluble in water, and soluble in alcohol; possesses the properties both of quinia and iodine, and has been employed with much success in *rebellious intermittents*.

All these preparations are well adapted for diseases in which iodine and a tonic are indicated, and hence may be given with success in many cases of *scrofulous and other cachexiæ*.

Under the name Hydriodate of Iron and Quinia, Mr. Battley[2] has introduced a new article into the lists of the materia medica, in which the iron exists in the form of a protosalt. The iodine also, being in the state of hydriodic acid, acts—it is conceived—more mildly than the tincture and its other compounds. The preparation is a syrup, sugar being required to prevent the conversion of the protosalt of iron into peroxide. The proportions are such, that each fluidram contains a grain and a half of quinia, a grain of iron, and a grain of iodine as hydriodic acid. The dose is from twenty to thirty drops.

CLII. QUINIÆ LACTAS.

Synonymes. Quinæ Lactas, Chininum Lacticum, Lactate of Quinia.
French. Lactate de Quinine.
German. Milchsaures Chinin.

By saturating *lactic acid* with *quinia*, and subjecting the solution to spontaneous evaporation in a flat vessel, groups of silky needles of the lactate are obtained, which are more flattened than those of the sulphate.

[1] Pharmaceutical Journal, March, 1845, cited in Ranking's Abstract, Amer. edit. i. 349. New York, 1845.
[2] London Med. Gazette, May 12, 1848.

Lactate of quinia does not crystallize as readily as the sulphate and valerianate, and it is more soluble than either of those salts.

Prince Louis Lucien Bonaparte, Beraudi and Bouchardat have found the lactate possessed of great energy, and M. Conte has proposed to replace the sulphate by it.[1]

MODE OF ADMINISTRATION.

Pilulæ quiniæ lactatis.

Pills of lactate of quinia.

℞. Quiniæ lactat. ʒss.
Extract. junip. q. s. ut fiant pil. xx.

Dose.—Two to six in the day in *intermittents*.—*Bouchardat.*

Mistura quiniæ lactatis.

Mixture of lactate of quinia.

℞. Quiniæ lactat. gr. vii.
Aq. menth. f ʒv.
Syrup. caryophyll. f ℥i.
Aquæ f ℥iiiss. M.

Dose.—One-third. The whole to be taken during the interval in *pernicious intermittents*. *Bouchardat.*

Syrupus quiniæ lactatis.

Syrup of lactate of quinia.

℞. Quiniæ lactat. gr. xv.
Solve in
Aquæ f ℥j.
adde
Sacchar. ℥ij. Solve.

Dose.—A coffee-spoonful in the *intermittents* of children. *Bouchardat.*

CLIII. QUI'NIÆ MU'RIAS.

Synonymes. Quininæ Murias, Chininum Muriaticum seu Salitum seu Hydrochloricum, Hydrochloras seu Murias Chinii seu Chinicus seu Quinicus, Chlorhydras Quinicus, Muriate of Quinia or of Quinine.
French. Muriate ou Hydrochlorate de Quinine.
German. Salzsaures Chinin, Hydrochlorsaures Chinin.

Perhaps, next to the sulphate of quinia, this salt has most frequently been employed in practice.

METHOD OF PREPARING.

It is obtained by dissolving pure *quinia* in *dilute muriatic acid*, or by the decomposition of *sulphate of quinia* dissolved in *warm water*, by means of a solution of *chloride of barium*, which is added so long as a white precipitate is thrown down; the hot mixture is then filtered; the precipitate washed, and the clear

[1] Bouchardat, Nouveau Formulaire Magistral, p. 264. Paris, 1845.

fluid evaporated, by a gentle heat, to crystallization, so long as crystals shoot on cooling; these are collected, washed in cold water, and purified by repeated crystallization. It forms fine, needle-shaped, white, silky crystals, of a mother-of-pearl lustre; and does not dissolve readily in water, but more so than the sulphate.

EFFECTS ON THE ECONOMY.

In this respect, the muriate agrees with the sulphate of quinia, and by those of weak digestive powers is borne better. Spielman[1] asserts that it is a more speedy and effectual remedy for *intermittent fever* than the sulphate, and is more soluble. It is, however, more expensive. The dose is generally considered to be the same as that of the sulphate. It is better given in solution than in powder. Spielman rates the dose at from half a grain to a grain.

CLIV. QUI'NIÆ NI'TRAS.

SYNONYMES. Quininæ Nitras, Chinium seu Chininum Nitricum, Nitras Chinii, &c. Nitrate of Quinia or of Quinine.
French. Nitrate de Quinine.
German. Salpetersaures Chinin.

METHOD OF PREPARING.

This salt is obtained, like the muriate, by the addition of *nitric acid* to *quinia;* or by the decomposition of *nitrate of baryta* by *sulphate of quinia.* It is, at first, a fluid, oil-like mass, which gradually becomes solid. In union with water it forms crystals. It dissolves with difficulty in water, but readily in alcohol.

CLV. QUI'NIÆ PHOSPHAS.

SYNONYMES. Quininæ Phosphas, Chinium seu Chininum Phosphoricum, Phosphas Chinii seu Chinini, Phosphate of Quinia, of Quina or of Quinine.
French. Phosphate de Quinine.
German. Phosphorsaures Chinin.

METHOD OF PREPARING.

In mode of preparation, it accords with the preceding forms; *dilute phosphoric acid* being added to *quinia*, or *phosphate of baryta* to *sulphate of quinia.*[2] It appears in the form of needle-shaped prisms, of a mother-of-pearl lustre, which, like the muriate of quinia, are readily soluble in water and alcohol. Harles,[3] how-

[1] Allgemein. Medicinisch. Zeitung, cited in Journal des Connaiss. Médic. Fév. 1836: see, also, Dierbach, in Heidelb. Klinisch. Annal. B. x. H. i. S. 33. Heidelb. 1834.

[2] Winkler, in Büchner's Repert. and Philad. Journ. of Pharmacy, new series, vol. ii. p. 12. Philada. 1837.

[3] Heidelb. Klinisch. Annal. B. x. H. i. S. 36. Heidelb. 1834; and Journal de Chimie Médicale, 1837.

ever, affirms, that in the neutral condition it dissolves, with difficulty, in water.

The phosphate is regarded by some to stand next to the sulphate in medicinal efficacy.

CLVI. QUI'NIÆ SULPHAS.

Synonymes. Quininæ Sulphas, Quinæ Disulphas seu Sulphas, Chinium seu Chininum Sulphuricum, Sulphas Chinii seu Quinicus, Sulphate of Quinia, of Quina or of Quinine.
French. Sulfate de Quinine.
German. Schwefelsaures Chinin, Chininsulphat.

This preparation of quinia is by far the most frequently administered. It is in fine, silky, flexible needles, and at times in rectangular columns. Its taste is extremely bitter, and resembles that of yellow bark. Exposed to a moderate heat, it loses its crystalline form, in consequence of the escape of its water of crystallization. It is only slightly soluble in cold water, requiring 740 parts at the ordinary temperature, and 30 parts of boiling water for its solution. In alcohol, it is very soluble, but only slightly so in ether. With sulphuric acid, it forms a super-sulphate, which is much more soluble in water than the neutral salt, and hence a few drops of dilute sulphuric acid are usually added to mixtures of sulphate of quinia.

METHOD OF PREPARING.

This salt is generally prepared on a large scale in the chemical laboratories. A formula was admitted, however, into the Pharmacopœia of the United States (1830,) which was taken from the process of M. Henry, Junr.,[1] for which he received a prize from the *Académie Royale des Sciences*, of Paris. It is as follows:—Take of *yellow bark*, in powder, a pound; *lime*, in powder, four ounces; *sulphuric acid*, *alcohol*, *animal charcoal*, *distilled water*, each a sufficient quantity. Boil the bark for half an hour with eight pints of distilled water, acidulated with a fluidounce of the sulphuric acid. Strain the decoction through linen: then boil the residue with the same quantity of acidulated water, and filter as before. Mix the filtered liquors, and gradually add the lime, stirring constantly. Wash the precipitate with distilled water, and, having dried it, digest in alcohol with a moderate heat. Pour off the tincture, and repeat the digestion several times, till the alcohol is no longer rendered bitter. Mix the tincture, and distil over the alcohol, till a brown viscid liquid remains in the retort. Upon this substance, removed from the retort, pour as much sulphuric acid, largely diluted with water, as may be sufficient for its

[1] Journal de Pharmacie, vii. 296. Juillet, 1821.

perfect saturation. Then add the animal charcoal, and having evaporated the liquor sufficiently, filter while hot, and set it aside to crystallize. In the last edition (1842,) the form has been modified as follows:—Take of *yellow bark*, in coarse powder, ℔iv.; *muriatic acid*, f ℥iij.; *lime*, in powder, ℥v.; *water*, five gallons; *sulphuric acid*, *alcohol*, *animal charcoal*, of each a sufficient quantity. Boil the bark in one-third of the water mixed with one-third of the muriatic acid, and strain through linen. Boil the residue twice successively with the same quantity of water and acid as before, and strain. Mix the decoction, and while the liquor is hot, gradually add the lime, previously mixed with two pints of water, stirring constantly, until the quinia is completely precipitated. Wash the precipitate with distilled water, and, having pressed and dried it, digest in boiling alcohol. Pour off the liquor, and repeat the digestion several times, until the alcohol is no longer rendered bitter. Mix the liquors, and distil off the alcohol, until a brown viscid mass remains. Upon this substance, removed from the vessel, pour about half a gallon of distilled water, and having heated the mixture to the boiling point, add as much sulphuric acid as may be necessary to dissolve the impure alkali. Then add an ounce and a half of animal charcoal, boil for two minutes, filter the liquor while hot, and set it aside to crystallize. Should the liquor, before filtration, be entirely neutral, acidulate it very slightly with sulphuric acid: should it, on the contrary, change the colour of litmus paper to a bright red, add more animal charcoal. Separate the crystals from the liquor, dissolve them in boiling water slightly acidulated with sulphuric acid; add a little animal charcoal, filter and set aside to crystallize: wrap the crystals in bibulous paper, and dry them with a gentle heat. The mother waters may be made to yield an additional quantity of sulphate of quinia by precipitating the quinia with solution of ammonia, and treating the precipitated alkali with water, sulphuric acid, and animal charcoal as before.[1]

It results from the calculation of Pelletier and Caventou, that from a quintal of cinchona, two pounds, one dram and thirty grains of sulphate of quinia may be obtained, which makes two drams, sixty-six grains and a sixth per pound, or thirteen grains and two-sixths per ounce; and as the sulphate is composed of nine parts and nine-tenths of sulphuric acid to ninety and a tenth of quinia, it follows that if the dose of cinchona in substance be two drams, we should administer to the patient three grains and nine thirty-secondths of a grain of sulphate of quinia; not taking into account a small quantity of sulphate of cinchonia, which may be mixed with it. Four grains of the salt are, consequently, more than an equivalent for the dose of the cinchona often prescribed in substance. Those practitioners, therefore, who prescribe thirty-six or seventy-

[1] Pharm. of the United States, p. 174. Philad, 1842.

two grains of the sulphate, give the representative of about twenty-seven drams of cinchona in the former case, and of fifty-four in the latter.[1]

Sulphate of quinia is liable to be adulterated,—for example, by mannite, which is similar in external appearance, but—as elsewhere shown—is destitute of all its properties. This adulteration can be readily detected by means of pure alcohol, which dissolves the quinia alone, but leaves the mannite untouched, which is freely soluble in water, and is known by its characteristic sweet taste. It is also adulterated with gypsum, the presence of which may likewise be detected by alcohol, which does not dissolve it.[2]

Some idea of the immense consumption may be formed, when it is stated, that from 40,000 to 50,000 ounces of sulphate of quinia were probably made during the year 1845, in Philadelphia.

The sulphate of quinia of commerce is said to be not unfrequently adulterated with salicin. If the proportion of the salicin be one-half, or even one-fourth, M. Pelletier[3] states, that the fraud may be detected by the addition of concentrated sulphuric acid, which produces with salicin a characteristic red colour. But if no more than one-tenth of salicin be mixed with the sulphate, the red colour is not developed by the addition of sulphuric acid. In order to detect the presence of salicin in this or a still less proportion, the salicin must be separated. For this purpose, take three or four grains of the suspected sulphate of quinia, and pour on it about six times its weight of concentrated sulphuric acid, which dissolves the salt, and if salicin be present forms a solution of a brown colour, like sulphuric acid soiled by some vegetable matter. To this some distilled water must be carefully and gradually added, until a white precipitate appears. This will probably be salicin, which will not dissolve in a moderately dilute acid solution of sulphate of quinia. Filter the liquid, and collect the precipitate on a watch-glass, and it will now produce, upon the addition of concentrated sulphuric acid, the bright red colour characteristic of salicin. If too much water be added, the precipitate will dissolve, and only a loose gelatinous precipitate will form, very difficult to separate.

One evidence of the value of this discovery of the sulphate of quinia, has been mentioned by the author elsewhere.[4] He was informed a few years ago, that although the best cinchona bark could not be purchased, at the time, in Philadelphia, for less than one dollar and thirty-seven cents per pound, and in powder for less than one dollar and fifty cents,—cinchona powder, so called, might be obtained for ten cents a pound! This consisted of the false and other barks, with the cinchona or true barks; and generally,

[1] Jourdan, Pharmacopée Universelle, ii. 375. Paris, 1828.
[2] Vallet & Dubail, Journal de Pharmacie, Janvier, 1840.
[3] Journ. de Chimie Médicale, cited in London Lancet, Jan. 11, 1845.
[4] Practice of Medicine, 3d edit. ii. 424. Philad. 1848.

perhaps, not a particle of the latter could be detected in it. Yet the appearance of the true and the spurious powder was so nearly alike, that no difference could be discovered, even by an experienced eye. From July 1848 to April, 1849, inclusive, Dr. Bailey,[1] inspector of drugs at the port of New York, rejected 34,000 pounds of spurious and worthless cinchona barks, which contained none, or but a trace, of the alkaloids of the true barks; and he affirms, that the cost of these barks, delivered in that market, was, at the time, about six cents a pound, whilst the genuine cost eighty cents!

EFFECTS ON THE ECONOMY.

The effects of the preparations of quinia on the healthy organism have not been much investigated. According to Caventou, they produce a general excitement, similar to that caused by coffee, and Wittmann affirms, that the sulphate induces an excitement similar to that of a paroxysm of fever. Hirschel,[2] too, asserts, that in a child, four years of age, to whom the sulphate was given in a case of *intermittent*, a general chilliness of some minutes' duration supervened immediately on taking the remedy, succeeded, in the course of half an hour, by general heat, and this again by a gentle perspiration, in all respects resembling a mild attack of fever. The excitant action of the salts of quinia formed by the vegetable acids is said to be less striking.

Sulphate of quinia, in large doses, appears, in some cases, to possess narcotic properties. It has even proved fatal, when given in excessive doses, and Dr. Baldwin,[3] of Alabama, from all he can gather, is disposed to think, that from fifty to eighty grains of a pure article, given in solution at one dose, will produce death nine times out of ten, in healthy adults, and that occasionally smaller doses will have the same result. "How far," he adds, "its operation may be modified by morbid action is a matter for consideration at the bed-side." M. Recamier[4] ordered a man in the Hôtel Dieu, affected with acute rheumatism, 48 grains of the sulphate in 12 powders—one to be taken every hour. The next day, 72 grains were ordered,—six to be taken every hour; but after the eighth dose, the patient was suddenly seized with violent agitation, followed by furious delirium, and died in a few hours. On examination, evidences of severe inflammation [?] of the cerebral membranes were discovered. An analogous case, in which very dangerous symptoms supervened on the administration of four scruples of the sulphate in twelve hours, occurred about the same time in the wards of M. Husson.[5] It has often, however, been

[1] Report on the practical operation of the Law relating to the Importation of adulterated and spurious Drugs, Medicines, &c. New York, 1849.
[2] Hufeland's Journal, B. lxi. St. 6, S. 140.
[3] American Journal of the Medical Sciences, April, 1847, p. 307.
[4] Bouchardat, Annuaire de Thérapeutique, &c. pour 1843, p. 170. Paris, 1843.
[5] Gazette des Hôpitaux, 8 Decembre, 1842.

administered in considerable quantity without the supervention of any disagreeable results. Bally[1] gave it to the extent of 110 grains in the day without any inconvenience. Dr. Thomas Fearn,[2] who administered it largely, regards it to be more narcotic than sedative,—usually, he thinks, stimulating in small doses, but in large doses the stimulant effects not being obvious, but rather the reverse; and such appears to be the view of Dr. A. Flint.[3] It is affirmed, that when administered for some days in large doses, the pulse became greatly retarded, fell below fifty in the minute, and great debility was experienced.[4] This decisive sedative action has been observed by the author[5] over and over again, when the sulphate of quinia has been given in free doses; but Dr. George Mendenhall,[6] of Cincinnati, affirms, from experiments made upon himself, that in all cases the pulse was increased in fulness and hardness, even when it decreased in frequency. "When ten grains, and also twenty grains were taken, the ringing in the ears was very great, with some considerable deafness for several hours; also a general feeling of the body, such as would be excited by riding in a railroad car." M. Favier took, in twelve days, 280 grains of the sulphate, commencing with six grains, and doubling the dose every three days. The first three doses produced no other effect than an evident diminution in the number of the pulsations, and a degree of activity in the nutritive functions; the three following, which were of 12 grains, still acted on the pulse, the force and frequency of which were diminished. From time to time, ringing in the ears supervened, with frequent hunger. The subsequent doses acted still more in reducing the activity of the circulation, and caused disorder of the mind, somnolency, tinnitus aurium, and so much debility, that M. Favier was almost unable to stand; and after he had discontinued the experiment, he did not recover his muscular strength for six or eight days.[7]

When Mr. Scott,[8] a medical gentleman and a martyr to *dys-*

[1] Revue Médicale, v. 244, Juillet, 1821.

[2] Transylvania Journal of Medicine, October, November and December, 1836, p. 798; cited in American Medical Intelligencer, June 15, 1837, p. 109.

[3] American Journal of Medical Sciences, Oct. 1841, p. 277.

[4] Bouchardat. op. cit. p. 170. See, also, on its sedative properties, J. W. Malone, Amer. Jour. of the Medical Sciences, Oct. 1843, p. 376; Boling, ibid. July, 1844, p. 89; Legroux, Journ. de Méd. in Encyclog. Med. Avril, 1845: cited in Ranking's Half-yearly Abstract, i. 218. New York, 1845; J. Bell, in Stokes and Bell's Lectures on the Theory and Practice of Physic, 3d edition, ii. 638. Philad. 1845; A. N. Bell, Medical Examiner, May, 1846, p. 283; M'Cormick, New Orleans Medical Journal, September, 1845; J. Harrison, ibid. Nov. 1845. See, also, on this subject, Dickson, Southern Jour. of Medicine and Pharmacy, January, 1846; T. D. Mitchell, New Orleans Medical and Surgical Journal, July, 1846, p. 25; Briquet, Annuaire de Thérapeutique pour 1849, p. 205; and G. L. Upshur, Medical Examiner, March, 1847, p. 143.

[5] Medical Examiner, April, 1845, p. 538, and his General Therapeutics and Materia Medica, 4th edit. ii. 85. Philad. 1850.

[6] American Journal of the Medical Sciences, July, 1846, p. 79.

[7] Bouchardat, Annuaire de Thérapeutique pour 1850, p. 172.

[8] London Medical and Physical Journal, March, 1833.

pepsia, took quinia in very large doses, under the idea that his malady was intermittent neuralgia, he found several singular phenomena induced thereby. He was directed to commence with two grains three times a day, until he arrived at twenty grains for a dose,—that is, a dram a day. Until the doses were increased to fourteen or sixteen grains, he did not experience any peculiar effects, but now began to feel heat of skin, dryness of mouth and fauces, and obstinate constipation. He likewise lost the power of naming substantives; was obliged for a long while to consider what familiar things were called, and was unable to cast up a line of six or eight figures correctly. His perceptions of quantity were likewise impaired, so that in prescriptions he wrote ounces for drams, drams for grains, &c., &c. He still, however, persevered with the quinia, until he took ℈j. four times a day; but he was unable to continue these large doses long, the untoward symptoms augmenting, so that he was often unable to stand, and fell several times in the street.

Very similar results to those observed by Mr. Scott, and especially as regards the inability of utterance—which, in their cases, was complete—are recorded by M. Ménage,[1] and Mr. G. O. Heming.[2] Cases of deafness caused by large doses have been detailed by Dr. Joseph Williams, of London,[3] Mr. C. R. Bree,[4] of Stow-market, England; M. Fr. Lugeol, of Havanna,[5] and Prof. Giacomoni,[6] and cases of blindness, induced by large doses, are recorded by Dr. John M'Lean,[7] and Dr. Wm. Alex. Thom.[8]

MM. Trousseau and Pidoux[9] refer to the case of a soldier who took 48 grains of the sulphate for the cure of spasmodic asthma, which returned daily at a certain hour. Four hours afterwards, he experienced buzzing in the ears, diminished sensibility, giddiness, and violent vomiting. Seven hours after taking it, he was blind and deaf, delirious, incapable of walking by reason of the giddiness, and vomited bile copiously. He was, in fact, in a state of intoxication. The symptoms gradually subsided. Usually, the action of the sulphate does not extend beyond twenty-four hours, and its maximum effects are experienced two or three hours after taking it.[10]

In impressible individuals, the sulphate and the muriate—even in moderate doses—not unfrequently induce a sense of anxiety, restlessness, vertigo, confusion, depravation of vision, tinnitus au-

[1] Gazette Médicale de Paris, 25 Avril, 1840.
[2] London Lancet, and Medical Examiner, July 18, 1840, p. 468.
[3] London Lancet, July 25, 1840, p. 639.
[4] Ibid. August 22, p. 786.
[5] Bullet. Gén. de Thérap. Mars, 1842.
[6] Annali di Medicin. Feb. 1841, and Journal de Pharmacie, Sept. 1842, p. 209.
[7] Illinois and Indiana Medical and Surgical Journal, Dec. 1846.
[8] Medical Examiner, April, 1847, p. 217.
[9] Traité de Thérapeutique, ii. 217.
[10] Trollier, in Bouchardat, Annuaire de Thérapeutique pour 1847, p. 176. Paris, 1847.

rium, and, in many cases, transient deafness—*cinchonism, quinism, quininism,*—all which symptoms appear to be of a neuropathic character; and, it has been affirmed, occur more frequently in females, especially those who are pregnant or suckling—and in persons of slender and delicate conformation.[1] In certain cases, quinia and its salts seem to have caused ptyalism—the saliva being inodorous, and the teeth firm; and, when calomel has been given along with it, it has been conceived that ptyalism has ensued sooner than it otherwise might have done.

M. Melier[2] in conjunction with M. Magendie has investigated the toxical properties of quinia. They found, in animals, congestion of the lungs and deficient coagulability of the blood. These were the principal *post mortem* phenomena. Its action was much more energetic when given fasting, and in acid solution. Its absorption and elimination were rapid.

The most striking agency of quinia and its salts is in cases of *periodical diseases of all kinds;* and especially in *intermittent fever;* they have now, indeed, almost wholly taken the place of the cinchona, over which they possess many points of preference. In the first place, their bulk is much less; they therefore do not oppress the stomach so much, whilst the impression of the cinchona on that organ not unfrequently interferes with its antipyretic properties. In *malignant fevers*, too, it is often impossible to introduce the requisite quantity of cinchona into the organism to prevent the succeeding paroxysm, and the life of the patient is consequently placed in danger. In this case, sulphate of quinia is invaluable, possessing, as it does, the antiperiodic virtues of cinchona in such a concentrated state, that but a small quantity is required to produce equal efficacy with a large quantity of powdered cinchona. In such cases, indeed, the latter is apt to disagree with, or be rejected by the stomach, before its full influence can be exerted. In those *pernicious fevers*, that occur especially in Italy and Holland, sulphate of quinia has supported life in innumerable cases where cinchona, in substance, might have failed, and has thereby best exhibited its sanative agency.[3] In such cases quinia is administered without regard to complications, which, in less urgent cases, might be allowed to interfere with its administration. Another advantage ascribed to quinia is, that in cases of paroxysmal fevers, in which the attacks follow each other so closely that the second commences before the first has terminated, it may be given during the paroxysm,—a time at which cinchona would be apt to occasion oppression of the stomach and vomiting.

Of late, a salutary change has occurred in the treatment of southern fevers, and indeed of yellow fever, by the liberal admi-

[1] Riecke, Die neuern Arzneimittel, S. 120.
[2] Mém. de l'Académie Royale de Médecine, tom. x. Paris, 1843.
[3] Repertorio Med. Chirurg, por l'anno 1822, Torino. No. 12; Med. Chirurg. Zeitung, B. ii. S. 137, 1823; and Richter's Specielle Therapie, B. x. S. 326, Berlin, 1828.

nistration of sulphate of quinia, which is now regarded by southern practitioners as "the Samson article of the Materia Medica," in place of calomel, on which the epithet was previously lavished. In the *congestive fever* of the Western States, Dr. Charles Parry[1] found the sulphate of quinia "the remedy;" and such has been the result of the experience of others.[2] Great success has followed the use of sulphate of quinia, in doses of from a scruple to a dram in *yellow fever*, in the practice of Drs. Hunt, Beattie, Farrel, Mackay, and others,[3] but Dr. W. A. Van Buren, U. S. A., never witnessed any decided and permanent good effects from it; and in the hands of others it has failed signally. In the *remittents* of the South and West, it has been an admirable remedy in the practice of Drs. J. B. Porter,[4] Wm. M. Boling,[5] Wm. A. Van Buren,[6] Prof. Dugas,[7] Dr. R. L. Scruggs,[8] and others.[9] Dr. T. D. Mitchell,[10] indeed, lays down the position, that all fevers "possess one common property, which confessedly under the control of the sulphate of quinia in the case of common ague and fever, is not less so in typhoid, typhus, congestive, yellow, and it may be all the fevers named in the books; and he assumes the position "plainly and boldly," that "there is but one feature or element in either of the fevers named, that is essential to its pathology, and that feature, or property, or element bows before the potent sway of the sulphate of quinia, and for this reason only we cure the patient."! M. Guérard[11] employs it at the commencement of all febrile affections. "Whenever a person is attacked with typhoid fever, variola, or any other acute febrile affection, which is attended at the onset with encephalic disturbance threatening a severe form,—as delirium with aberration of the senses, particularly of the sense of sight, which is most appreciable by the physician, he prescribes, before every thing, two *grammes* or about 31 grains of the sulphate of quinia, to be taken by spoonfuls through the twenty-four hours. This dose has to be given the next day, and at times also on the day following." The encephalic symptoms, he affirms, are immediately dissipated; the pulse becomes regular, and the disease assumes a mild character. He states, also, that he has used it

[1] American Journal of the Med. Sciences, July, 1843, p. 32. See, also, C. E. Lavender, American Journal of the Med. Sciences, July, 1848, p. 51.
[2] Tuck, New Orleans Med. and Surg. Journ., cited in Med. Examiner, Dec. 1845, p. 749.
[3] Medical Examiner, Oct. 19, and Oct 26, 1839.
[4] American Journal of the Medical Sciences, Oct. 1845, p. 296.
[5] Ibid. July, 1846, p. 18.
[6] Cited in Medical Examiner, Feb. 1846, p. 139.
[7] Southern Med. and Surg. Journal, cited in Med. Examiner, for Feb. 1847, p. 107.
[8] Med. Examiner, Dec. 1848, p. 716.
[9] See a discussion on the powers of quinia in *remittent fevers*, in Med. Examiner, Feb. 1850, p. 78.
[10] Western Lancet, cited in Examiner, June, 1845, p. 386. See, also, New Orleans Med. and Surg. Journ. July, 1846, p. 22.
[11] Bouchardat, Annuaire de Thérapeutique pour 1849, p. 212.

successfully in tinnitus aurium not accompanied by febrile phenomena and dependent upon cerebral congestion.

Dr. Scruggs holds it to be a most important fact connected with the use of the sulphate of quinia, "that it should never be given upon a rising fever,—that is, until the fever has attained its climax, or has been arrested by the use of the lancet or other remedial agents, and has a downward tendency. Then, although the pulse may have mounted up to one hundred and forty beats to the minute, and have declined only ten beats, quinine may be given in large and repeated doses, combined with ipecacuanha, not only with safety, but with the most decidedly beneficial results." On the other hand, Dr. R. S. Holmes[1] affirms, that as a remedy for periodicity quinia is to be given regardless of any existing state of inflammation.

In the *typhoid fever of children* it was found serviceable by MM. Rilliet and Barthez.[2] Trials of the remedy have likewise been made at the Hôpital Cochin in Paris, by M. Blache, in the *typhoid fever of adults*, the results of which were favourable. The cases, however, were not numerous, and in certain of them other remedies were prescribed either before or in conjunction with the sulphate of quinia. Afterwards, some of the patients of M. Husson at the same hospital were subjected to the same mode of treatment, and the results were published by M. Laurent.[3] The dose of the medicine usually prescribed was three quarters of a grain every hour: at times, the dose was larger, and given less frequently; and, in several instances, two drams and more were given in the twenty-four hours for several days together. In thirteen cases no other remedy was administered, but although the patients recovered, the results did not show any great superiority over other modes of management. In no instance were the phenomena arrested by the quinia. Of ten patients, who had the disease mildly, all recovered but one, whose death was attributed by M. Laurent to the quinia. Of three patients, labouring under the disease in a severe form, one only recovered; and he was for a time in great danger from intestinal hemorrhage. The report of M. Laurent is not very favourable to the beneficial effects of the sulphate of quinia in typhoid fever. By Dr. A. N. Bell[4], it has been given in the same disease; with the effect of reducing the frequency of the pulse, but without appearing to affect in the least the duration of the disease.

Of late, it has been prescribed by M. Leudet,[5] in large doses as a preventive of puerperal fever, and Dr. W. M. Boling,[6] of Alabama, has

[1] Amer. Journ. of the Medical Sciences, Oct. 1846, p. 304.
[2] Archiv. Général de Méd. Juin, 1841. [3] Ibid., Sept. 1842.
[4] Méd. Examiner, May, 1846, p. 282.
[5] L'Union Médicale, 8 Avril, 1848; and Wahu, Annuaire de Médecine, &c., pour 1849, p. 299. [6] Amer. Journ. of the Medical Sciences, July, 1844, p. 110.

adduced what he esteems reasons for the belief, that it is "peculiarly" applicable to the treatment of the *inflammatory affections of malarious districts*,—and this he considers is owing to the combination with its antiphlogistic properties of a power to control the periodicity of morbid action. "As an antiphlogistic remedy in elevated and healthy localities," he remarks, "it will probably never supersede the lancet, antimonials, &c., though it may in many cases be brought to their aid; but in malarious regions, ere long, it will generally be looked upon as the safest and most manageable contra-stimulant we possess, and, at the same time, one sufficiently powerful, while other agents of the same class will only be used to fulfil some casual indication or as adjuvants to this the powerful remedy."

It is scarcely necessary, however, to say that quinia and its preparations are not universally admissible. The stomach is occasionally so irritable as not to retain it. In such cases, it is true, it may be given in the form of enema. In remittents, too, that are accompanied with hyperæmia of important organs, such hyperæmia must be removed before it can exert its wonted efficacy. "Those," says Prof. Dickson,[1] "deceive themselves, who regard quinine as a universal and *infallible* febrifuge even in malarious fevers."

Sulphate of quinia has likewise been found advantageous in large doses—twelve to thirty grains and more daily—in *engorgement of the spleen*, consequent on intermittent fever;[2] and M. Levy[3] has seen the *dropsical effusions*, that not unfrequently supervene on neglected cases of the same disease, yield readily to the sulphate in full doses.[4] In a memoir presented to the Academy of Sciences of Paris, by M. Piorry, a few years ago, he laid down the astounding opinion, that sulphate of quinia, dissolved in a small quantity of sulphuric acid and administered in moderate doses, acted so rapidly on the spleen, that in the course of 40 seconds a notable diminution in the size of the organ took place. As might have been presumed, there would seem to be some source of fallacy in his observations; and M. Gouraud[5] has boldly maintained, as the result of accurate inquiry into the phenomena, that the disappearance of dulness in the splenic region under such circumstances is dependent upon the ingestion of fluid with the sulphate of quinia, which produces a development of gas, rather than upon the action of the sulphate of quinia, and M. Gouraud's observations have been confirmed by M. Valleix.[6]

Its use has been recommended in *asthma* by Dr. B. R. Hogan,[7]

[1] Southern Journal of Medicine and Pharmacy, Jan. 1846.

[2] For the opinions of Bally, Nonat, and Piorry on this subject, see Medico-Chirurg. Rev. July, 1840, from La Lancette Française. [3] Op. cit.

[4] Bulletin Général de Thérapeutique, 30 Nov., 1837, and Levy, Gazette Méd. No. xxii. [5] Cited in Medical Examiner, Sept. 1845, p. 577.

[6] Monthly Journ. of Med. Science, July, 1847; and Med. Examiner, Nov. 1847, p. 697.

[7] American Medical Intelligencer, Feb. 1842, p. 153.

who gave it in doses of from two to eight grains, repeated in an hour, if relief did not follow. He also affirms, that in the forming stage of *croup*, in the case of a child, two years old, two grains of the sulphate and a snuff plaster on the chest warded off the attack. It has been administered successfully in the same disease by M. Puls[1] in the form of *lavement* in the dose of 60 *centigrammes*—gr. 9¼—in the day. Where there was a *malarious complication* it was more decidedly efficacious.

In *hiccough*, when at all periodical, M. Mondière has found the disease promptly and decisively cured by the free use of quinia, after it had resisted every other mode of treatment. He has also used it with good results in many cases of severe *cardialgia*. In a case of *traumatic tetanus* it was administered along with sulphate of morphia in large sedative doses, with much success, by Dr. Bishop;[2] and in *marsh cachexy—cachexie paludéenne*—it was found, by M. Duclos, most advantageous. In these cases, it is associated with chalybeates by Professor Trousseau.[3]

Sulphate of quinia, like cinchona, has been given largely in *acute rheumatism*—a disease which is peculiar, and in the author's view, largely neuropathic.[4] Some years ago, M. Briquet announced that he had cured *acute articular rheumatism*, accompanied with violent pain, swelling, redness, fever, &c., in two or three days, with sulphate of quinia, in doses of about a dram and a half daily. In such cases, and especially in the subacute form, the author has prescribed from twenty to thirty grains in the twenty-four hours with marked advantage. Its antiperiodic virtues are clear, and instead of its acting as an excitant, it produces sedative effects.[5] In obstinate cases, a combination with opium—three or four grains in the twenty-four hours—proved most decidedly salutary. Given after the use of the lancet, in highly inflammatory cases, or after powerful purgation with croton oil, it has been productive of the happiest effects in the hands of Dr. Geo. L. Upshur,[6] of Norfolk, Va.

Some years ago, M. Gueneau de Mussy,[7] in the name of a committee, made a report on different papers that had been forwarded to the French Academy, on the treatment of acute rheumatism by large doses of sulphate of quinia. The committee concluded, that it should not be given in the high doses of four to six scruples, advised by M. Briquet; and they affirmed, that the same therapeutic effects may be obtained from ordinary doses. The

[1] Bouchardat, op. cit. p. 214.
[2] New York Journal of Medicine, Sept. 1847.
[3] Bouchardat, Annuaire, &c. pour 1849, p. 215.
[4] Practice of Medicine, 3d edit. ii. 611. Philad. 1848;—and Med. Examiner, Sept. 1845, p. 538.
[5] See Legroux, Journal de Méd. in Encyclographie Méd. Avril, 1845, cited in Ranking's Half-yearly Abstract, Amer. edit. i. 218. New York, 1845.
[6] Med. Examiner, Oct. 1850, p. 581.
[7] Ibid. July 8, 1843, p. 156.

sulphate of quinia plan of treatment is followed by MM. Andral, Monneret, Legroux, and Professor Trousseau,[1] at the Hôpital Necker, and is recommended by M. Vinet.[2]

Of late, it has been strongly advised by many of the French practitioners as a prophylactic against *cholera;* but the observations made at the Hôpital Cochin, in Paris, were by no means favourable to those pretensions.[3] In large doses, it has been prescribed with speedy and good effect by M. Piorry,[4] in certain cases of *insanity*, in those especially in which the disease has seemed to have been connected with certain changes of the functions of the organs of sense, especially of hearing; and in the case of *hypochondriasis*, with certain abdominal sensations. Periodicity is a characteristic in many of these cases, and hence the utility of quinia.

Besides their antiperiodic property, the salts of quinia possess a tonic virtue that adapts them for numerous cases in which that class of remedies is indicated. Yet there are many who think that cinchona is better calculated for such cases than quinia, and who administer the latter to prevent the paroxysms of an intermittent, but have recourse to cinchona when they are desirous of fortifying the system to prevent a relapse. There are cases, too, which resist quinia and its preparations, and which subsequently yield to cinchona in substance; but this may be owing to the quantity of lignin, or woody matter in the bark in substance aiding the quinia of the cinchona in producing that new impression on the nerves of the stomach, which is necessary to break in upon the paroxysmal catenation. In its antiseptic virtues, also, sulphate of quinia is inferior to cinchona. It has been doubted, indeed, whether it has any such virtues.

Lastly: there is an advantage possessed by sulphate of quinia, —that in irritable or impressible persons it may be exhibited endermically, and thus no disorder be induced in the digestive actions. It need scarcely be said, that cinchona is not well adapted for this mode of administration.

MODE OF ADMINISTRATION.

Sulphate of quinia may be given internally in the form of powder or pill, and in solution in water, alcohol, or syrup. The average dose, in the twenty-four hours of apyrexia, is from four to ten grains; yet it has been given frequently to a much greater extent. As in the case of cinchona, it has also been advised, that

[1] Trousseau and Pidoux, Traité de Thérapeutique, &c., 3ème éd. ii. 322. Paris, 1847; See, also, Med. Examiner, May, 1848, p. 330.

[2] Union Médicale, No. 43; cited in British and Foreign Med.-Chirurg., July, 1848, p. 259.

[3] Bouchardat, Annuaire de Thérapeutique pour 1850, p. 196.

[4] Gazette des Hôpitaux, No. 86; cited in British and Foreign Med.-Chirurg. Review, Oct. 1848, p. 554.

a large dose should be given immediately before the expected paroxysm, so as to render the frequent administration during the apyrexia unnecessary: this dose need not be so great as the combined doses would amount to, so that there may be economy in the plan. Dupasquier, Elliotson,[1] the author, and many others,[2] have found this course eminently successful; but some object to it. In ordinary intermittents, the author is in the habit of administering the sulphate in the form of the *mistura quiniæ sulphatis*, given hereafter. As the antiperiodic virtues of the remedy are exerted through the nervous system, he considers it advisable to impress not only the nerves of the stomach but those of gustation, which cannot be effected by the pilular form. Half the mixture—or five grains of the sulphate—is given about an hour before the paroxysm, and the remainder half an hour afterwards; and if signs of the paroxysm appear notwithstanding, he directs fifty or sixty drops of the tincture of opium to be given. This course rarely fails.[3] The advantages of the solution over the pilular form have been confirmed by the observations of M. Briquet.[4] He considers it more active by one-half.

A case of *severe remittent* has been detailed by Dr. Thomas Fearn,[5] in which he gave, at one dose, three tea-spoonfuls—weighing thirty-two grains. At the end of an hour, there was a diminution in the frequency of the pulse—"the invariable effect of large doses of quinia, when its operation is favourable." The dose was repeated, and at the end of another hour, it was again given, making ninety-six grains in two hours. Dr. Fearn remarks, that his usual practice in remittent fever had been to give three doses of twenty grains each, with an interval of an hour between.

Of late years, it has been the practice with many physicians to administer it in very large doses—gr. xx. to gr. xl.—in ordinary intermittent fever;[6] and there may be cases in which after the disease has resisted the usual doses it may yield to these; but the author has not met with many. It has been stated, indeed, that M. Piorry, who was formerly an advocate for large doses of the sulphate in intermittents, now affirms, that he obtains the same results from doses of fifteen grains, as he did from those of seventy and ninety.[7] Dr. Upshur,[8] of Norfolk, gives it in doses of three or five grains, every two hours, commencing as soon as there is the slightest diminution in the hot stage, and continuing it until the patient complains of noises in the ears. He found that, when administered in large doses in the hot stage, so far from exciting

[1] Medico-Chirurgical Transactions, xii. 543. Lond. 1824.
[2] Thomas Stratton, R. N., Edinb. Med. and Surg. Journal, April, 1844.
[3] See the author's Practice of Medicine, 3d edit. ii. 424, Philad. 1848.
[4] Bouchardat, Annuaire de Thérapeutique pour 1849, p. 211. [5] Op. cit.
[6] A. Flint, in American Journal of the Medical Sciences, Oct. 1841, p. 278.
[7] Philad. Med. Examiner, Feb. 4, 1843, p. 24. [8] Ibid. Feb. 1846, p. 89.

the circulation, it acted as a decided sedative—the pulse, in every instance, being lessened in force and frequency under its influence.[1] A medical friend of Dr. Dickson,[2] of Charleston, assured him that in Alabama, he had administered "thirty grains of a solution of sulphate of quinia, every hour for seventeen successive hours," and he states that he had heard authentically of a western physician, "who emptied into the stomach of a patient labouring under *bilious remittent*, an ounce bottle in one night." Even larger doses than these are recorded. Dr. B. Rush Mitchell,[3] in a case of *congestive fever*, gave thirty grains every half hour, until 240 grains were taken in about four hours; and the patient recovered. Generally, between the paroxysms several doses are administered; and, according to the particular case, the efficacy of the salt of quinia is attempted to be increased by the addition of antimonials, laxatives, carminatives, &c., and—in pernicious or malignant intermittents especially—of opium or morphia.

By many, a combination of quinia with moderate doses of cinchona is highly recommended. Chapman advises its union with piperin: a combination with the alcoholic extract of cinchona has also been prescribed.

Mr. Sherwin,[4] of Hull, affirms, that a piece of apple, chewed for a moment, immediately annihilates the bitter taste left by it, and MM. Des Vouves, Dorvault, Quevenne and Bouchardat[5] state, that an infusion of roasted coffee masks the bitterness so completely, that children—not the most docile—take it without repugnance. M. Thélu[6] has found, that an infusion of black tea, which possesses the same astringent principles as coffee, has the like effect. Perhaps the tannic acid contained in them is the active agent; inasmuch as Dr. Richard H. Thomas,[7] of Baltimore, noticed that the addition of two grains of the acid to ten of the sulphate of quinia in a mixture deprived it of its bitterness.

It is stated,[8] that quinia, given in infusion of senna, is more efficacious as a tonic, notwithstanding the cathartic nature of the mixture, than almost double the quantity given in pill.

Sulphate of quinia may be used in the way of enema, and endermically, when the condition of the stomach forbids its internal employment. As an enema, three times the ordinary dose, or more, may be mixed with starch, and be thrown up a short time before the paroxysm, or at the inception of the same. In this way it has been found efficacious.[9]

[1] Medical Examiner, March, 1847, p. 146.
[2] Dickson, loc. cit.
[3] New Orleans Med. and Surg. Journal, July, 1846, p. 20.
[4] Lond. Med. Gaz. April 1, 1837.
[5] Annuaire de Thérapeutique pour 1848, p. 153. Paris, 1848.
[6] Bouchardat, op. cit. p. 157.
[7] American Journal of the Medical Sciences, April, 1850, p. 541.
[8] Lond. Lancet, Nov. 4, 1843.
[9] Richter, Op. cit. S. 331. Berlin. Medicin. Zeitung, Jan. 4, 1837.

In administering the sulphate or muriate of quinia endermically, a space on the surface of the body is deprived of its cuticle by means of a blister, and on this denuded portion the agent is applied, either in the form of powder or of ointment. To testify in regard to the efficacy of this mode of administering the salts of quinia, many observers have come forward,—Lesieur, Lembert, Martin, Wesche, Lehmann, Reilingh, Stratingh, Lieber, G. Lane Corbin,[1] and others. From four to eight grains may be placed on the denuded part once or oftener in the day. Dr. Lieber, of Berlin, seems to have prescribed the salt most frequently in this way: he mentions, that of sixty cases, in which he employed it, only eight or ten were unsuccessful; and there was reason to believe, that in these the internal administration of sulphate of quinia would have failed also. In the case of adults, he applies a blister in the evening—of the size of a dollar—over the epigastric region; in the morning, during the apyrexia, the blister is cut; the cuticle removed, and five or six grains—in children two grains—of the sulphate are sprinkled over the denuded surface. The whole is then covered with adhesive plaster, which must extend to the breadth of a finger over the edges of the blistered part. The sprinkling of the sulphate always occasions a violent burning sensation, but if it be applied in the form of ointment, this evil is avoided, or at least diminished. The pain, however, speedily disappears. Some hours after the application, oppression is felt in the stomach, with a desire to vomit, without, however, vomiting actually supervening; borborygmi, or uneasiness in the bowels, and frequently fluid dejections, with augmented secretion of saliva, which, in some cases, continues for several days. In the course of from twelve to twenty-four hours after the application, a very bitter taste is usually perceived over the whole tongue, similar to that of quinia; and if the application has been made sufficiently long before the anticipated paroxysm, it may be entirely prevented, or rendered much milder. After the effect has been produced, the adhesive plaster may be kept applied for some days, and, if the sore is not healed, it may be dressed with simple applications. In only two cases did Dr. Lieber observe any extensive or offensive suppuration; and both cases healed under simple dressings with dry lint. At times, the blistered surface is made much more extensive, and the quantity of the sulphate of quinia much larger. Dr. Wooten,[2] for example, does not apply less than two drams in the case of an adult, when the endermic use of the remedy is required, which, of course, is not often. In a case related by Dr. Corbin[3] of *intermittent of eighteen months' duration*, which had resisted various measures, a blister was applied to each extremity, and one over the epigastrium, an hour before the expected paroxysm; and

[1] American Medical Intelligencer, Aug. 1841, p. 26.
[2] Southern Medical and Surgical Journal, July, 1846, p. 414. [3] Op. cit.

to the exposed cutis, an ointment, composed of five drams of the sulphate to four ounces of simple cerate. The whole of this was spread on cloths, and laid on the blistered surfaces eight hours after the blisters had been applied; and the dressings were not disturbed until the parts were healed. The cure was complete. It is affirmed by M. Martin Solon,[1] that when sulphate of quinia has been applied endermically, in no case could it be detected in the urine.

Rubbing quinia or its salts on the gums has, likewise, been occasionally recommended, as well as frictions with the alcoholic solution, or with an ointment, on these as well as other portions of the surface of the body—the thighs, groins, and pit of the stomach;[2] and it has been advised in cases of *intermittent cephalalgia*, and in *iralgia*, to be snuffed up the nostrils.[3] M. Ducros[4] makes the strange assertion, that doses of about three quarters of a grain, dissolved in sulphuric ether, and applied with friction to the lining membrane of the mouth—"*par la méthode buccale*"—cause a stronger and more rapid action than half a dram given by the stomach or rectum; and that they are not liable to induce *quininism*. This rapidity of action he regards as peculiarly important in *malignant intermittents*. "Sulphate of quinia, administered in pills or enema, requires five or six hours for its action, [?] but when administered by friction in the mouth, half an hour before the third paroxysm, which is often fatal, reaction has time to take place."

Dr. Guastamocchia[5] has succeeded in arresting *intermittents* by dissolving eight grains of *sulphate of quinia* in half an ounce of *alcohol*, and rubbing it, in two doses, with an interval of a quarter of an hour between them, along the spine. This should be done at the beginning of the cold stage. It very often prevented a recurrence of the paroxysm.

Mistura quiniæ sulphatis.
Mixture of sulphate of quinia.

℞. Quiniæ sulphat. gr. x.
Acid. sulph. dil. gtt. viij.
Aquæ vel
Aquæ cinnam. f ℥iiss.
Syrup. f ℥ij. M.

Dose.—One-half to be taken an hour, and the other half, half an hour before the expected paroxysm of an *intermittent*, or the whole to be taken in divided doses during the apyrexia.

[1] Cited in Medical Examiner, Nov. 1845, p. 695.

[2] Schuster, cited in American Journal, May, 1832, p. 242; and Antonini, Journal des Connaissances, &c., Oct. 1838.

[3] B. St. Hilaire, in Gazette Médicale de Paris, 26 Mars, 1836.

[4] Comptes Rendus, cited in Western Lancet, July, 1846, p. 138; and Bouchardat, Annuaire de Thérapeutique pour 1847, p. 179. Paris, 1847.

[5] Il Filiatre Sebezio, Agosto, 1841, cited in British and Foreign Medical Review, Jan. 1843, p. 236.

Syrupus quiniæ sulphatis.

Syrup of sulphate of quinia.

℞. Quiniæ sulphat. gr. xvj.
Syrup. f ℥viij. M.

Dose.—A spoonful. *Magendie.*

Syrupus quiniæ sulphatis compositus.

Compound syrup of sulphate of quinia.

℞. Quiniæ sulphat. gr. xvj.
Acid. sulphur. dilut. gtt. v.
Syrup. limonis f ℥viij. M.

Dose.—Same as the last.

Mel quiniæ sulphatis.

Honey of sulphate of quinia.

(*Miel de quinine.*)

℞. Quiniæ sulphat. gr. viij. (50 *cent.*)
Acid. sulphur. aromat. ℥j.
Mel purificat. ℥iss. M.

Dose.—A tea-spoonful in the *intermittents* of children. It is generally taken without repugnance. *Petzold.*[1]

Tinctura quiniæ sulphatis.

Tincture of sulphate of quinia.

℞. Quiniæ sulph. gr. vj.
Solve in
Alcohol. 34° (.847) f ℥j.

Dose.—f ℥j. or f ℥ij. immediately before an attack of *intermittent.* *Magendie.*

Guttæ quiniæ sulphatis et opii.

Drops of sulphate of quinia and opium.

℞. Quiniæ sulphat. (seu acetat.) gr. xij.
Solve in
Alcohol. (seu sp. æther. sulph. comp.) f ℥ss.
Adde
Tinct. opii gtt. xij.

Dose.—Morning and evening, twenty drops, in the *summer fevers* of Europe. *Schmidt.*

Pulveres quiniæ sulphatis.

Powders of sulphate of quinia.

℞. Quiniæ sulphat. gr. iij. ad xij.
Sacchar. ℥ij.
Misce et fiat pulvis in partes vj. æquales dividendus.

Dose.—A powder, morning and evening, in *nervous debility* and in *intermittents.*

Radius[2] advises, that the powders should be taken in coffee, by which means the bitter taste is almost wholly counteracted.

[1] Annuaire de Thérapeutique, &c., pour 1847, p. 178. Paris, 1847.
[2] Auserlesene Heilformeln, u. s. w. S. 186. Leip. 1836.

Pulveres quiniæ sulphatis et sodæ carbonatis.

Powders of sulphate of quinia and carbonate of soda.

℞. Quiniæ sulphat. gr. j.—ij.
Sodæ carbonat. gr. iv.—v.
Sacch. ℈j.
Misce et fiat pulvis.

Dose.—A powder, morning and evening, in *scrofulous ophthalmia.* *Von Ammon.*

Pulveres quiniæ sulphatis et antimonii et potassæ tartratis.

Powders of sulphate of quinia and tartrate of antimony and potassa.

℞. Quiniæ sulphat. gr. x.
Antim. et potass. tartrat. gr. iij.
Sacchar. gr. xxiij.
Misce exactè, et divide in partes sex æquales.

Dose.—One, every two hours, during the apyrexia, in cases of *obstinate intermittents.* *Gola.*[1]

Pulveres quiniæ sulphatis et opii.

Powders of sulphate of quinia and opium.

℞. Opii puri gr. j.
Quiniæ sulph. gr. iij.
Sacchar.
Acac. āā. gr. vj. M. et fiat pulvis.

To be taken a short time before the paroxysm in *malignant intermittents.* *Neumann.*

Pulveres quiniæ sulphatis et morphiæ sulphatis.

Powders of sulphate of quinia and sulphate of morphia.

℞. Quiniæ sulph. gr. ij. ad. vj.
Morphiæ sulph. gr. ss. ad. j.
Divide in dos. iv.

Magendie.

Pulveres quiniæ sulphatis compositi.

Compound powders of sulphate of quinia.

℞. Quiniæ sulph. gr. j.
Cinchon. pulv. gr. xv.
Rhei pulv.
Oleosacchar. menth. āā. gr. v.
Misce et fiat pulvis.

Eight of these to be given in cases of *intermittent fever.* *Neumann.*

℞. Quiniæ sulph. gr. ¼.
Chocolat. gr. vij.
Sacchar. lact. gr. ij.
Misce. Fiat pulvis tertiis omnibus horis sumendus.

In *debility of the stomach.* *Kopp.*

[1] Annali Univers. di Medicina, tom. 35.

Pilulæ quiniæ sulphatis.

Pills of sulphate of quinia.

℞. Quiniæ sulphat. gr. v.—xij.
Ext. glycyrrhiz. ʒi.
Misce et fiant pilulæ xij.

To be given, according to prescription, in *nervous diseases.*
Radius.

A form for PILLS OF SULPHATE OF QUINIA is admitted into the Pharmacopœia of the United States:

℞. Quiniæ sulphat. ℥j.
Acaciæ in pulv. ʒij.
Syrup. q. s.

Mix together the sulphate of quinia and the gum; then beat them with the syrup so as to a form a mass, to be divided into four hundred and eighty pills.

Each pill contains a grain of the sulphate.

Pilulæ quiniæ sulphatis compositæ.

Compound pills of sulphate of quinia.

℞. Quiniæ sulphat. gr. x.—xv.
Acid. phosphoric. sicc. ℈ij.
Althææ (vel rhei,) pulv. ℈iv.
Ext. centaur. minor. vel gentian. ℈ij.
Misce et fiant pilulæ lx.

Dose.—Three to six pills, two or three times a day, in cases of *nervous debility* with *disposition to hemorrhage*,—as after *abortion.* *Radius.*

℞. Quiniæ sulphat. gr. xv.
Cinnam. pulv. ʒss.
Extract. cinchonæ q. s. ut fiant pilulæ xxx.

Dose.—Four pills every two to four hours. *Henschel.*

℞. Quiniæ sulphat. gr. xij.
Extract. trifol. ℈j.
Calam. pulv. q. s.
Fiant pilulæ xij.

Dose.—One or two every two hours. *Hildenbrand.*

Pulvis sternutatorius ex quiniæ sulphate.

Sternutatory powder of sulphate of quinia.

℞. Quiniæ sulphat. gr. xv.
Tabaci sternutator. com. ℥j. M.

To be snuffed up the nostrils in the course of five or six days, in cases of *intermittent headach.*

℞. Quiniæ sulphat. gr. vj.
Sacchar. pulv. ʒj.
Irid. rad. pulv. ʒiss. M.

Small pinches of this to be snuffed up the nose at night.
B. St. Hilaire.

Unguentum quiniæ sulphatis.
Ointment of sulphate of quinia.

℞. Quiniæ sulphat. ℥j.
Alcohol (38° ad 40°) q. s. (℥ij.)
Acid. sulphuric. q. s. (gtt. lxxx.)
Adipis ℥iv. M.

Half an ounce at a time to be rubbed on the groins in *malignant intermittents*. It may be likewise placed in the axillæ.
Antonini.

An ointment composed of ʒj. of *sulphate of quinia* and ℥ij. of *lard* has been rubbed with success into the axilla in cases of *ague* in children.[1]

Vinum quiniæ.
Wine of quinia.

℞. Quiniæ sulphat. gr. xij.
Vin. Mader. Oij.

Wine of quinia may, also, be made extemporaneously, by adding two ounces of the tincture to a pint bottle of wine.

CLVII. QUINIÆ VALERIA'NAS.

Synonymes. Chininum Valerianicum, Valerianate of Quinia.
French. Valerianate de Quinine.
German. Valeriansaures Chinin.

This salt was first formed of late years by Prince Louis Lucien Bonaparte.

METHOD OF PREPARING.

A cold solution of *valerianic acid* in *distilled water* is saturated by a concentrated solution of *quinia* in *alcohol* at 36° (s. g. .847;) and the valerianate of quinia thus formed is subjected to spontaneous evaporation.[2] Or, it may be made by adding freshly precipitated *quinia* to a hot solution of *valerianic acid*, and then crystallizing. The crystals are in thin, colourless rhomboidal plates, of a mother of pearl lustre, or in needles. It is not very soluble in water, but more so in alcohol and ether. It has a smell of valerianic acid, and a very bitter taste.[3]

Another method of preparing it is the following. Into an alcoholic and concentrated solution of *quinia* a slight excess of *valerianic acid* is poured; the whole is then suspended in twice its bulk of distilled water; and the mixture is carefully stirred, and subjected to evaporation in a stove at a temperature not exceeding 50°. When the evaporation of the alcohol has taken place, the

[1] Lond. Med. Gaz., April 3, 1840.
[2] Bouchardat, Nouveau Formulaire Magistral, p. 263. Paris, 1845.
[3] Ballard and Garrod, Elements of Materia Medica and Therapeutics, p. 409. Lond. 1845. See, also, Galvani, cited in Med. Examiner, April, 1846, p. 249.

valerianate presents itself in the form of beautiful crystals, sometimes isolated; at others grouped together. It may also be prepared by double decomposition, by mixing *sulphate of quinia* with *chloride of calcium*, or *chloride of barium*,—both being dissolved in weak alcohol.[1] The Dublin College prepare it by the double decomposition of *muriate of quinia* and *valerianate of soda*.[2]

EFFECTS ON THE ECONOMY.

Prince L. L. Bonaparte administered the valerianate of quinia to two inhabitants of the Maremma district, in Italy, and found that it did not produce the same neuropathic phenomena that occasionally follow the use of sulphate of quinia. Since then, the salt has been employed by different observers. M. Devay,[3] of Lyons, infers, as the result of his observations, that it is a more powerful antiperiodic than the sulphate, even when given in smaller doses. M. Castiglioni[4] gave it in eighteen cases of *intermittent* or *remittent fever:* in fifteen it effected a cure, and in three it produced only temporary relief. In two of the last cases the sulphate of quinia had been employed without success; and in one the most vaunted remedies had proved useless. The minimum dose for curing the disease was six grains; the maximum thirty-five; the medium quantity about ten grains and a half. The minimum time required for the cure was two days; the maximum eight days, and the mean three days and a half. The high price, however, of the salt, will necessarily prevent it from being much used.

MODE OF ADMINISTRATION.

Valerianate of quinia being easily decomposed, it is best to exhibit it in the most simple form. M. Devay dissolves 30 *centigrammes*, (about gr. 4½,) in 632 *grammes*, (about f ℥iij,) of gum water; and directs it to be taken at three times, in cases of *rebellious fevers*. It may also be given in pills, and as it dissolves readily in oil, one *gramme* (gr. 15.44,) may be dissolved in 60 *grammes* (about ℥ij,) of olive oil, to form a liniment, which may be rubbed over the region of the spleen. When administered in the form of enema, 5 *decigrammes* (gr. 5.7,) may be dissolved in 200 *grammes* (f ℥viss,) of water.

[1] Gazette Médicale de Paris, cited in Provincial Med. and Surg. Journ. Dec. 24, 1844; and Bouchardat, Annuaire de Thérapeutique pour 1845, p. 136.

[2] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850, p. 167. Dublin, 1850.

[3] Journal de Pharmacie, cited in Pharmaceutical Journal, March, 1845.

[4] Bouchardat, op. cit. p. 138.

CLVIII. QUI'NIÆ ET CINCHO'NIÆ TANNAS.

.Synonymes. Chininum Tannicum, Tannas Chinii seu Cinchonicus seu Quinicus, Tannate of Quinia and Cinchonia.
German. Gerbstoffsaures Chinin, Gerbesaures oder Tanninsaures Chinin.

Dr. Otto[1] has drawn the attention of physicians to the efficacy of the tannates of quinia and cinchona as recommended by Dr. Ronander, the Secretary to the Swedish Medical Association. He regards them as the most active ingredients in the cinchonas; and affirms that he has cured by their agency several cases of *obstinate intermittent*, which had resisted the use of sulphate of quinia and other powerful remedies. He found them likewise useful in *typhus*, and in states of *general weakness* and *tendency to putrescency*, where sulphate of quinia seemed to be ineffectual. Dr. Ronander's experiments establish the belief, that the tannic acid of the cinchonas may be instrumental in developing their full febrifuge powers.[2] Tannate of quinia has been found successful in *typic* or *intermittent neuralgia*, where sulphate of quinia had failed.[3] M. Oesterlen,[4] however, considers it a superfluous preparation. It is a cheaper remedy than the sulphate.

OTHER PREPARATIONS OF QUINIA.

On separating quinia from cinchona by means of acids, a *resinous constituent of the bark* remains behind, which affords no more quinia, but yet possesses considerable anti-periodic power, and on that account has been much used by the Dutch physicians. Two grains of this residuum are said to act as well as one grain of quinia. Truessink adduces a series of observations of different physicians, all of which confirm this, and he cites the experience of American physicians with the residuum. According to Dr. Chapman,[5] a grain of this may be given every two hours during the apyrexia, in the form of pill. Strathing ascribes its efficacy to the quinia still contained in it. In Italy, several physicians have found the mother waters or lees after the preparations of quinia, when boiled to the consistence of syrup, very efficacious in intermittents; and Roux recommends it highly in practice amongst the poor. Buchner advises the lees, evaporated to dryness—which he terms *Chininum Resino-sulphuricum*—to be introduced as a cheap, and, at the same time, efficacious prepara-

[1] Dublin Journal of Medical Science, Sept. 1836.
[2] Revue Médicale, Mai, 1837, cited in Amer. Med. Intelligencer, Oct. 16, 1837, p. 270.
[3] Hauff, cited in Northern Journal of Medicine, Dec. 1835, from Oesterlen's Jahrbuch, and in Braithwaite's Retrospect, Jan.—June, 1846.
[4] Handbuch der Heilmittellehre, S. 442. Tübing. 1845.
[5] Elements of Therapeutics, 6th edit. ii. 292. Philad. 1831.

tion of cinchona, which may be used in charitable institutions, rubbed up with sugar as a powder, or dissolved in alcohol, in place of sulphate of quinia. These experiments and propositions, as Riecke[1] observes, merit more consideration than they have yet received; for quinia, notwithstanding its price is much less than formerly, is yet so dear, that its administration does not adapt it well for eleemosynary institutions, whilst the residue, which possesses valuable properties, is generally thrown away, and in this manner the price of quinia is enhanced.

Sertürner[2] thinks he discovered, besides quinia and cinchona, other alkaloids of cinchona, especially one which he called *Chinioidine, Chinoidine, or Quinoidine*, and which excels, he considers, in medicinal properties, all the other preparations of cinchona. Henry and Delondre—the French chemists—affirm, that chinioidine is nothing more than quinia, cinchonia, and a peculiar yellow resinous matter, intimately adherent to the alkaloids, and rendering them uncrystallizable. It appears, also, from the experiments of different physicians with the presumed new alkaloid, that it essentially resembles the preparations already mentioned in its medical properties.[3] A *resina chinæ præparata* is recommended by Plagge, which is prepared from the mother waters or lees of quinia, by means of precipitation by a carbonated alkali, extraction by alcohol, and removal of the alcoholic liquor by distillation. It is said, likewise, to possess markedly curative powers in *intermittents*.

The Pharmacopœia of the United States of 1830 gave a formula under the title Quiniæ Sulphas Impurus, which consisted in evaporating the liquor poured off the crystals of sulphate of quinia to the consistence of a pilular mass. This has been known for years in Philadelphia under the name Extract of Quinia, and its active ingredients appear to be sulphate of quinia and sulphate of cinchonia, which are prevented from crystallizing by a peculiar resinoid substance united with them. Dr. Wood[4] asserts, that he has seldom found intermittents resist twenty-four grains of the impure sulphate, given between the paroxysms; although a larger quantity may be employed with safety and greater certainty of success; and more recently, Bertini[5] has considered these residual extracts after the preparation of sulphate of quinia to be highly efficacious in *masked intermittents*, as well as in those cases of *relapse* in which the salts of quinia, from long use, have become powerless. He remarked, moreover, that intermittents cured by this agent were less liable to relapse. These preparations, however, become important from

[1] Die neuern Arzneimittel, u. s. w. S. 130.
[2] Hufeland's Journal, Jan., 1829.
[3] Radius, Auserlesene Heilformeln, S. 191. Leipz. 1836, and Lincke, Vollständiges Recept-Taschenbuch, i. 455, Leipz. 1840.
[4] Wood and Bache's Dispensatory, 4th edit. p. 1032. Philad., 1839.
[5] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 184. Paris, 1847.

recent investigations of Liebig, which show that their active principle is really quinia, *amorphous quinia;*—that the substance in fact described by Sertürner, Henry, and Delondre is simply the alkaloid quinia in an amorphous or uncrystalline state, and bearing the same relation to quinia, that uncrystallizable sugar does to cane sugar. "The testimony of Dr. Sertürner, and of Henry and Delondre, on the therapeutic effects of their alkaloid," says a recent writer[1]—"becomes therefore a matter of some interest, as Liebig tells us a large quantity has probably accumulated, and, if so, it may be obtained at a far cheaper rate than the price sulphate of quinia now bears in the market.[2] This amorphous quinia is advertised in the English journals, as a most efficacious and cheap antiperiodic.

CLIX. SALICINA.

Synonymes. Salicinum, Salicinium, Salicine, Salicin.
French. Salicine.
German. Salicin, Weidenstoff, Weidenbitter.

The tonic virtues of the bark of the willow have been known for ages, and it has been regarded as one of the best substitutes for cinchona in eleemosynary institutions. It was not much valued, however, in more modern times, until the discovery of an active principle in it again attracted to it the attention of practitioners. This discovery, if not made, was perfected by Leroux,[3] an apothecary at Vitry, in France, who first obtained salicin in a pure state in 1828, after it had been procured in an impure form by some German and Italian chemists.[4] It is prepared, by preference, from Salix helix, but is found likewise in the barks of other willows —Salix alba, S. vitellina, S. purpurea, S. Lambertiana, S. pentandra, S. polyandra, S. fragilis, S. viminalis, &c., and in the leaves and barks of several varieties of poplar, Populus tremula, P. tremuloides,[5] P. alba, and P. Græca.[6]

METHOD OF PREPARING.

According to the method of Leroux, three pounds of dried and powdered *willow bark* (*salix helix*) are boiled for three-quarters of an hour in fifteen pounds of *water*, to which four ounces of *carbonate of potassa* have been added. To the cold decoction are added two pounds of *liquid subacetate of lead.* The mixture is

[1] London Lancet, May 28, 1846.
[2] London Medical Gazette, June 26, 1846, p. 1117, and Bouchardat, op. cit. pour 1848, p. 159.
[3] Annales de Chimie, &c. xliii., and Journal de Chimie Médicale, tom. vi.
[4] Dictionnaire de Mat. Méd. par Mérat & De Lens, art. Salicine.
[5] See L. Turnbull, on Populus Tremuloides, White Poplar or American Aspen, in American Journal of Pharmacy, Jan. 1843, p. 275.
[6] Riecke, Die neuern Arzneimittel, S. 365, und 2te Auflage, 572. Stuttgart, 1840.

permitted to settle, filtered, treated with *sulphuric acid*, and the remaining lead is precipitated by a stream of *sulphuretted hydrogen gas*. The excess of acid is neutralized by *carbonate of lime*: the mixture is again filtered, and the fluid inspissated and neutralized by *dilute sulphuric acid*. It is deprived of its colour by *ivory black*, and filtered whilst boiling. It is then twice crystallized—if still coloured after the first crystallization—and dried in the dark. This process yields about an ounce of salicin.

Braconnot[1] obtains it by adding *subacetate of lead* to a *decoction of the bark*, precipitating the excess of lead by *sulphuric acid*, evaporating the colourless liquid that remains, adding near the end of the process a little *animal charcoal* previously washed, and filtering the liquor while hot. Salicin is deposited, on cooling, in a crystalline form.[2]

The following plan was advised by Messrs. Fisher and Tyson, of Baltimore.[3] *Willow bark* is boiled with *caustic lime* in *water*; the decoction filtered, and *sulphate of zinc* added, so long as it produces a precipitate. The liquid, having been again filtered, is evaporated to the consistence of an extract, and the residue is treated with *alcohol*. The tincture, thus obtained, if carefully evaporated, yields crystals of salicin, which may be purified by washing with a saturated solution of the same principle in cold water.

Salicin forms very fine silky masses of white crystals, which have the appearance of mother-of-pearl. It bears a distant resemblance to sulphate of quinia, yet it is not so loose and delicate. It is permanent in the air, inodorous, and has a strong, enduring bitter taste, with a striking accompanying balsamic flavour, like the bark of the willow.[4] One hundred parts of cold water dissolve six parts of salicin. In warm water, it is more soluble, and also in alcohol; but it is not soluble either in ether or the essential oils. It excites no alkaline reaction. By admixture with sulphuric acid it acquires a beautiful red colour.[5]

EFFECTS ON THE ECONOMY.

The well known effects of the bark of the willows gave occasion to the immediate employment of salicin in cases of *intermittent fever*. Miquel[6] appears to have been one of the first—if not the first—who instituted experiments with it; and he satisfied himself, that it merits a distinguished place amongst our antiperiodic agents, although it requires larger doses than quinia. Soon afterwards it was given by other physicians—by Husson and Bally,

[1] Journal de Chimie Médicale, Janvier, 1831.

[2] For Peschier's method, see Annales de Chimie, vol. xliv., and Amer. Journ. Med. Sciences, May, 1831, p. 256.

[3] Journal of the Philadelphia College of Pharmacy, iii. 214.

[4] Pélouze and Jules Gay Lussac, in Annales de Chimie, vol. xliv.

[5] For an elaborate account of the chemical relations of salicin, see M. R. Piria, Annales de Chimie et de Physique, Novembre, 1838.

[6] Gazette Médicale de Paris, Janv. 1830; see, also, Annales de Chimie, xliii. and xliv.

Girardin, Magendie, Andral, Blaincourt, Graff, Linz, Stegmayer, Amelung, Stam, Van Sneek, Blom, Gräfe, Von dem Busch, Krombholz, Pleischl, and others. The sentiments respecting its value are discrepant; some classing it far beneath quinia, whilst others assign it even a higher position. Its general properties are certainly analogous to those of quinia; but it in no respect merits a preference,[1] not even in the article of price: for, although an equal weight of salicin may cost less, it requires so much more to produce the same effect, that the cost is perhaps equal. Still, as M. Pleischl,[2] of Prague, has suggested, even if salicin were much the dearer of the two, it might be better to use it, because it is of home manufacture, and can be obtained in war as well as in peace.

From all the testimony brought forward, M. Richard[3] is of opinion, that we may conclude; *first*, that salicin possesses antiperiodic virtues; *secondly*, that its efficacy is in an inverse ratio with the duration of the fever; *thirdly*, that when its febrifuge virtues are not realized after the fourth dose, it is well to abandon its use, as it will probably prove inefficacious; *fourthly*, that in intermittents of the tertian type it cures nine cases in ten; and in those of the quotidian type five and a half times in ten; *fifthly*, that the quantity necessary for the cure of an intermittent is two or three times greater than that of sulphate of quinia; *sixthly*, that it ought not to be prescribed in pernicious intermittents, the second or third paroxysm of which may be fatal; *seventhly*, that it has never been rejected by the stomach; and has never increased diarrhœa, nor "exasperated the sensibility of the stomach," and hence it should be employed in preference to the sulphate of quinia in *intermittents complicated with gastric or intestinal irritation; eighthly* and *lastly*, that it has appeared to diminish, in a marked manner, the circulation during the apyrexia, even when it did not prevent the paroxysm; and during convalescence, when the paroxysms had ceased, the pulse has frequently fallen thirty beats in a minute.

Comparative trials with salicin and sulphate of quinia have been directed by the able head of the medical department of the army, Dr. Lawson, so that we may be enabled to learn their relative value as antiperiodics. Such an examination was made by Dr. E. D. Fenner,[4] of New Orleans, who arrived at the conclusion that "the average amount of quinia required to cure 20 cases of intermittent fever, and costing twenty-five cents, is fully three times as efficacious as the average amount of salicin required in a like number of cases, and costing seventy-five cents." Dr. Fenner's report

[1] Richelot, in Archives Générales de Médecine, Sepr. 1833; see, also, Dierbach, in Heidelb. Klinisch. Annal. B. x. H. 1, S. 62. Heidelb. 1834.

[2] Medicinisch. Jahrbücher des k. k. ö. Staat. 1835; cited in Br. and For. Med. Rev. for April, 1836, p. 576.

[3] Eléments d'Histoire Naturelle Médicale, 4ème édit. i. 232. Paris, 1849.

[4] New Orleans Med. and Surg. Journ. Nov. 1845.

bears the stamp of accurate and impartial observation and induction; and it is certainly far from according with the statement of Bertini[1] and others, who consider that salicin is wholly inert in the treatment of periodical fevers.

MODE OF ADMINISTRATION.

The ordinary dose of salicin, in a case of *intermittent*, is about four or six grains every three hours during the period of intermission: in the *febres larvatæ* or *masked fevers*, smaller doses may be given; but in the very violent fevers at Calvi, in the Island of Corsica, Levy found it often necessary to give from forty to fifty grains in twenty-four hours. Of thirty cases of *quotidian* and *tertian intermittents*, twenty were cured by the use of salicin; but ten required afterwards the sulphate of quinia. He considers it preferable to sulphate of quinia in intermittents that are accompanied by irritation of the primæ viæ: he never saw it rejected or produce vomiting; and in cases of manifest irritation of the digestive tube, it was borne perfectly well.[2]

Salicin is generally given in intermittents in the form of powder. In other affections, to obtain its antiperiodic or tonic agency, one or two grains may be given four or five times a day—gradually augmenting the dose. In cases of *asthenia of the digestive organs*, Von dem Busch prescribes a powder of salicin and sugar with the addition of cinnamon; and lozenges of salicin, sugar, gum Arabic, and oil of peppermint. In cases of *copious secretion from the mucous membranes*, especially in *chronic bronchitis* and *leucorrhœa*, he directs salicin to be combined with a decoction of polygala amara, or of lichen islandicus. In *intermittents*, Stegmayer advises it to be associated with small doses of tartrate of antimony and potassa.

Pilulæ salicinæ.

Pills of salicin.

℞. Salicin.
Ext. gentian. āā. gr. xxiv.
Glycyrrh. pulv. q. v.
ut fiant pilulæ xij.

Vavasseur.

Pulveres salicinæ.

Powders of salicin.

℞. Salicin. gr. xij.
Sacch. ℥ij. Misce
et fiat pulvis in partes iv. æquales dividendus.

Dose.—One, three times a day. *Krombholz.*

[1] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 184. Paris, 1847.
[2] Archives Médicales de Strasbourg, and Gazette Médicale de Paris, 25 Fév., 1837.

Pulveres salicinæ compositi.

Compound powders of salicin.

℞. Salicin. gr. xv.
Antim. et potass. tartrat. gr. j.
Sacchar. ℈iiss. Misce
et fiat pulvis in partes x. æquales dividendus.

Dose.—A powder, every two hours. *Stegmayer.*

Mistura salicinæ.

Mixture of salicin.

℞. Polygal. amar. rad. ʒvj.
Coque cum aquæ f ℥xij. ad remanent. f ℥viij.
Colaturæ adde
Salicin. gr. viij. ad. x. M.

Dose. One or two spoonfuls every two hours.
Von dem Busch.

CLX. SAPO MOLLIS.

Synonymes. Sapo Viridis seu Niger seu Kalicus seu Domesticus Mollis seu ex Olivæ Oleo et Potassâ Confectus, Kali elaïnicum.
French. Savon Noir, Savon Mou, Savon à base de Potasse.
German. Schmierseife, Grüne Schmierseife, Käufliche Kaliseife, Schwarze Seife, Oelsaures Kali.

Under this name a soap is used, which is formed by a union of oil with potassa. It is the "*sapo ex oleo et potassâ confectus*" of the London Pharmacopœia, has of late years been brought forward in Germany as a remedial agent in cases of *itch*,[1] and been employed in many hospitals.

MODE OF ADMINISTRATION.

The treatment of *itch* by soft soap is directed by Pfeuffer to be carried into effect in the following manner. Attention is paid to the general health of the patient for a day before the soap is applied. The whole body, with the exception of the head, face, and genital organs, is then besmeared with it, and the application is repeated, morning and evening, for six days. At first, two rubbings, of from four to six ounces, are used: at the third and fourth, from two to three ounces; and from the fifth to the seventh inclusive, from half an ounce to an ounce; but after this, the soap is applied only on those parts which are affected with the eruption or itching. On the eighth day the patient takes a bath of tepid soap and water; and the body and bed linen, which have not been shifted during the cure, may now be changed for cleaner. In dry and warm seasons, the patient is able to leave the infirmary on the tenth day,

[1] Pfeuffer, Beobachtungen über die Krätze und ihre Behandlung durch die Schmier- oder grüne Seife. Bamberg, 1833.

cured; but in moist and cold, not until the twelfth or fourteenth. The cure of the eruption is generally effected in seven days,—that is by fourteen rubbings. During the period of treatment, he must remain in bed, avoid exposure to draughts of air, and reside in a chamber, whose temperature is from 73° to 77° of Fahrenheit. On account of the strong smell of soap, not more than ten patients ought to be allowed to occupy the same room. Full diet may be allowed.

From six to eight hours after the first or second rubbing, a sense of tension and pricking is felt in the skin, which, at times, gradually augments until it amounts to a feeling of burning heat. About the fifth or sixth rubbing, the skin appears of a scarlet hue, without the temperature being materially elevated. In several cases, irritative fever ensues, which disappears in the course of twenty-four hours, with augmented secretion of urine. Miliary vesicles form in groups; sweating takes place freely; the sleep, which may have been disturbed for a night or two, recurs; the skin desquamates, and the patient does not find his strength in the least exhausted. Should the inflammation of the skin occur earlier than the sixth rubbing, the friction must be pretermitted. Pfeuffer, however, never observed this to be the case.

In *scrofulous syphilitic dyscrasies*, the friction may have to be repeated once more, and the patient have to remain from two to four weeks in the institution. It very generally happens that this plan excites inflammation of the skin and desquamation of the cuticle: when this is not the case, no change whatever is produced in the eruption.

In order to mitigate the distressing feeling of burning produced by the rubbing, one part of flowers of sulphur may be added to two parts of the soft soap.

In cases, in which the disease has existed for years, with greater or less intervals, and in those who were strumous in their youth, or were at a subsequent period affected with syphilis;—in all cases, indeed, in which the cutaneous affection has become, as it were, habitual, Pfeuffer directs, that a cathartic should be premised, and that in the course of the cure, a quart of the decoction of the woods should be taken. This mode of treatment, according to him, is contraindicated by febrile conditions, especially of the synochal kind; by acute cutaneous affections; pulmonary and abdominal catarrhs; pulmonary and abdominal phthisis; chronic headach; and hereditary or acquired tendency to epilepsy. In such cases he prefers the internal and external use of sulphur: and, after the cure, the establishment of issues. The great recommendation of this plan in hospitals and infirmaries, is said to be its cheapness, although it strikes us, that there cannot be any marked difference in this respect between it and the treatment by sulphur, which is

greatly used, on this very ground, in many of the eleemosynary establishments of Germany at this time.[1]

The efficacy of Pfeuffer's plan of treatment has been confirmed by numerous observers,—by Graff, Bermann, and Cramer, who is said to have first recommended soap in scabies; and by Sicherer, Seyffer, Cless, and others, all of whom agree as to its excellence: they regard it as one of the best methods of treatment in use. Soft soap forms an ingredient in many of the officinal and other itch ointments.[2]

CLXI. SODA CHLORINA'TA.

Synonymes. Sodæ Chloridum seu Chloruretum seu Hypochloris seu Oxymurias, Chloruretum Oxidi Sodii, Natrum Chloratum seu Chloricum seu Oxymuriaticum, Chlorinated Soda, Chloride, Hypochlorite, Chloruret, Chlorite or Oxymuriate of Soda.
French. Chlorure de Soude, Chlorure d'Oxide de Sodium.
German. Chlornatron, Chlorsaures Natrum, Chlornatrum, Oxydirt oder Hyperoxygenirt Salzsaures Natrum.

This preparation resembles in almost all respects chlorinated lime. Both it and chlorinated potassa were associated by Berthollet under the common name *Eau de Javelle* or 'bleaching liquor;' and it has of late generally received the name of *Liqueur de Labarraque* or *Labarraque's Soda Disinfecting Liquid.*

METHOD OF PREPARING.

Labarraque[3] recommended it to be prepared directly by passing a current of chlorine gas into a solution of carbonate of soda. The following is the formula in the last London Pharmacopœia for the Liquor Sodæ Chlorinatæ, *Liquor Sodæ Chloridi* seu *Sodæ Oxymuriaticæ* seu *Chloreti* seu *Chlorureti Natri* seu *Sodæ*, *Natrum Chloratum Liquidum*, *Liquor* seu *Aqua Natri Oxymuriatici* seu *Natri Chlorati*, *Hypochloris Sodicus Aquâ Solutus;* German, Oxydirt salzsaures Natronwasser, Chlorsodaflüssigkeit or *Labarraque's Disinfecting Liquid.* "Take of *Carbonate of soda*, a pound; *Distilled water*, forty-eight fluidounces; *Chloride of sodium*, four ounces; *Binoxide of manganese*, three ounces; *Sulphuric acid*, four ounces. Dissolve the carbonate of soda in two pints (imperial measure) of the water; then put the chloride of sodium and binoxide of manganese, rubbed to powder, into a retort, and add to them the sulphuric acid, previously mixed with three fluidounces of water, and cooled. Heat and transmit the chlorine first through five fluidounces of water,

[1] Vezin, Ueber die Krätze und ihre Behandlung nach der Englischen Methode. Osnabrück, 1836. See, also, Amer. Med. Intelligencer, Aug. 15, 1839, p. 158.
[2] Riecke, Die neuern Arzneimittel, u. s. w. 2te Auflage, S. 584. Stuttgart, 1840.
[3] Gazette de Santé, 25 Avril, 1826.

and afterwards into the solution of carbonate of soda above directed."

The following form is given in the last edition of the Pharmacopœia of the United States (1842:)—"Take of *Chlorinated lime*, ℔j.; *Carbonate of soda*, ℔ij.; *Water*, a gallon and a half. Dissolve the carbonate of soda in three pints of the water, with the aid of heat. To the remainder of the water add, by small portions at a time, the chlorinated lime, previously well triturated, stirring the mixture after each addition. Set the mixture by for several hours, that the dregs may subside; then decant the clear liquid, and mix it with the solution of carbonate of soda. Lastly, decant the clear liquor from the precipitated carbonate of lime, pass it through a linen cloth, and keep it in bottles secluded from the light."

When the solution of chlorinated soda is properly prepared, it is devoid of colour; has a sharp, saline, and astringent taste, and an odour of chlorine. By careful evaporation, it yields crystals, which produce the original liquid when re-dissolved. When the solution is exposed to the air, and allowed to evaporate spontaneously, it gives out chlorine, and yields crystals of carbonate of soda.[1]

EFFECTS ON THE ECONOMY.

In its general remedial agency, chlorinated soda resembles chlorinated lime, and has been administered both internally and externally in the same cases. It is preferred for internal, whilst chlorinated lime is generally chosen for external, use; and this chiefly, perhaps, owing to its being obtained more conveniently, and cheaply. Dr. Pereira states, however, that he has carefully prepared and tried the two chlorides, and gives a decided preference to the chloride of soda. Labarraque, likewise, preferred it as an antiseptic, on the ground, that by the process of disinfection it becomes chloride of sodium, which is not a deliquescent salt; whilst chloride of calcium, formed by chloride of lime, attracts water from the atmosphere, and thereby furnishes one of the conditions—moisture—necessary for the putrefactive process. Hence, he thinks, whilst chloride of lime will serve equally well for simple disinfection, chloride of soda is to be preferred where we wish at the same time to prevent a renewal of putrefaction.[2]

By Bouillaud, Chomel and others, chlorinated soda has been given, with advantage, in *typhous fevers;* and by Kretschmar,[3] Lalesque, Colson, and Gouzee,[4] in *intermittents.*[5] Ten cases are reported by the last named gentleman; in two, the intermittent

[1] Faraday, Quarterly Journal of Science, N. S. ii. 84, cited by Brande, Dictionary of the Materia Medica, p. 508. Lond. 1839.

[2] Pereira, Elements of Mat. Med. 2d edit. p. 540. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.

[3] Venus, Grundriss der Medicin. Receptirkunst, S. 67. Weimar, 1838.

[4] Revue Médicale, Fév. 1836.

[5] Riecke, Die neuern Arzneimittel, S. 334, und 2te Auflage, S. 511. Stuttgart, 1840.

yielded immediately; two others were cured after a slight return; in one, there were four attacks, gradually diminishing; in two cases, the severity of the paroxysms abated, but it was thought necessary to have recourse to sulphate of quinia; in two others, no effect was produced, and in one, the disease was aggravated. Gouzee infers, that these cases prove the febrifuge properties of chlorinated soda to be less marked than those of sulphate of quinia, and, therefore, that it ought not to be trusted to, except in the slighter cases, and where the patients are easily susceptible of the effects of medicine,—as women and children. In like manner, it has been found useful in *scrofulous affections*, and in various diseases in which chlorinated lime has proved serviceable. See Calx Chlorinata.

MODE OF ADMINISTRATION.

From ten drops to a dram mixed with plain or sugared water may be given internally for a dose.

The form in which it was prescribed by Gouzee in *intermittents* was a mixture, composed of half a dram to four ounces of distilled water. This was taken by spoonfuls during the apyrexia; so that the last dose should be swallowed shortly before the next paroxysm was expected. The patients were restricted to their beds, or at least to their chambers.

When applied externally, it is rarely used pure or diluted with so little as one half water, except in cases of *asphyxia*, and *gangrene*, and for dressing *old ulcers*, &c. Most commonly it is diluted with ten or thirty parts of water, and in this strength is applied to *ulcers* of various kinds, *burns*, *cutaneous diseases*, &c. When used as a disinfecting agent, it is generally diluted with ten, twenty or thirty times its weight of water.[1]

CLXII. SPIRITUS PYRO-ACETICUS.

Synonymes. Æther Pyro-aceticus seu Lignosus, Pyro-acetic Spirit, Pyro-acetic Ether, Acetone, Mesitic Alcohol, Bihydrate of Mesitylene; called, also, Naphtha, and Wood Naphtha.
French. Acétone, Esprit Pyro-acétique.
German. Essiggeist, Mesitalkohol, Essigalkohol.

There has been some confusion amongst therapeutists in regard to the article meant by *naphtha* or *wood naphtha*, which Dr. John Hastings[2] brought forward of late years as an important remedy in tubercular phthisis. The term naphtha, according to Dr. Pereira,[3] had been applied, but erroneously, to *pyroxylic*, or as he writes it, *pyroxilic* spirit; and it is this article *naphtha*, which,

[1] Payan, Revue Médicale, Août, 1839.
[2] Pulmonary Consumption successfully treated with Naphtha. Lond. 1843.
[3] Elements of Mat. Med. and Therap. 2d Amer. edit. by Carson, i. 355. Philad. 1846.

according to Messrs. Ballard and Garrod,[1] was given by Dr. Hastings. In this they are in error; and the confusion has probably arisen from Dr. Hastings having also given the erroneous name "naphtha," to the *pyro-acetic spirit*, which was the article really used by him.

METHOD OF PREPARING.

Pyro-acetic spirit may be prepared by distilling a mixture of two parts of crystallized *acetate of lead* and one part of *quick-lime* in a salt glaze jar (graybeard) the lower part of the jar being coated with fire clay, and a bent glass tube, half an inch in diameter, being adapted to the mouth by a cork so as to form a distillatory apparatus. The jar is supported on the mouth of a small furnace, by which the lower part only is heated to redness, and the vapours are conducted into a Liebig's condenser. The product is repeatedly redistilled from quick-lime, until its boiling point is constant at 132°.[2]

It is a colourless, volatile, inflammable liquid, having a peculiar penetrating odour, and a pungent taste like that of peppermint. Its specific gravity is 0.792. As found in the shops, its density is generally not lower than 0.820. It is miscible with water, ether and alcohol in all proportions. If, when mixed with water, it becomes turbid, it has not been freed from empyreumatic oil.

EFFECTS ON THE ECONOMY.

Dr. Hastings[3] states, that the reason why he was induced to deviate from the line of medical treatment of phthisis, which has so universally, and for so long a period, been in vogue, and to admit a new method of management, was the fatal termination of all cases, whatever was the treatment adopted, during an experience of upwards of twenty years. "I was led," he says, "to the conclusion, from a careful survey of the chemical analyses of tubercle made by Thénard, that it was defective, inasmuch as the composition of the animal matter, which amounted to upwards of 98 parts out of 100, had not been investigated. From the greasy nature of tubercle in its crude state, there did not exist the slightest doubt in my mind, that carbon entered largely into its formation, and that its composition had a striking resemblance to fatty matter. In consequence of the loss of fat, so remarkable in the earlier stages of consumption, I determined to employ those compound agents, rich in carbon and hydrogen, which had not been previously used in medicine; not with the idea that they would make up the deficiency which the system had sustained in the progress of the disease, but that such a change would, by that means, be introduced into the constitution as would act on the forces of the organism,

[1] Elements of Mat. Med. and Therap. p. 391. Lond. 1845.
[2] Bache, Dispensatory of the United States, 6th edit. p. 1291. Philad. 1845.
[3] Op. cit.

at the point of departure from health, whether that took place in the stomach, blood or elsewhere; that change tending to such an affinity in the elements within the body, that the carbon, hydrogen, oxygen and nitrogen, instead of assisting in the formation of products which threaten life, would tend to develop those materials only which are required for the preservation of health and the prolongation of existence."

Thirty-six cases, presenting all the phenomena of *tubercular phthisis*, are stated by him to have been cured by the pyro-acetic spirit—the cough, expectoration, sweats, &c., disappearing for the most part within a few weeks, and the physical signs indicative of structural lesions disappearing soon after. The statements of Dr. Hastings were very properly doubted by the best observers; but still it was deemed advisable to give the remedy a fair trial, and the result has been far from confirming them. In the author's experience no good has resulted from its use except what follows the employment of ordinary excitant expectorants, as creasote. Testimony in its favour from others has not, however, been wanting. Mr. D. Wilson[1] narrates cases which appeared to exhibit all the functional and physical phenomena of phthisis, and were cured or relieved by it.

In enumerating the cases in which he recommends the use of "naphtha," Dr. Hastings[2] observes, that the less complicated phthisis may be with other affections, the more suitable is it for treatment by this agent. When the pulse is at the ordinary standard or thereabouts; when the hectic is slight; laryngeal and peritoneal disease absent; the functions of the stomach and bowels not much impaired; the constitutional disturbance inconsiderable, and the physical signs denoting only a slight deposit of tubercles in one lung; the prognosis is favourable, and a speedy recovery may be anticipated. In many cases, this mild character of the disease is never witnessed, howsoever early they may be seen: for want of close observation, too, this period frequently escapes notice; hence, success depends upon an early and correct diagnosis. If naphtha be given in *acute phthisis*, when the cough is very harassing, with slight frothy expectoration; respirations 30 to 40 per minute; pulse 120 to 140; hot skin; profuse night sweats; great thirst; appetite deficient or altogether wanting; and the physical signs denoting an extensive deposition of tubercles in both lungs, it will be found, he says, injurious rather than beneficial. If it be employed in *chronic phthisis* co-existing with disease in other organs, its value is diminished in proportion to the extent of the complications, and their vitiating influence on the constitutional powers; and if it be persevered with in certain cases in which improvement had followed its use, after the appearance of intercurrent pneumonia, bronchitis or pleurisy, it will do great mischief. Many such cases, says Dr.

[1] London Lancet, June 3d, 1834, p. 344, and Nov. 25, 1843, p. 250. [2] Op. cit.

Hastings, give way to a short course of treatment with antimony, digitalis, &c., and then the pyro-acetic spirit may be again employed with the greatest advantage. Where hæmoptysis is present, or where it has recently existed, it is generally contra-indicated. When *phthisis is complicated with dyspepsia*, little or no benefit will accrue from its use, until the latter affection is removed; yet Dr. Hughes Bennett[1] ascribes all its agency in phthisis to its power of calming the *irritability of the stomach*, which occurs often in the disease, and for which, according to his experience, naphtha is the best remedy. Dr. Hastings states farther, that the disease is not amenable to the plan of treatment when the patients are in crowded hospitals, or in other situations where the atmosphere is impure.

If doubt may be entertained in regard to the efficacy of pyro-acetic spirit in phthisis, there would seem to be none, that in cases of *chronic bronchitis resembling phthisis* it has produced, and may be expected to produce, benefit. Mr. Procter[2] has related a case, in which, after *acute bronchitis*, difficulty of breathing, cough, with well marked purulent expectoration, and nocturnal perspiration existed, with great emaciation and occasional hæmoptysis. A mixture was prescribed of *pyro-acetic spirit* f ℥j; *liquor opii sedativus* f ʒij.; of which the patient took fifteen drops three times a day in a little water. The medicine was continued for about two months, when the patient reported himself well. In the Report of the Hospital for Consumption and Diseases of the Chest, (Lond. 1849,) it is stated, that in some cases of *bronchitis with profuse secretion* it seemed useful, but it was not otherwise productive of benefit, and often proved hurtful.[3] It is in *chronic bronchial affections* that the pyro-acetic spirit will probably be almost wholly employed, provided it retains its place in the catalogue of the materia medica; and hence it has been classed elsewhere by the author with creasote, the balsams, &c., amongst excitant expectorants.[4]

M. Lavirotte, of Lyons, and Dr. David W. Yandell[5] have recommended it in diarrhœa. In 23 cases—16 of *diarrhœa*, and 7 of *dysentery*—the results were favourable. Dr. Yandell gives it in the dose of twenty drops at intervals of three hours.

Dr. Hastings[6] has also extolled it highly in *gout*, and in *acute* and *chronic rheumatism*. "For upwards of twelve months," he says, "I have employed pyro-acetic spirit in these affections,

[1] On Cod-liver Oil. Edinb. 1848.
[2] Lond. Med. Gazette, Nov. 17, 1843, p. 213.
[3] British and Foreign Medico-chirurg. Rev. for April, 1850, p. 321. See, also, the similar sentiments of Dr. Theophilus Thomson, Dr. Golding Bird, and others, in Lancet, January 15, 1848.
[4] General Therapeutics and Materia Medica, 4th edit. i. 240. Philad. 1850.
[5] Western Journal of Medicine and Surgery, Sept. 1849.
[6] Cited in Amer. Journ. of Pharmacy, New Series, xiii. 66. Philad. 1847.

and my treatment has been attended with a success quite extraordinary, far exceeding the results usually obtained by colchicum, &c." His overstrained eulogies, however, of its effect in phthisis will render the profession slow to credit this assertion.

MODE OF ADMINISTRATION.

The dose in which Dr. Hastings generally administers the pyroacetic spirit is from ten to twenty drops three times a day in a small quantity of water. After the second or third day he augments the dose by about one-fourth, regulating its increase or decrease according to the absence or presence of nausea, vomiting, or any other untoward symptom resulting from its use. As the disease advances he raises the dose to 40 and even 50 drops, and administers it four times instead of three times a day.

STRYCHNIA ET EJUS SALES.

SYNONYME. Strychnia and its salts.

CLXIII. STRYCH'NIA.

SYNONYMES. Strychnium, Strychninum, Strychna, Strychnine, Vauqueline.
French. Strychnine.
German. Strychnin, Krähenaugenstoff, Krähenaugenbitter.

This alkaloid was discovered by Pelletier and Caventou[1] in nux vomica, St. Ignatius's bean, upas tieuté, and in the wood of strychnos colubrina; and experiment has shown, that these substances are indebted for their medicinal properties to it.[2] In them, strychnia is found associated with another principle analogous to it in its properties—brucia.[3] In St. Ignatius's bean, there is less brucia than in nux vomica, so that it is best adapted for the preparation of strychnia; but it is not as easily obtained, and consequently nux vomica is almost always used.

METHOD OF PREPARING.

According to one form of preparation, liquid *subacetate of lead* is added to a solution of the *alcoholic extract of nux vomica* in water, until a precipitate is no longer thrown down; the foreign matters being thus precipitated, the strychnia remains in solution with a proportion of colouring matter, and sometimes an excess of acetate of lead. The lead is now separated by *sulphuretted hydrogen;* and the fluid is filtered and boiled with *magnesia*, which unites with the acetic acid, and precipitates the strychnia. The

[1] Annales de Chimie, tom. viii. ix. and x.
[2] Magendie, Annales de Chimie, x. 176. 1819.
[3] See page 146.

precipitate is next washed in cold water, and redissolved in *alcohol* to separate it from the excess of magnesia, and by evaporating the alcohol, the strychnia is obtained. If it be not perfectly white, it must be dissolved in acetic, or hydrochloric acid, and be reprecipitated by means of magnesia.

The modes of preparation recommended in the Pharmacopœias of London, Edinburgh, and the United States, differ from each other. The following is that contained in the last work (1842:)—Take of *nux vomica*, rasped, ℔iv.; *lime*, in powder, ℥vj.; *muriatic acid*, f ℥iij.; *alcohol*, *dilute sulphuric acid*, *solution of ammonia*, *purified animal charcoal*, *water*, each a sufficient quantity. Digest the nux vomica in two gallons of water, acidulated with a fluidounce of the muriatic acid, for twenty-four hours; then boil for two hours, and strain with expression through a strong linen rag. Boil the residuum twice successively in the same quantity of acidulated water, each time straining as before. Mix the decoctions, and evaporate to the consistence of thin syrup; then add the lime previously mixed with a pint of water, and boil for ten minutes, frequently stirring. Pour the mixture into a double linen bag, and, having washed the precipitate well with water, press, dry, and powder it. Treat the powder repeatedly with boiling alcohol until deprived of its bitterness; mix the liquors; and distil off the alcohol by means of a water bath. Mix the residue with water, and, having applied heat, drop in sufficient diluted sulphuric acid to neutralize and dissolve the strychnia; then add *purified animal charcoal*, boil for a few minutes, filter, evaporate and crystallize. Dissolve the crystals in water, and add sufficient solution of ammonia to precipitate the strychnia. Lastly, dry the precipitate on bibulous paper.[1]

As thus prepared, it is in the form of a white powder.

Strychnia, obtained by crystallization from an alcoholic solution, which has been diluted with a small quantity of water, and left to itself, appears under the form of microscopic crystals, constituting four-sided prisms, terminated by pyramids with four flattened or depressed faces. When crystallized rapidly, it is white and granular, is insupportably bitter to the taste, and leaves an after taste similar to that caused by certain metallic salts; it has no smell, and is not changed by exposure to the air; is neither fusible nor volatile; for, when subjected to the action of heat, it does not fuse, until the moment of its decomposition and carbonization, and it is decomposed by a degree of heat inferior to that which destroys most vegetable substances. When exposed to the naked fire, it swells, becomes black, and yields an empyreumatic oil, a little water, acetic acid, carbonic acid and carburetted hydrogen. Distilled with oxide of copper, it gives out much carbonic acid, and only slight traces of nitrogen. It is composed of oxygen, hydro-

[1] Pharm. of the United States, p. 184. Philad. 1842.

gen, carbon and nitrogen. Although strychnia has so strong a taste, it is scarcely soluble in water. At 50° Fahr., 6667 parts of water dissolve but one of it; boiling water dissolves a little more than double, so that it may be said to be soluble in 2500 parts of boiling water. It is remarkable, however, that a solution made in the cold, and containing therefore only $\frac{1}{6667}$th part of its weight, may be diluted one hundred times, and still retain a very decidedly bitter taste. It is more soluble in strong alcohol, little so in weak, and not much so in ether or fixed oils, although they acquire a bitter taste from it. On the other hand, it is very readily soluble in volatile oils, and the hot saturated solution, on cooling, deposits crystals. It has an alkaline reaction and forms, with acids, salts which are mostly crystallizable, and insupportably bitter, and are more soluble than pure strychnia.[1]

Strychnia, being sold at a high price, is liable to adulteration. A respectable druggist of Philadelphia informed the author, that one of his customers was offered strychnia by another house at a price considerably lower than what he had to pay for it when purchased even in large quantities from respectable sources. He bought an eighth of an ounce of it at the rate of five dollars the ounce; when pure strychnia could not be offered at less than nine dollars per ounce. Some of this was tested, when it was found to consist of equal parts of flour or starch, and pure strychnia.

EFFECTS ON THE ANIMAL ECONOMY IN HEALTH.

The effects of strychnia on man and animals resemble, on the whole, those of the spirituous extract of nux vomica, except that they are more intense. According to Magendie, one-eighth of a grain is sufficient to kill a strong dog. Pope, who made experiments on dogs, found that one-twelfth of a grain was enough to paralyze the lower limbs of a small dog in four or five minutes, and in half an hour to kill it. Christison[2] considers strychnia the strongest poison after hydrocyanic acid. He injected a solution of a third of a grain in alcohol into the thorax of a wild boar, and in ten minutes the animal died. A dog was destroyed by one-sixth of a grain in two minutes; and he believes, that the same effect would be induced on man by half a grain introduced into a wound. Lembert[3] observed similar results from placing a grain in the thorax of a small dog, and from three grains introduced into the areolar tissue of a larger animal, on which tetanic spasms were induced in the thoracic muscles. Dr. Blake[4] injected a grain of strychnia, dissolved in a small quantity of acetic acid, into the veins of a dog. The first effect of the poison was to induce gene-

[1] Magendie's Formulaire, &c.
[2] Treatise on Poisons, 3d edit. Edinb. 1836; and Dispensatory, p. 895. Edinb. 1842.
[3] Essai sur la Méthode Endermique. Paris, 1828. 8vo.
[4] Edinb. Med. and Surg. Journal, April, 1839, p. 338.

ral convulsions in about thirty seconds after its injection, the action of the heart being at the same time rendered irregular, which Dr. Blake presumes was owing to the convulsive struggles of the animal. All external signs of life ceased in about a minute and a half after the injection of the poison, but the heart still continued to beat. He found that when strychnia was introduced into the circulation in so small a quantity as not to produce any general symptoms, it did not appear to exert the least influence on the heart.

That the action of strychnia is analogous to that of nux vomica, has been proved by the experiments of Ségalas,[1] Andral,[2] Bardsley,[3] Redlich, Sandras, Lüders, Hennemann, and numerous others.[4] It affects especially the vesicular matter of the spinal marrow, the reflex system of Dr. M. Hall,—less strikingly the brain: small doses, according to some,[5] excite the ganglionic system; larger, the spinal marrow; consequently, it has been imagined, that it might be an efficacious remedy in nervous diseases, which are dependent upon spasmodic disorder of the ganglionic system, or upon diminished sensibility and torpor of the nerves of motion.[6]

The observations of Cartoni led him to infer, *first*, that strychnia has a special elective action on the nerves of motion in general, and chiefly on those which are concerned in the movements of the iris: *secondly*, that its action is diametrically opposed to that of substances, which occasion, and keep up, abnormous dilatation of the pupil; and *lastly*, that "it is a precious and efficacious agent in *certain diseases of the eyeball*, which depend upon vital and organico-vital modifications of the system of ciliary nerves."[7]

The following are the effects observed by Oppler from the internal use of nitrate of strychnia:—a sensation of warmth and itching in the epigastrium; eructation; nausea; vertigo; slight excitement like that of intoxication; great vividness, with more or less confusion of mind; dull pain over the eyes; spots before the same; dilatation of the pupils; diplopia; tinnitus aurium; difficult articulation and deglutition; slight trismus; sense of formication in the paralyzed parts, with convulsive motions or twitchings, at times, in them; at others, over the whole body, similar to electric shocks; tremors of the muscles; occasionally, violent spasms; tetanus; asthma; palpitations; febrile heat; general sweating; prostration; pale or livid countenance; pulse sometimes full and frequent,

[1] Magendie's Journal de Physiologie, ii. 4. [2] Ibid. Juillet, 1823.

[3] Hospital Facts and Observations, Illustrative of the Efficacy of Strychnia, Brucia, &c. Lond. 1830.

[4] Pétrequin, Gazette Médicale de Paris, No. 44, Nov. 1838.

[5] Stumpf. art. Strychnos, Encyclopäd. Wörterb. der Medicin. Wissensch. xxxii. 480. Berlin, 1844.

[6] See, on this subject, Pickford, of Heidelberg, cited from Gazette Méd. de Paris, 5 Juin, 1844, in Amer. Journal of the Med. Sciences, July, 1844, p. 201.

[7] Bouchardat, Annuaire de Thérapeutique, &c. pour 1847, p 38. Paris, 1847.

at others, small and contracted; great sensibility over the whole body; involuntary laughter, succeeded always by difficulty of breathing and convulsions. The sleep was generally interrupted by convulsions; the secretion of urine scanty, and occasionally suppressed. These symptoms came on gradually, and disappeared in the same manner, when the dose was moderate, in the course of some hours. Large doses, he says, induce death by a sudden shock to the nervous system; smaller doses, when continued for a long time, may destroy by causing apoplexy, of which he saw many examples in his experiments on animals.[1]

Dr. Blumhardt[2] has recorded a case of poisoning by strychnia, which occurred to him in Stuttgart. He was called to a young man, seventeen years old, who had swallowed two scruples of strychnia after dinner. A short time afterwards, experiencing great restlessness, he repented of what he had done, and immediately took four grains of tartar emetic, which excited considerable vomiting. When the physician arrived, about a quarter of an hour after the strychnia had been taken, he found the patient on his back in bed, with his head thrown back, rigid and incapable of motion, but with a constant inclination to turn towards the right side. He could only move the upper limbs freely. The countenance was pale and haggard; the temperature of the skin natural, and the pulse quick and contracted. Consciousness remained unaffected; the speech was rendered difficult by an occasional contraction of the muscles that move the lower jaw; but it could not properly be said to be interrupted: deglutition was unaffected. The trismus, however, became more and more frequent and violent, and the respiration thereby unequal and suspended; the pulse was small, suppressed and quick. The remedies—employed to save him—as tincture of iodine and acetate of morphia, were of no avail. With the periodical trismus was now associated spasmodic agitation of the whole body, to which—after a short interval—succeeded opisthotonos with violent symptoms of suffocation; the trismus attained the highest degree, and the upper extremities were deprived of the influence of volition. With the increase of the general tonic spasm, the respiration was always more difficult and oppressed, and for a time wholly ceased; the pulsation of the heart and arteries became irregular, less distinct, and at length imperceptible. In this condition, the skin acquired a bluish appearance; the countenance was puffed and of a violet hue; the lips dark-blue, the neck swollen, the eyes protruded, fixed and directed towards the right side; the pupils enlarged and immovable, and the conjunctiva injected. At this period, the patient was entirely unconscious; but from this condition he awoke once, and all

[1] See, also, Tanquerel des Planches, Essai sur la Paralysie de Plomb. Paris, 1834.
[2] Medicinisch. Correspondenz-Blatt, in Encyclog. des Sciences Médicales, Sept. 1837.

the symptoms became mitigated; during this remission, the muscles influenced by the spinal marrow remained cramped, except the upper extremities, which could be moved voluntarily. In a quarter of an hour, the tetanic attack returned in its violence, with intense commotion of the whole body; this ended in asphyxia, from which he again recovered to consciousness. The same thing happened in a third attack. In the fourth, he succumbed under the power of the poison. The whole scene, from the taking of the poison to the occurrence of death, lasted an hour and a half.

During the last attack, as doubt existed whether he was really dead, the median vein of the left arm, which was turgid, was opened, and after the vessel was emptied of its thick, black blood, which resembled that of an animal, several bubbles of air, from the size of a pea to that of a small cherry, were forced out by pressure. The dissection was made twenty hours after death. In spite of the elevated summer heat, there were no signs of putrefaction. The whole of the body was uncommonly rigid. The muscles of the back were of a brownish-red colour, almost like that of smoked meat. On opening the spinal canal, a considerable quantity of thick, dark-coloured blood, like that of an animal, flowed out. The *plexus venosi spinales* were turgid with the same kind of blood, as well as the vessels of the pia mater. Under this membrane, especially in the cervical portion, some watery fluid was effused. The upper portions of the spinal marrow were soft, pappy in some places, but lower down it became gradually harder. Within the cavity of the cranium, the same turgid condition of vessels existed; all the veins of the dura mater appeared as if injected; the veins of the pia mater were likewise engorged; and the whole mass of the brain indicated an unusual supply of blood, so that the cortical substance appeared quite blue. The cerebellum was softer than usual. In the cavities of the abdomen and thorax, a striking poverty of blood was perceptible. The heart was shrunken and empty, as well as the large vessels of the thorax. The stomach was full of solid food, which appeared to have undergone no change; its blood-vessels contained a considerable quantity of blood, and the mucous coat exhibited marked redness over its whole surface; but this was especially concentrated about the cardia and the fundus; the small intestine was likewise redder than natural, as is commonly the case in those who have died whilst digestion was going on. The liver was tolerably supplied with blood; the gall-bladder empty.[1]

When strychnia is used endermically, as is not unfrequently the case, the course of the phenomena is somewhat different. G. H. Richter employed it in this way in many cases of hemiple-

[1] For other cases, see Christison on Poisons, 1st Amer. edit. p. 685. Philad. 1845; and James Wilson, London and Edinburgh Monthly Journal of Medical Science, Dec. 1845; cited at length in Amer. Journal of the Med. Sciences, April, 1846, p. 528; and Taylor, On Poisons, Amer. edit. by R. E. Griffith, p. 622. Philad. 1848.

gia, in one of which it occasioned symptoms of actual poisoning. When the dose exceeded a quarter of a grain, a feeling arose in the part to which it was applied as if needles were run into the skin; this gradually spread over the whole limb; the temperature of the body was augmented; the pulse was quickened, full and hard; the breathing constrained; pain was experienced in the same side of the head; the secretion of urine was increased, and a general perspiration broke out, which persisted for about an hour, after which the pricking of the surface, and the excitement of the vessels ceased. To these symptoms—and seldom later than two hours after the application of the agent—convulsive movements succeeded in the paralyzed limbs like those induced by electricity, which augmented in violence and in frequency with the increase of the dose,—being strongest and most severe during the night, at which time the limbs were moved involuntarily. When awake, a feeling of stiffness was experienced in all the limbs, which passed off when they were used. On digestion, defecation, and the appetite, the nitrate of strychnia seldom exerted any influence. Only in one case—in which no effects were induced on the nervous system, when the dose was gradually carried to three grains—was obstinate constipation induced. In general, when it was begun with in the dose of one-eighth of a grain, and on the next day one-fourth was given, on the third day one-half, and afterwards the dose was increased daily by one-fourth of a grain, until one and a quarter were taken,—the following unpleasant symptoms supervened. The patient experienced twitchings earlier than before, and first in the paralyzed limbs. As these became, from minute to minute, more violent, a penetrating pain was felt in the occiput, with vertigo and tinnitus aurium. The twitchings now extended over the affected arm, and, subsequently, to the sound side, whereupon the vertigo and headach increased, and insensibility, with difficult and stertorous breathing, ensued. The pulse now became very full, hard, slow, and intermitting; the countenance bluish-red and turgid; the paralyzed lower extremities of a marbled blue; the pupils very much dilated, and the mouth open,—the convulsions being occasionally so strong as to toss him to and fro on the bed. When these phenomena declared themselves, Richter removed the dressing from the surface, which appeared inflamed, and still contained a quantity of strychnia that had not been absorbed; the parts were then washed and sprinkled immediately—according to Lembert's and Lesieur's recommendation—with two grains of acetate of morphia; the face was washed with cold water, the soles of the feet brushed, and other excitants administered.[1]

[1] See some Experiments relative to the action of Strychnia on the Nervous System, by H. Stannius, in Müller's Archiv. Heft. ii. 1831; cited in Brit. and For. Med. Review, for Jan. 1838, p. 221,

Dr. Christison[1] considers, that strychnia is not a cumulative poison; yet the author has seen one or two cases which would favour the contrary opinion,[2] and Dr. F. A. Gebhard,[3] of Moscow, under view of the dangerous effects it often induces, thinks that some other remedy should be sought for, even in those cases in which it has been found advantageous. The continued employment of strychnia in small doses, or its administration in larger, appears to him to cause, in some unknown manner, such a change in the blood as to result unexpectedly and suddenly in a powerful reaction in the nervous system, marked by convulsions, tetanus, exhaustion, paralysis and death. Dr. Gebhard proposes, as a substitute, one of the most energetic articles of the materia medica—veratria.

Morphia appears to be the most powerful antidote: under its use the dangerous symptoms rapidly disappear; consciousness returns; the patient sleeps for some hours, and a general perspiration breaks out, after which he awakes with a feeling of dulness, and with stiffness of the limbs, which soon, however, vanish. In respect to the topical application of strychnia by the endermic method, A. L. Richter[4] remarks, that the preparations of strychnia produce much more powerful local effects than those of morphia; they maintain the abraded portions of the skin in an inflamed state, promote suppuration more than morphia, and occasion violent itching and burning, with a feeling as if needles were run into the skin. Artus recommends, from his investigations, pure baryta (Aetzbaryt) as an antidote. It forms an insoluble precipitate with strychnia, and he esteems it to be more certain than the tinctures of iodine and bromine recommended by Donné,[5] the chloride of barium, or the infusions of tar and galls recommended by Raspail.[6]

The effects, referred to above, were chiefly obtained from the administration of the nitrate, but they may be esteemed applicable to all the preparations of strychnia, as we know nothing of any difference in their action. It is probable, however, that the salts of strychnia, owing to their greater solubility, may have more action than strychnia itself, although the muriatic and acetic, or lactic acids, which are almost always present in the stomach, it might be presumed, would readily unite with it.

EFFECTS ON THE ECONOMY IN DISEASE.

The following remarks apply equally to pure strychnia, and its

[1] Dispensatory, p. 895. Edinb. 1842.

[2] See, also, Pereira, Elements of Mat. Med. and Therap. ii. 1310. Lond. 1842; or 2d American edition, by Carson. Philad. 1846.

[3] Zeitschrift für Therapie, u. s. w. Freiburg, Dec. 1844, No. 3, cited in Amer. Journal of the Medical Sciences, Jan. 1846, p. 202.

[4] Die Endermatische Methode, u. s. w. Berlin, 1835.

[5] Journal de Chimie Méd. v. 494. Paris, 1829.

[6] Nouveau Système de Chimie Organique. Paris, 1833.

salts, and to the alcoholic extract of nux vomica, (see page 538,) which is preferred by some.[1] It has been administered in

Paralysis, especially in that arising from the action of lead, in which Bally, Lembert, Bardsley, Andral, Rayer, and Tanquerel[2] have employed it beneficially. In *paraplegia* and *hemiplegia* it has been prescribed by Lesieur, G. H. Richter, Romberg, Bardsley, Bally, Lafaye, Oesterlen, Reinhardt, Heyfelder, Faye, Mart, Schaible, Raciborski, A. T. Thomson,[3] Gellie,[4] Pétrequin,[5] Toulmouche,[6] Badeley,[7] and numerous others.[8] From the results of their observations it would seem, that strychnia is most efficacious in paraplegia; less so in hemiplegia, although it is said to have been given with advantage in the latter affection; but its administration in hemiplegia requires special circumspection, particularly when the paralysis has succeeded to apoplexy.[9]

The results of the observations of M. Toulmouche induce him to believe, that strychnia will only succeed in paralysis or other affections "that proceed from some lesion of spinal innervation, occasioned by excessive masturbation or indulgence in venereal pleasures, by the abuse of spirituous or narcotic liquors, by the action of the emanations of lead," &c.; and that it is never successful in paralysis which is owing to an inflammatory condition of the brain or spinal marrow. He is of opinion that strychnia has a directly excitant effect upon the spinal marrow, and secondarily on the organs that receive their nerves from it. Romberg affirms that, as a general rule, in cases of paralysis dependent upon disease of the central organs of the nervous system, he has never seen any striking effect from the endermic use of strychnia, and that great care is needed lest it should react injuriously on the brain. He considers it especially adapted for cases of paralysis that are dependent upon some affection of the spinal marrow induced by mechanical concussion; as well as for the *local paralysis* that succeeds to rheumatism, suppressed exanthems, &c.

In *paralysis of the upper eyelid*, it has been employed successfully by M. Saint Martin, in the way of inoculation, as proposed by M. Lafargue in the case of morphia (note page 520,) two *centigrammes*—from one-fourth to one-third of a grain—of the sulphate being introduced into twelve small punctures around the orbit. The operation was continued for six days, with com-

[1] Pétrequin, Bulletin Général de Thérapeutique, Mars, 1840.
[2] Gazette Médicale pour 1835, p. 383.
[3] Lond. Med. Gaz. April, 1831.
[4] La Lancette Française, 29 Août, 1837.
[5] Op. citat.
[6] Gazette Méd. de Paris, No. 5, 1841.
[7] Lond. Med. Gaz. July 12, 1846, p. 496.
[8] Pétrequin, Gazette Médicale, Nov. 1838; and l'Expérience, Oct. 1843.
[9] See Bally, Considérations sur la Strychnine, &c., in Bulletin Général de Thérapeutique, Fév. 1838.

plete success.[1] The same result, as shown hereafter, has followed its use by inoculation in *amaurosis*.

Dr. Favell[2] contends, that the forms of paralysis most likely to be benefited by it are those dependent upon cold, poisons, and certain molecular changes in the brain and nerves, altogether inappreciable by post mortem examination. He considers, that the most dangerous symptoms resulting from an over dose are generally caused by the influence of the drug on the nerves distributed to the heart. Dr. Benton, of Illinois,[3] affirms, that he has employed it with the happiest results in some forms of *coma* attending fevers in malarious districts. The phenomenon occurred in remittent fever, and seemed wholly independent of organic lesion;—the secretions being natural, the tongue and skin moist, and all the symptoms improving, excepting those referable to the encephalon. In such cases, strychnia in doses of one-twelfth of a grain, every six hours, afforded relief in from 24 to 48 hours.

Dr. Pereira[4] has seen it very serviceable in that *shaking or trembling action of the muscles*, which is produced by habitual intoxication. G. H. Richter cured a case of *aphonia* by it, and Dr. P. H. Clarke,[5] of West Tennessee, considers, that it not only proved beneficial in *loss of voice* caused by relaxation of the muscles of the larynx, but in *chronic bronchitis*. It has been much used internally, and successfully, in *amblyopia* and *amaurosis*, by Short, Liston,[6] Guthrie, Middlemore,[7] Henderson, Furnari,[8] Mart, Pétrequin,[9] Dusterburg,[10] Debreyne,[11] and others. Mr. Tyrrell and Mr. Lawrence,[12] however, affirm that they have found it inefficacious in amaurosis. In these cases, it is generally used endermically on the temporal region. Dr. Stevenson[13] derived benefit from it—when applied in this way—in cases of amaurosis of many years' duration. Half a grain was repeated twice a day until tremors of the limbs were produced. He employed it in the same manner in other cases of *local paralysis*. In cases of *amaurosis*, Henderson advises, in addition, that a solution of strychnia should be dropped into the eye; and it has likewise been used in the form of inoculation, in the manner described hereafter. It has been given successfully in *paralysis of the bladder* by Schaible, Bally, Hennemann, Behrend,[14] and

[1] Bouchardat, Annuaire de Thérapeutique pour 1849, p. 70.
[2] Provincial Medical and Surgical Journal, Dec. 31, 1845.
[3] Bullet. of Med. Science. [4] Med. Gazette, vol. xix.
[5] Illinois and Indiana Med. and Surg. Journ. April and May, 1847.
[6] Lond. Med. Gaz. v. 541 and 575.
[7] Midland Medical and Surgical Reporter, May and August, 1831.
[8] Bouchardat, Annuaire de Thérapeutique, pour 1841, p. 8. Paris, 1841.
[9] Bulletin Général de Thérapeutique, Juillet, 1838.
[10] Cited in London Medical Gazette, August 5, 1842, p. 733.
[11] Noticed in Medico-Chirurg. Review, Oct. 1844.
[12] A Treatise on Diseases of the Eye. Amer. edit. by Hays, p. 519. Philad. 1843.
[13] Transactions of the Medical and Physical Society of Calcutta, vol. v.
[14] Medicin. Zeitung, Sept. 1837, S. 190.

others; and in *paralysis of the facial nerve*, by Drs. O'Brien,[1] Beales,[2] and Joslin.[3] In two cases of *paralysis of the rectum* in elderly people, accompanying a disordered state of the bowels, the author found the best effects from the endermic use of strychnia—in the quantity of a quarter of a grain, night and morning, to a blistered surface on the sacrum. In *high grades of paraplegia*, the internal use of the remedy is to be preferred, but in general the endermic administration is more advisable. In *paralysis of the limbs*, a spot is selected in the vicinity of the spinal marrow.

Strychnia is likewise given in other affections. Very favourable reports have been made, as to its efficacy in *irregular gout*, by Wendt, who rubs on the affected parts an ointment composed of a grain and a half of *nitrate of strychnia* to two drams of *lard;* and in

Neuralgia. Mart found it beneficial in *tic douloureux* and in *nervous headach;* Magnus in a case of *neuralgia of the arm;* and several successful cases have been published by Dr. Pidduck.[4] The sulphate of strychnia, in doses of one-twelfth of a grain, two or three times a day, occasionally combined with sedatives and quinia, has been highly recommended by Dr. John Waters.[5]

Traumatic Tetanus. In this disease it has been extolled by Lüders, and a case, occurring in a negro girl, which terminated favourably under its use, in the dose of one-twelfth of a grain every two hours, has been reported by Dr. P. M. Kollock.[6]

In *hysteria*, *hypochondriasis*, and *dyspepsia*,[7] it has been advised by Schmidtmann, and Basedow, but morphia appears to render more essential service.

In *chorea*, Romberg and Professor Trousseau,[8] Dr. A. Ross,[9] Dr. Griscom,[10] and Dr. B. R. Hogan,[11] saw good effects from it. Professor Trousseau administers a syrup of the sulphate during or after meals, in cautiously increased doses until convulsive movements take place. These are to be kept up for about eight days, when, by diminishing the dose, a mere muscular stiffness should be maintained for a similar period, and the remedy be persevered in for eight or ten days after all irregular movements have ceased. Eight cases are cited in proof of his assertions; but Dr. Cowan[12]

[1] Med. Chirurg. Review, and L'Expérience, Nov. 1838.
[2] New York Journal of Medicine and Surgery, July, 1839, p. 201.
[3] Amer. Journ. of the Med. Sciences, Oct. 1842, p. 322.
[4] Lond. Medical Gazette, Aug. 7, 1840, p. 759.
[5] Cowan's Address, Trans. of the Provin. Med. and Surg. Ass. p. 62. Lond. 1845.
[6] Southern Medical and Surgical Journal, Oct. 1847.
[7] Melcombe, in London Medical Gazette, for March 4, 1837, p. 850.
[8] Journal de Médecine de Beau, Juin et Juillet, 1844, and Traité de Thérapeutique &c., i. 798. Paris, 1847. Also, Union Médicale, Juin, 1849, cited in Ranking's Half-yearly Abstract, July to Dec. 1849. Amer. edit. p. 41.
[9] London Lancet, June 7, 1845, p. 636.
[10] American Journal of the Med. Sciences, April, 1846, p. 471.
[11] New Orleans Med. and Surg. Journal, Sep. 1846.
[12] Retrospective Address, in Transactions of the Provincial Medical and Surgical Association, xiii. 58. Lond. 1845.

doubts whether success should justify the employment of a remedy so difficult to regulate, especially in cases which seldom resist ordinary and well known treatment. The experience of Professor Trousseau is confirmed by that of M. Rougier.[1] More recently, M. Trousseau[2] has published his mode of administering this powerful article. This consists in employing very small doses, increasing them by regular gradations, until slight tetanic rigidity is produced; then suspending the medicine or continuing the last dose, but never increasing it beyond that point. He states, that an itching of the skin and scalp generally precedes the rigidity, and that the masseter muscle is first affected. Hence he advises, that the child should be frequently asked whether it has any difficulty in opening the mouth, and thus the earliest toxical effects may be recognised.

In *retention of urine* from loss of power after parturition, Dr. Cory[3] administered a sixteenth of a grain of strychnia three times a day, with apparent advantage; and it was given, with good results, in a case of retention of urine following scarlatina, by Dr. Geo. L. Upshur, of Norfolk, Va.[4]

It has likewise been advised in *epilepsy*[5] and *catalepsy*. In a successful case related by Dr. Weyland, nitrate of strychnia was taken in such quantity as to produce the peculiar tetanic effects of strychnia. Fricke has administered it successfully in—

Syphilitic Osteocopi. It has also been given with benefit in cases of

Dysentery and *Diarrhœa*, by Bardsley, Recamier, Geddings,[6] and others; and has been used endermically in *cholera*—two or three grains being applied to the blistered surface on the nape of the neck. By MM. Dreyfus, Grimaud d'Angers and Potton it was given internally in the same affection to allay *vomiting:*—a quarter to a half a grain being added to three ounces of water, and prescribed in the dose of a spoonful every hour.[7] Dr. Ryan[8] asserts, that he has repeatedly known a few of the pills—the formula for which is given below—check a profuse diarrhœa with rice-coloured evacuations, and even when the extremities were blue, in malignant cholera. In the same disease Mr. C. E. Jenkins[9] gives a pill of one-eighteenth of a grain every quarter of an hour, washing it down with copious draughts of cold water. He

[1] American Journal of the Medical Sciences, Oct 1844; cited from Medical Times, Aug. 31, 1844. [2] Revue Médico-chirurgicale, Janv. 1850.
[3] Medico-Chirurgical Review, July, 1839.
[4] Medical Examiner, April, 1847, p. 213.
[5] Brofferio, in Repertorio Medico-Chir. di Torino, 1825, and Revue Medicale, iv. 488. Paris, 1825; and Weyland, Wochenschrift für die gesammte Heilkunde, cited in Encyc. des Sciences Méd. Janv. 1851, p. 65.
[6] N. American Archives, No. 2, Nov. 1834.
[7] Mérat and De Lens, Dict. de Mat. Méd. art. Strychnine.
[8] Formulary, 3d edit. p. 335. Lond. 1839.
[9] London Lancet, Sep. 2, 1848.

finds the first three or four pills probably ejected, but the subsequent doses are retained, and their good effect is speedily perceived. On the other hand, Dr. Ranking[1] combined it with an aperient extract with advantage in *habitual constipation;* and M. Homolle[2] relates three cases in which he found *milligramme*—gr. .0154—doses, repeated every hour, completely efficacious, after various other means had been used in vain, in relieving urgent symptoms of *internal strangulation.*

It has likewise been beneficial in *nervous vomiting* and *gastralgia*, in the former of which two teaspoonfuls of a solution of 5 *centigrammes*—gr. $\frac{3}{4}$,—in 100 *grammes*—$\overline{3}$iij$\frac{1}{4}$—of water, are given every quarter of an hour. M. Debout has seen the vomiting arrested after the fourth or fifth dose. In gastralgia he gives the same dose night and morning only.[3]

In *gleet*, unaccompanied by stricture, Dr. C. Johnson[4] has found good effects from an injection of strychnia, according to the formula given hereafter.

Amenorrhœa. Of twelve cases of suppressed menstruation, treated by Dr. Bardsley, ten were cured, and two relieved. Dr. Churchill[5] also had two cases, in which the cure by it was complete and permanent. *Lastly.* From its efficacy in analogous affections of the digestive mucous membrane, Dr. Stokes[6] thinks there is good reason to hope that it may prove useful in *bronchitis.* It has been employed, indeed, in all the cases in which the alcoholic extract of nux vomica has been found of service, than which it is of course to be more relied upon, in consequence of its greater uniformity,—nux vomica itself being often found unequal.

Intermittent Fever. This powerful agent has been recently recommended in this disease by Dr. S. E. M'Kinley,[7] of Tennessee, who states, that no remedy acts "with more certainty, as a permanent cure, if persisted in for two or more weeks." He gives from one-sixteenth to one-eighth of a grain every three hours, gradually augmenting the dose, "until, in some cases, one grain may be given three or four times a day, and without any toxical symptoms arising whatever." It need scarcely be said, however, that so potent an article must be administered with the greatest caution, and the cases must be rare in which it need be had recourse to to such an extent as to cause apprehension of the unpleasant results that appear to be produced at times by its cumulating in the system.

[1] L'Union Médicale, No. 138–9, 1848, cited in Brit. and For. Med. Chir. Rev. April, 1849, p. 539. [2] Ibid.

[3] Bouchardat, Annuaire de Thérapeutique pour 1849, p. 71.

[4] American Journal of the Medical Sciences, April, 1850, p. 541.

[5] Outlines of the Principal Diseases of Females, Amer. Med. Library edit. p. 54. Philad. 1839.

[6] Treatise on Diseases of the Chest, p. 125. Dublin, 1837, or Amer. Med. Library edit. Philad. 1838.

[7] Medical Examiner, July, 1850, p. 382.

In very obstinate cases, Dr. Keller,[1] of Philadelphia, prescribes the extract of nux vomica in combination with arsenic, sulphate of quinia and extract of quassia.

MODE OF ADMINISTRATION.

Pure strychnia is best exhibited internally, in the form of pill, or in spirituous solution; but if a little acid, especially the acetic, be added to it, it may be given in watery solution, as in this way a salt of strychnia may be formed extemporaneously. The dose is from one-sixteenth to one-eighth of a grain, which may be gradually increased until a grain is taken. In ordinary cases it will be sufficient to raise the dose to half a grain, two or three times a day; but if any circumstance should arise to cause its discontinuance, it ought not to be recommended in doses as large as the last, but with small doses, as at the beginning. In the endermic application of the remedy, we sprinkle, twice a day, a quarter of a grain on the denuded surface, and slowly increase the quantity to half a grain or more should this be necessary. If the larger doses do not act more beneficially, it will be advisable to discontinue it for a few days—after which the smaller doses may again exert a signal influence—rather than to carry the dose still higher. M. Pétrequin[2] thinks that the endermic use of strychnia frequently fails, owing to the vesicated surface to which it is applied becoming covered with a layer of coagulable lymph, in consequence of which the strychnia is unable to make its appropriate impression. This layer of lymph should be removed as far as possible at each application; and as the vesicated surface daily becomes less and less sensible, the dose must be proportionally increased. M. Pétrequin recommends, that a third or a fourth of a grain of strychnia should be mixed with two or three grains of powdered nux vomica, and the compound be sprinkled on the surface; but it would seem to be preferable to increase the dose of strychnia than to place so much insoluble and irritating powder on the sensitive surface.

It has also been introduced by inoculation in the neighbourhood of the eye in cases of *amaurosis*.[3] A grain of the sulphate was in one case dissolved in two drops of water: the first day twelve inoculations were practised,—six above the eye in the course of the supra-orbitar nerve; and six under and on the side of the nose, where the ethmoidal filaments and nasal branch terminate, and whence arise the filaments that go to the iris. On that day, there was no effect; but the next day slight tremors occurred in the neighbourhood of the inoculated spots. After a rest of two

[1] Nord Amerikanischer Monatsbericht für Natur und Heilkunde, Sept. 1, 1850, S. 103.
[2] Bulletin Général de Thérapeutique, Mars, 1840.
[3] Verlegh, Gazetta Medica di Milano, April, 1844, cited in London and Edinburgh Monthly Journal of the Medical Sciences, Aug. 1844, p. 713.

days, the inoculations were repeated, and the number of punctures increased to eighteen. The patient now became sensible of a slight haziness. After five successive inoculations, carried to the length of thirty punctures, the patient began to distinguish objects; after the eighth, vision was completely restored, the contraction of the pupil gradually increased, and the other symptoms diminished, after five grains of the sulphate had been used. During the same time, inoculations were had recourse to in the neighbourhood of the other eye. After the lapse of two months, the patient was perfectly restored.

Pilulæ strychniæ.

Pills of strychnia.

℞. Strychniæ pur. gr. ij.
Confect. rosæ ʒss.
Divide in pilulas xxiv.

Dose.—One to two, morning and evening. *Magendie.*

℞. Strychniæ gr. j.
Confect. ros. ʒss.
Glycyrrhiz. pulv. ℈ss.
Divide in pilulas xij.

Dose.—One, night and morning. The quantity may be increased to four or five daily. *Ryan.*

℞. Strychniæ gr. ij.
Ext. valerian. q. s.
ut fiant pil. xxxij.

Dose.—One, every morning, fasting, for five days:—afterwards one, morning and evening, in *torpid amaurosis.* *Furnari.*

Tinctura strychniæ.

℞. Strychniæ pur. gr. iij.
Alcohol 36° (.837) f ℥j. M.

Dose.—Six to twenty-four drops, twice or thrice a day.
Magendie.

Mistura strychniæ.

Mixture of strychnia.

(*Potion stimulante.*)

℞. Aq. destillat. f ℥ij.
Strychniæ gr. i.
Sacch. ʒij.
Acid. acet. gtt. ij. M.

Dose.—A dessert-spoonful, morning and evening.—*Magendie.*

Collyrium strychniæ.

Collyrium of strychnia.

℞. Strychniæ gr. ij.—iv.—vj.—viij.
Acid. acet. dil.
Aq. destillat. āā. f ℥j. M.

Two drops to be let fall into the eye, a few times a day, in *amaurosis.* *Henderson.*

Injectio strychniæ.

Injection of strychnia.

℞. Strychniæ gr. ij.
Acid. nitric. fort. gtt. iv.
Aquæ f ℥ij. M.

A dram to be injected three times a day in *gleet*.

Christopher Johnson.

Unguentum strychniæ.

Ointment of strychnia.

℞. Strychniæ gr. xvj.
Adipis ℥j. M.

Used in friction on *paralyzed parts*. *Sandras.*[1]

It may be well to dissolve the strychnia, before admixture, in a little alcohol.

Linimentum strychniæ.

Liniment of strychnia.

℞. Strychniæ gr. xxiv.
Ol. oliv. ℥j. M.

Twelve drops of the oil to be rubbed on the temples four times a day in cases of *amaurosis*. *Cunier.*

CLXIV. STRYCH'NIÆ ACE'TAS.

Synonymes. Strychniæ Acetas, Strychnium seu Strychninum Aceticum, Acetas Strychnii seu Strychnicus, Acetate of Strychnia or Strychnine. *German.* Essigsaures Strychnin, Strychninacetat.

In addition to the acetate, formed extemporaneously, as mentioned under Strychnia, the proper acetate of strychnia has been administered, especially by Lüders and Fricke. It may be made, like the acetate of quinia, from the direct combination of *strychnia* with *acetic acid*. According to Thénard, it is very soluble, and crystallizes with difficulty. Even when diluted 40,000 times, its solution occasions a sense of bitterness on the tongue.

The following formulæ have been given by the physicians cited.

Guttæ strychniæ acetatis.

Drops of acetate of strychnia.

℞. Strychniæ acet. gr. iij.
Alcohol. f ℥j.
Aq. cinnam. f ℥vij. M.

Dose.—Five drops, twice a day, gradually increasing the dose.

Lüders.

[1] Bouchardat, Nouveau Formulaire Magistral, p. 113. Paris, 1845.

Tinctura strychniæ acetatis.

Tincture of acetate of strychnia.

℞. Strychniæ acet. gr. iss.
Alcohol. f ℥ss. M.

Dose.—From three or four to twenty or thirty drops to be taken at bed-time in cases of *syphilitic pains of the bones.*

Fricke.

CLXV. STRYCHNIÆ IODAS.

Synonymes. Strychninæ Iodas, Strychnina Iodata, Strychnium seu Strychninum Iodicum, Iodas Strychnii seu Strychnicus, Iodate of Strychnia or Strychnine.

German. Iodsaures Strychnin, Strychninjodat.

METHOD OF PREPARING.

The preparation of this salt, according to Magendie, is easy. It is sufficient to add a concentrated solution of *iodic acid* to *powdered strychnia:* in a moment, the mass swells up, absorbs water, becomes thicker, and at times very consistent. It is now treated with *boiling alcohol*, filtered, and left to spontaneous evaporation. In this way, beautiful crystals of iodide of strychnia are obtained. The iodic acid, proper for this preparation, is procured, according to Geiger, in the following manner. Nine parts of *iodide of baryta* are boiled with two parts of *oil of vitriol*, previously diluted with ten times as much water, for half an hour. It is then filtered, and evaporated by a gentle heat to the consistence of a thin syrup, and is exposed to the air for spontaneous evaporation.

Iodate of strychnia may likewise be formed by double decomposition, by mixing a soluble iodate, as iodate of soda, with a solution of sulphate or muriate of strychnia. The iodate of strychnia is precipitated, which may be treated with boiling alcohol, and crystallized as above directed.

The iodide is of a white colour, and crystallizes in beautiful prismatic needles: it is but slightly soluble in cold water, but more so in boiling water and alcohol.

EFFECTS ON THE ECONOMY.

"This salt," says Magendie, "is one of the most active poisons with which I am acquainted. A single grain is sufficient to destroy a strong dog with tetanic symptoms. It acts, likewise, powerfully on the diseased organism. I gave it to several persons with a success which far exceeded my expectations. It proved effectual in some *old paraplegic affections*, which had been esteemed incurable, and after all the usual remedies had been administered in vain." He gave it in pills, each of which contained one-eighth of a grain. One of these was prescribed night and morning, and the dose was gradually increased, until ultimately a grain was

taken in the twenty-four hours. The greatest circumspection was, however, necessary in its use.

Magendie is of opinion, that the *hydriodate of strychnia, strychnium hydroiodicum, hydriodas* seu *iodhydras strychniæ* seu *strychnicus;* Germ. *Iodwasserstoffsaures Strychnin, iodwasserstoff Strychnin*, might be advantageously introduced into medicine. It is prepared by mixing a solution of *iodide of potassium* with a concentrated solution of *acetate of strychnia:* a white crystalline powder is precipitated, which is soluble in alcohol, and is pure hydriodate of strychnia.

It does not appear to have been used as yet in medicine.

AN IODIDE OF IODHYDRATE OF STRYCHNIA; French, *Iodure d'Iodhydrate de strychnine*, has likewise been proposed. It is prepared by pouring a solution of *ioduretted iodide of potassium* into a solution of a *salt of strychnia.* A flocculent precipitate is formed of a light chestnut hue, which is dried and treated with *boiling alcohol.* On cooling, the alcohol suffers crystals of ioduretted iodhydrate of strychnia to be deposited. It has the form of semi-transparent needles, of a deep ruby red colour; is soluble in alcohol and ether; but completely insoluble in water, even when slightly acidulated.

M. Bouchardat[1] has administered this preparation to dogs, in the dose of three *decigrammes* (gr. 4.63.) It poisoned them like strychnia, but the action was much longer in developing itself. In the dose of five *centigrammes*, (gr. .771,) it occasioned, in about an hour, convulsive shocks, which persisted for some time; but the animal completely recovered. He thinks the advantage it possesses over strychnia is in being less poisonous and more persistent. It is always identical in composition, and easy to obtain pure.

The dose is a *centigramme* (about a sixth of a grain) a day, gradually increasing it.

A DOUBLE IODIDE OF ZINC AND STRYCHNIA has also been prepared, which, according to M. Bouchardat, is a well defined salt, crystallizing regularly in beautiful needles of a brilliant white colour. It is composed of one atom of iodhydrate of strychnia, and one of iodide of zinc, and is soluble in water and in alcohol. When given to animals, it acts like strychnia and its salts; but requires double the dose. It is prepared by digesting for several days, in *hot water*, the *iodide of iodhydrate of strychnia* and *zinc;* the boiling liquid is filtered, and, on cooling, the salt crystallizes. M. Bouchardat[2] thinks it may replace strychnia with advantage,—being more manageable; and he suggests, that it may be a valuable agent in many serious *neuroses*, and especially in *epilepsy.*

[1] Nouveau Formulaire Magistral, p. 114. Paris, 1845. [2] Ibid. p. 114.

CLXVI. STRYCH'NIÆ NITRAS.

SYNONYMES. Strychninæ Nitras, Strychnium seu Strychninum Nitricum, Nitras Strychnii seu Strychnicus, Nitrate of Strychnia or Strychnine. *German.* Salpetersaures Strychnin, Strychninnitrat.

This preparation of strychnia has been more used in Germany than any other.[1] It has been received into the Prussian Pharmacopœia, (Landespharmakopöe,) where it is directed to be prepared in the following manner:

METHOD OF PREPARING.

On eight pounds of *nux vomica*, sixteen pounds of *spirit of wine* (Kornbranntwein) are poured, and the liquid is distilled to one-half. The nux vomica is then freed from the liquor by filtering, dried and reduced to coarse powder. This is digested two or three times, with a sufficient quantity of the spirit, and after digestion it is strained. The tinctures are then subjected to distillation, and what remains is evaporated along with the fluid that remained after the boiling: to this *acetate of lead*, dissolved in a sufficient quantity of *distilled water*, is added so long as a precipitate falls. The fluid, separated as much as possible from the precipitate, by means of the filter, is now evaporated to one-half, by a gentle heat. When cold, it is mixed with two ounces of *calcined magnesia*, and suffered to stand three days, when the deposit is separated by the aid of the filter, washed, and dried. This, after having been rubbed to powder, is digested two or three times in *alcohol*, and the tinctures are subjected to distillation, until only a few ounces remain. The strychnia, which, on cooling, appears in the retort in the form of a white powder, is separated by the filter, washed two or three times with *rectified spirit of wine* diluted with an equal quantity of *common water*, and neutralized by a proper quantity of *dilute nitric acid*. The filtered fluid is evaporated by a gentle heat so as to allow the formation of crystals. These crystals are needle-shaped, colourless, of a silky splendour, and a very bitter taste: they are soluble with difficulty in alcohol, but dissolve in ether.

MODE OF ADMINISTRATION.

The dose and mode of administering the nitrate of strychnia are the same as in the case of pure strychnia. Its endermic application will sometimes succeed when the internal administration has been more limited in its results. The experiments instituted by Dr. Stannius, and others, and referred to in a former page, were with nitrate of strychnia.

[1] Stumpf. art. Strychnos, Encyclopäd. Wörterb. der Medicin. Wissench. xxxii. 484. Berlin, 1844.

Magendie found, in his experiments, that this salt completely prevented the coagulation of the blood.[1]

CLXVII. STRYCH'NIÆ SULPHAS.

Synonymes. Strychninæ Sulphas, Strychnium seu Strychninum Sulphuricum, Sulphas Strychnii seu Strychnicus, Sulphate of Strychnia or Strychnine.

German. Schwefelsaures Strychnin, Strychninusulphat.

The same effects have been observed from this preparation as from the others. It is also dispensed in the same forms and doses. It may be obtained by the simple union of *strychnia* with *sulphuric acid.* According to Pelletier, 100 parts of the alkaloid saturate 10.486 of the acid. It is soluble in less than sixteen parts of cold water, and crystallizes, when neutral, in transparent cubes; when acid, in needles. Its taste is extraordinarily bitter. It is decomposed by every soluble salifiable base.

Sulphate of strychnia is much used by M. Trousseau, (see page 570:) he prescribes it in the form of

Syrupus strychniæ sulphatis.

Syrup of sulphate of strychnia.

(*Sirop de strychnine.*—Trousseau.)

R. Strychniæ sulphat. gr. 3.85 (25 *cent.*)
Syrup. Oj. (500 *grammes*) M.

Trousseau.

CLXVIII. SUL'PHURIS CARBURE'TUM.

Synonymes. Sulphuretum Carbonii seu Carbonei, Carbonium seu Carboneum Sulphuratum, Alcohol Sulphuris, Bisulphuretum Carbonii, Carbonii Bisulphuretum, Sulfidum Carbonii, Sulphuret of Carbon, Bisulphuret of Carbon, Sulphide of Carbon, Carburet of Sulphur, Alcohol of Sulphur.

French. Sulfure de Carbon, Carbure de Soufre, Soufre Carburé, Alcool de Soufre.

German. Schwefelalkohol, Schwefelkohlenstoff, Flüssiger Kohlenschwefel, Kohlensulfurid.

Carburet of sulphur or sulphuret of carbon was discovered by Lampadius in the year 1796. It is a transparent and colourless fluid at the ordinary temperature; has a very penetrating and disagreeable odour; and a taste cooling at first, but afterwards burning, acrid, and somewhat aromatic. Its specific gravity is 1.272. It boils at 106° of Fahrenheit. It is not decomposed at

[1] Leçons sur le Sang; or translation in Lond. Lancet, Jan. 26, 1839, p. 637.

the highest temperatures; but volatilizes rapidly in the air, and burns readily. It is not soluble in water, but is so in alcohol, ether, and the fixed and volatile oils. Water separates it immediately from those solutions. It unites intimately with the alkalies; but, of the acids, aqua regia—which is a mixture of the nitric and muriatic acids—alone lays hold of it. It dissolves potassa, camphor, sulphur, and phosphorus. Lampadius, in the first instance, regarded sulphuret of carbon as a compound of sulphur and hydrogen; it is now, however, decided, that it consists of sulphur and carbon,—according to Vauquelin, in the proportion of 85 or 86 to 15 or 14; according to Berzelius and Marcet, of 84.84 to 15.16.

METHOD OF PREPARING.

The following method is recommended by Mitscherlich:[1]

The temperature at which sulphur enters into ebullition is not sufficient to make the two substances combine, but if burning coals be placed in contact with vapours of sulphur, the combination takes place immediately. With this view, a tube of porcelain may be used, or, what is better, one of cast iron, lined internally with a coating of clay by running it several times through a paste of clay and water, and heating the tube each time. In this manner, the crust of dry clay will become strong enough to prevent the sulphur from attacking the iron. The tube is then filled with strongly calcined coals, and is heated to redness in an oblong furnace. One end of the tube is closed by a cork, and a small hole is made at the upper part of the tube, through which the sulphur is introduced, and which is closed by a plug. The other end, which has passed through the furnace, is likewise closed by a large cork, traversed by a glass tube. To make the stoppers close the tube hermetically, they are boiled with glue. The long glass tube passes into a large jar, through a hole in which it is adapted hermetically by means of a cork. The ordinary aperture of the jar is closed by a cork in which a tube is fitted hermetically, which passes through the window. At the bottom of the jar is contained a little water. The long tube passing from the furnace to the jar may be kept cool by water made to drop upon it, or by covering it with snow or ice. When the charcoal is heated to redness, small fragments of sulphur are dropped in, from time to time, by means of the aperture before mentioned, which must be carefully closed each time afterwards. The sulphur, on melting, runs towards the hottest parts of the tube, to which a slight inclination has been given on placing it in the furnace. It enters into ebullition, and is transformed into sulphureous vapour, which, by passing over the hot coals, combines with them: the sulphuret of car-

[1] Elémens de Chimie, traduits par M. B. Valerius, i. 156. Bruxelles, 1835.

bon or carburet of sulphur, formed, condenses in the long tube, from which it runs into the jar, and falls to the bottom of the water. As the coal always retains a little hydrogen, the sulphur likewise unites with it, to form a gaseous body, which is carried off by the tube passing through the window.

Carburet of sulphur is preserved in well-stopped bottles, and is covered with about an inch of water, whence it can be best obtained for use by means of a small glass or ivory syringe.

EFFECTS ON THE ECONOMY.

Dr. Snow[1] diffused its vapour through air, and noticed the effects on mice. He concludes that a single deep inspiration of air saturated with it, at a summer temperature, would produce instant death. It did not cause muscular relaxation before dissolution; but tremulous convulsions continued until the last. They supervened, or were threatened, almost as soon as complete insensibility to external impressions was established.

Carburet of sulphur holds a place amongst the transient or diffusible stimulants.[2] Its most marked effects are said to consist in its "exciting the function of cutaneous transpiration to copious sweating; increasing the secretion of urine, elevating the temperature of the body, quickening the pulse, and causing congestions towards the head and those parts of the body whose vitality may have been already somewhat augmented."[3] Its most striking agency is exhibited in the more active exercise of the functions of the skin. According to Mansfeld, it acts likewise as an emmenagogue; but, in this respect, probably only like similar excitants. On account of its great volatility, it produces on the skin the feeling of considerable cold.

The discoverer of the carburet of sulphur first recommended it as a remedial agent.[4] He particularly advised it, both internally and externally, in *rheumatic and gouty affections*. In Freiburg, a mixture of one part of *camphor*, two of *carburet of sulphur*, and four of *alcohol*, is a very common external application in *rheumatic pains*. Kappe found decided advantage from it in *gout* and *rheumatism;* and Mansfeld and Wutzer, resting upon a series of observations, maintain, that in *rheumatism unaccompanied by fever*, or where the fever is slight, it exceeds every other remedy of the class. Dr. Otto,[5] of Copenhagen, prescribes four drops of a mixture composed of one part of *carburet of sulphur*, and four parts of *highly rectified spirit of wine*, to be taken every two

[1] London Med. Gazette, June 23, 1848.

[2] Wutzer, Journ. de Chimie Méd.; cited in Amer. Journ. Med. Sciences, Nov. 1831, p. 215.

[3] Riecke, Die neuern Arzneimittel, S. 109; und 2te Auflage, S. 166. Stuttgart, 1840.

[4] Lampadius, in Bulletin des Sciences Médicales de Ferussac, xi. 315.

[5] Annales de Chimie Médicale, cited in American Journal of the Medical Sciences, for Nov. 1836, p. 222.

hours: and he directs the affected part to be rubbed with an embrocation, composed of one part of *sulphuret of carbon*, and four parts of *olive oil*. The cure, he states, is ordinarily effected in from eight to fifteen days. In deep-rooted *dyscrasies*, however, these gentlemen found no advantage from it. On the other hand, in trials at the Berlin Charité, it was found to be of no avail in *chronic rheumatism*, although it was used for a long time, and given in by no means small doses.[1]

Mansfeld, also, employed it in cases of *after-pains*, rubbing it, without admixture, on the abdomen; and he affirms, that good effects resulted from it, even when ergot had failed. In *hysteric fainting*, the same gentleman found it useful when internally exhibited. Lampadius likewise recommended it in *fainting*, as well as in *asphyxia*. Krimer found it extremely efficacious in *asphyxia from carbonic acid*, but he frequently thought it necessary to premise blood-letting. In this way, he treated eleven cases, and only one—in which apoplexy had already supervened—terminated fatally. The same physician exhibited it in some cases of *drunkenness*, attended with loss of consciousness, and found its effects very beneficial. He gave it with great advantage once in a case of *goître;* and, in *incarcerated hernia*, no agent, he says, facilitates so much the taxis as the cold produced by dropping carburet of sulphur on the tumour.[2] Lampadius found, that *slight burns* were instantaneously cured by it. Dr. Turnbull affirms, that the vapour of this substance was useful in cases of *indurated lymphatic glands*, and for the removal of *deafness*, dependent upon want of nervous energy, and deficiency of cerumen. It is applied by means of a bottle having a proper sized mouth, and containing a fluidram of the bisulphuret, imbibed by a piece of sponge. In the case of indurated lymphatic glands, the part is first well moistened with water. When the vapour is applied to the ear, the bottle, the neck of which must be small to fit the meatus, is held close to the organ, until considerable warmth is induced.[3] Clarus recommends it in *hypertrophy of the coats of the stomach*, and in *contraction of the œsophagus*—when administered according to the formula given below. Every thing, indeed, says Riecke, encourages its farther trial as a remedial agent.[4] It has been employed recently by Dr. Simpson,[5] of Edinburgh, as an *anæsthetic*. By one or two to whom it was exhibited, it was declared to be more pleasant than chloroform; but in several it produced disagreeable encephalic disorder. Its effects as an anæsthetic were powerful,

[1] G. Simon, art. Schwefelkohlenstoff, Encyclopäd. Wörterb. der Medicinisch. Wissenschaft. xxxi. 270. Berlin, 1843.

[2] Journal de Pharmacie, and American Journal of Pharmacy, ix. 264.

[3] Pharm. Journ. and Transact. ii. 352; cited in Dispensatory of the United States, 6th edit. p. 1235. Philad. 1845.

[4] Die neuern Arzneimittel, u. s. w. S. 110.

[5] Pharmaceutical Journal, vii. 517.

and very rapid, but difficult of regulation; and its deranging influence continued for some time after it was exhibited. Dr. Simpson employed it in *obstetrical cases*, when the same objections were found to apply to it.

MODE OF ADMINISTRATION.

Carburet of sulphur may be given internally in doses of from one drop to four, every five or ten minutes, in cases of *fainting* and *asphyxia;* but where such a rapid analeptic agency is not demanded, it may be given every two or three hours. It may be administered dropped on sugar or in a spoonful of sugared water or barley water. Clarus thinks it is best given in cow's milk.

Externally, it is either applied pure, when a rapid development of cold is needed—as in cases of *burns* and *incarcerated hernia*—or dissolved in alcohol or oil.

Guttæ sulphuris carbureti.

Drops of carburet of sulphur.

℞. Sulphur. carbur. f ʒij.
Æther. sulphur. f ℥j. M.

Dose.—A few drops on sugar. *Lampadius.*

℞. Sulphur. carbur. f ʒj.
Alcohol. f ℥ss. M.

Dose.—Four to six drops, every two hours, in *rheumatism.* *Wutzer.*

℞. Sulphur. carbur. f ʒj.
Alcohol. f ʒij. M.

Dose.—Five, ten, or fifteen drops, three times a day, in cases of *rheumatism.* *Wutzer.*

Mistura sulphuris carbureti.

Mixture of carburet of sulphur.

℞. Sulphur. carbur. ℈j.
Lact. vaccin. f ℥vj.
Sacch. ʒij. M.

Dose.—A table-spoonful, four times a day, or oftener. *Clarus.*

Embrocatio sulphuris carbureti.

Embrocation of carburet of sulphur.

℞. Sulphur. carbur. ℥ss.
Olei amygd. dulc. ℥j. M.

To be rubbed in, in cases of *old gouty nodes.* *Mansfeld* and *Otto.*[1]

℞. Sulphur. carbur. f ʒij.
Ol. oliv. seu
Linim. ammon. camphor. f ℥ij. M.

To be rubbed in, in cases of *rheumatism.* *Wutzer.*

[1] Bibliothek for Læger, 1835; cited in Brit. and For. Med. Review, July, 1836, p. 252.

℞. Camphor. ʒij.
Solve in
Sulphur. carbur. f ℥ss.
Adde
Alcohol. f ʒj. M.

To be used in friction, in cases of *rheumatism*, and especially in *rheumatic odontalgia*. *Lampadius.*

CLXIX. SULPH'URIS IO'DIDUM.

Synonymes. Sulphuris Ioduretum, Sulphur Iodatum seu Ioduratum, Ioduret or Iodide of Sulphur.
French. Soufre Ioduré, Iodure de Soufre.
German. Iodschwefel, Iodinschwefel, Schwefeliodür.

METHOD OF PREPARING.

Iodide of sulphur is prepared by heating slightly a mixture of four parts of *iodine*, and one of sublimed *sulphur*. The excess of iodine is driven off, and the iodide of sulphur remains as a grayish-black mass, very deliquescent, and readily decomposed by water. M. G. Van Melekebeke [1] has proposed the following form:—Take of *iodine*, two parts; *washed sulphur*, one part. Bruise them together, and introduce the mixture into a glass tube, pressing it down until the tube is well filled; then seal hermetically. Heat at first gently, until the mixture begins to become of a darker colour; then augment the heat so as to fuse the iodide; keep it for some time in this state, and turn the tube constantly, that the action may be uniform; remove it from the fire, and shake it until the iodide begins to congeal, and until vapours of iodine no longer form; open the tube, and compress again the iodide, in order to have it in fine cylinders. M. Van Melekebeke recommends this as a very expeditious process, and one which enables the pharmacien to prepare the iodide in very small quantity. The committee of the *Société des Sciences Médicales et Naturelles* of Malines approve of the process, but suggest, that the proportion of iodine to sulphur should be three to one.

The following form for its preparation has been introduced into the last edition of the Pharmacopœia of the United States:—Take of *iodine*, ℥iv.; *sulphur*, ℥j. Rub the iodine and sulphur together in a glass, porcelain, or marble mortar, until they are thoroughly mixed. Put the mixture into a matrass; close the orifice loosely, and apply a gentle heat so as to darken the mass without melting it. When the colour has become uniformly dark throughout, increase the heat so as to melt the iodide; then incline the matrass in different directions, in order to return into the mass any portion of iodine which may have condensed on the inner surface of the

[1] Archives de la Médecine Belge, Mars, 1842, p. 307.

vessel: lastly, allow the matrass to cool, break it, and put the iodide into bottles, which are to be well stopped.

EFFECTS ON THE ECONOMY.

Biett has used this agent in *squamous*, *pustular*, and *papular diseases of the skin*. It has been found especially effective in *psoriasis*, in the form of friction. Patients, who had been long affected with diseases of this kind, which had resisted every other remedy, were cured in four or five months by iodide of sulphur alone. To prevent relapses, Biett advises that the frictions should be continued after the eruptions have scaled off. He found it equally efficacious in the *lepra vulgaris* of Willan; and in *acne*—the *gutta rosacea* of Alibert—when the inflammation of the skin had passed away. Even *acne indurata* was often completely cured by it.[1] He found it also beneficial in *inveterate porrigo of the scalp*.[2] At times, after the rubbing, a diffuse red inflammation of the skin arises, with subsequent desquamation; and, in particular cases, the inflammation extends even to the subjacent areolar membrane. In *old standing lepra*, Rayer[3] prefers it for external use to calomel and white precipitate; and he ranks it highly, with the iodides of mercury, for the cure of *lupus non exedens;* and by Dr. Volmar[4] it has been used, with great success, in *herpes pustulosus labialis*. It is likewise extolled by Lugol as a very active therapeutical agent. Cless affirms, that in *chronic squamous affections of the skin*, especially in *psoriasis*, he has employed it with advantage, but he was not able to cure *lepra vulgaris* with it. It has been strongly recommended in *tinea capitis*, in the proportion of ten grains of the *iodide* to an ounce of *lard*. A writer in an English periodical[5] affirms, that he was induced to make trial of it in some obstinate cases, and was much astonished at the remarkable power it possessed over the disease. He rubbed it on the head, night and morning, and increased the strength of the ointment according as the affected part was able to bear the stimulus, until the iodide bore the proportion of half a dram to the ounce of lard or spermaceti cerate. Dr. Wilson has recommended, that the surface in *porrigo*, after ablution with warm water, should be rubbed gently twice a day with a liniment composed of *iodid. sulphur* ʒss., *ol. oliv.*, ℥j. In *porrigo decalvans* it has been found beneficial, made into an ointment with 18 or 20 parts of lard, and rubbed on very gently night and morning. Dr. W. Davidson,[6] too, has ex-

[1] See, also, Rayer, Traité Théorique et Pratique des Maladies de la Peau; and Copland, Dictionary of Practical Medicine, art. Acne.

[2] Cazenave et Schedel, Maladies de la Peau, p. 219; and Cogswell on Iodine, p. 120. Edinb. 1837.

[3] Diseases of the Skin, p. 634.

[4] Die neuesten Entdeckung. in d. Mat. Med.; cited by Pereira, Elements of Mat. Med. ii. 477, 2d edit. Lond. 1842; or 2d Amer. edit. by Carson. Philad. 1846.

[5] London Medical Gazette, for Sept. 9, 1837, p. 879. See, also, M. Cazenave, cited in American Journal of the Medical Sciences, Oct. 1841, p. 460.

[6] London and Edinburgh Monthly Journal of Medical Science, Dec. 1841: also, J. J. Ross, ibid. Sept. 1842, p. 792.

tolled it highly. He affirms, that although it does not seem to have so much power over *lepra* and *psoriasis* as over porrigo, it has succeeded more frequently than any agent he has tried, with the exception of blistering by cantharides. The author has certainly obtained far more satisfactory results from the use of iodide of sulphur in chronic cutaneous diseases in general, and especially in *porrigo*, *eczema*, and *psoriasis*, than from any other external agent; and such is the result of the observations of M. Escolar.[1]

The inhalation of the vapour of this substance has been employed in *humoral asthma* by Dr. Copland,[2] with temporary benefit; and fumigations of iodine and sulphur have been used advantageously in certain *atonic ulcers* and *chronic cutaneous diseases*.[3] With this view, the sulphur and iodine may be combined extemporaneously,—say four parts of iodine to one part of sulphur.

MODE OF ADMINISTRATION.

Unguentum sulphuris iodidi.

Ointment of iodide of sulphur.

R. Sulphur. iodid. ℈j.—℥ss.
Adipis ℥j. M. et fiat unguentum.

Biett.—Rayer.

CLXX. URE'A.

Synonymes. Ureum, Uricum, Nephrine, Nephrin.
French. Urée, Extrait Savonneux de l'Urine.
German. Harnstoff.

This immediate principle of the urine of man and quadrupeds was discovered in an impure state by Rouelle, in 1773; and since then it has been studied by Cruickshanks, Fourcroy and Vauquelin, Berzelius, Proust, and Liebig more especially.[4]

METHOD OF PREPARING.

Urea is obtained by placing a mixture of equal volumes of *urine*, reduced to the consistence of syrup, and *nitric acid* at 20° in a refrigerative bath; by which means crystallized nitrate of urea is precipitated. On dissolving this in cold water, and decomposing by *carbonate of potassa*, reducing it almost to dryness, and treating the residue by *alcohol* at 40°, which takes up the urea, crystals may be obtained by evaporation, which may subsequently be procured colourless by the agency of *animal charcoal*.

[1] Bouchardat, Annuaire de Thérapeutique pour 1848, p. 196. Paris, 1848.
[2] Dict. of Practical Medicine, art. Asthma.
[3] London Lancet, vol. i. 1838.
[4] Annales de Chimie et de Physique, x. 369, and Mérat and De Lens, art. Urée.

M. Henry,[1] who was not satisfied with the scanty product yielded by this process, recommends the following:—Add to fresh *urine* a slight excess of *subacetate of lead;* a precipitate is thus formed, which consists of oxide of lead united to the various acids of the urine, together with the mucus, and a great part of the animal matter; the decanted liquor is then treated with *sulphuric acid* in slight excess to separate the lead, and, afterwards, in the progress of the evaporation, to decompose the salts of soda and lime that may have been formed. After having separated the white precipitate, concentrate rapidly over a steady fire, adding a portion of *animal charcoal* during the ebullition. When the whole has become a clear syrup, pass it through linen of close texture, and then reduce it one-third by evaporation. On cooling, the liquid is converted into a yellow mass, crystallized in needles, and formed of a great proportion of urea and some salts. The crystals, being drained and pressed, are added to those obtained from the mother waters treated in a similar manner. They are next treated with a very small quantity of *carbonate of soda*, with the view of separating any remaining acetate of lime, and then digested in alcohol of 38° to 40°. The alcoholic solution being filtered, and the alcohol separated by distillation, the urea remains, which may be crystallized afresh from water, if necessary.[2]

Urea, thus obtained, is in silky or prismatic needles, is very soluble, and of a cooling taste.

The following improved method of preparation has been proposed by Prof. Liebig.[3] Twenty-eight parts of *ferrocyanuret of potassium* perfectly dried are mixed with fourteen parts of *peroxide of manganese*, both being reduced to as fine a powder as possible; the mixture is then heated on an iron plate, not in a crucible, over a coal fire to a feeble red heat. At this temperature it inflames, and is gradually extinguished. By shaking it several times, at intervals, it is prevented from becoming agglutinated, and the access of air is facilitated. The mass, on cooling, is treated with cold water, and the liquor is mixed with twenty parts and a half of dry *sulphate of ammonia* of commerce, prepared by saturating sulphuric acid with carbonate of ammonia, and evaporating it to dryness. It is well to put to one side the first concentrated washings afforded by the ferrocyanuret of potassium; to dissolve in the last washings, in the cold, the sulphate of ammonia, and to mix them with the first. Commonly, an abundant precipitate of sulphate of potassa forms immediately. The supernatant liquid is poured off, and evaporated in a salt water bath, or rather in a

[1] Journal de Pharmacie, xi. 161. Paris, 1829.

[2] Manual of Materia Medica and Pharmacy; by H. M. Edwards and P. Vavasseur, p. 231. Philada. 1829.

[3] Annalen der Chimie und Pharmacie, B. xxxviii.; and Journal de Pharmacie, Août, 1841, p. 502.

warm place,—care being taken to prevent ebullition. Fresh crystalline plates of sulphate of potassa are deposited, and the liquor is decanted as far as possible. The decanted liquor is then evaporated to dryness, and the residuum is treated with *boiling alcohol* of eighty to ninety *per cent.* This dissolves the urea, which crystallizes by the cooling and evaporation of the alcohol, whilst the sulphates do not dissolve.

EFFECTS ON THE ECONOMY.

The experiments of M. Ségalas have established, that urea is devoid of any noxious action on animals into whose veins it has been injected, and, consequently, that we cannot ascribe the serious symptoms to it which arise from the absorption of urine in certain morbid cases. They demonstrate, farther, what has been confirmed by the trials of Fouquier, that urea is a diuretic, and, therefore, might be useful in *dropsy*, and it has been so prescribed by him and by M. Ségalas. Fouquier employed it, also, but unsuccessfully, in *diabetes*.[1] Laënnec used it with advantage in a case of *dropsy*. In two cases reported by Mr. Kingdon,[2] he found that Nitrate of Urea,—*Nïtras Ureæ, Urea Nïtrica;* French, *Nitrate d'Urée;* German, Salpetersaures Harnstoff—acted as a very powerful diuretic; reducing, in a comparatively short time, *anasarcous swellings* of some standing, when ordinary diuretics had failed. In the first case, he gave one grain of the nitrate with one grain of calomel, in the form of pill, every night and morning for twelve days. The urine became copious, and the swelling disappeared. In the second case, a grain and a half of the nitrate was given alone three times a day. The like success attended this case: in ten days the anasarca had disappeared. Urea was also prescribed by M. Piorry in *albuminuria*.[3]

According to Prof. Fée,[4] urea is received into the lists of the Materia Medica in the Batavian Pharmacopœia, and in some others less known. It has also been admitted into the French Pharmacopœia.

MODE OF ADMINISTRATION.

Urea has been given in solution in distilled water, sweetened, in the dose of twenty-four to thirty grains, and even as high as several drams, in the day.

[1] Journal de Physiol. de Magendie, ii. 344, and Magendie, Formulaire pour la Préparation, &c., de plusieurs nouveaux Médicamens.

[2] London Lancet, Sept. 7, 1844, p. 729.

[3] Aschenbrenner, Die neueren Arzneimittel, S. 268. Erlangen, 1848.

[4] Cours. d'Hist. Naturelle Pharm. ii. 764; cited in Mérat and De Lens, Dict. de Mat. Méd. art. Urée.

CLXXI. VERATRIA.

Synonymes. Veratrina, Veratrinum, Veratrium, Veratrine.
French. Vératrine.
German. Veratrin, Niesswurzstoff.

This alkaloid, which was discovered in 1819, by MM. Pelletier and Caventou,[1] and almost at the same time by Meissner,[2] is commonly prepared from the seeds of veratrum sabadilla—*Sabadilla* or *Cevadilla* of the Pharmacopœia of the United States. It is contained in several of the plants belonging to the family Colchicaceæ.

METHOD OF PREPARING.

Cevadilla is repeatedly treated with *boiling alcohol.* The tinctures, filtered when almost boiling, allow whitish flakes of wax to be deposited on cooling; the dissolved matters, brought to the consistence of an extract, are now dissolved in *cold water*, and filtered. whereby a small quantity of fatty matter remains on the filter. The solution is then slowly evaporated, when a yellowish orange-coloured precipitate is formed, which possesses the characters of the colouring matter found in almost all woody vegetables. On adding a solution of *acetate of lead* to the still deeply coloured liquid, a new and very abundant yellow precipitate is thrown down, which can be separated by means of the filter. The liquor, now nearly colourless, contains, besides other substances, acetate of lead, which had been added in excess; this is separated by means of a stream of *sulphuretted hydrogen;* the liquor is then filtered, and concentrated by evaporation; treated by *magnesia*, and again filtered. The magnesian precipitate is digested in *boiling alcohol*, and on evaporating the alcoholic liquors, a pulverulent, extremely acrid matter is obtained, which possesses all the properties of the alkalies. It appears at first yellowish; but by solutions in *alcohol*, and subsequent precipitations, caused by pouring *water* into the alcoholic solutions, it is obtained in the form of a very white and perfectly inodorous powder.[3]

Veratria has been received into the London and United States Pharmacopœias.[4] In these it is directed to be prepared as follows:—Take of *cevadilla*, bruised, two pounds; *alcohol*, three gallons; *diluted sulphuric acid, solution of ammonia, purified animal charcoal, magnesia*, each a sufficient quantity. Boil the cevadilla in a gallon of the alcohol, in a retort with a receiver attached, for an hour, and pour off the liquor. To the residue

[1] Annales de Chimie et de Physique, xiv. 69.
[2] Gilbert's Annalen der Physik, lxv. 335.
[3] Magendie's Formulaire pour la Préparation, &c., de plusieurs nouveaux Médicamens.
[4] Pharm. of the United States, p. 237. Philada. 1842. For Righini's method of obtaining what M. Soubeiran calls "*medicinal veratrine*," see Journal de Pharmacie, Oct. 1837.

add another gallon of the alcohol, together with the portion recently distilled, again boil for an hour, and pour off the liquor. Repeat the boiling a third time with the remaining alcohol, and with that distilled in the previous operation. Press the cevadilla, mix and strain the liquors, and by means of a water bath distil off the alcohol. Boil the residue three or four times in water acidulated with sulphuric acid, mix and strain the liquors, and evaporate to the consistence of syrup. Add magnesia in slight excess, shake the mixture frequently; then express and wash what remains. Repeat the expression and washing two or three times, and, having dried the residue, digest it with a gentle heat several times in alcohol, and strain after each digestion. Distil off the alcohol from the mixed liquors; boil the residue for fifteen minutes in water with a little sulphuric acid and purified animal charcoal, and strain. Having thoroughly washed what remains, mix the washings with the strained liquor, evaporate with a moderate heat to the consistence of syrup, and drop in as much solution of ammonia as may be necessary to precipitate the veratria. Lastly, separate and dry the precipitate.

The following is the rationale of this process. The cevadilla gives up its veratria united with a vegetable acid to the alcohol; and when the alcohol extract is treated with water and sulphuric acid, an impure solution of sulphate of veratria is obtained. The magnesia decomposes this, setting free the veratria, which is taken up by alcohol. The alcohol is then distilled off, and the extract is boiled in water with sulphuric acid and animal charcoal: the acid unites with the veratria, whilst the charcoal abstracts the colouring matter. Ammonia, added to the strained solution, unites with the sulphuric acid, and the veratria is precipitated.[1]

Veratria—*commercial or medicinal veratria*—as prepared by the last process, is pulverulent, of a grayish-white colour, inodorous, and of a bitter acrid taste, causing a sensation of tingling with numbness in the tongue. It is scarcely at all soluble in cold water; but boiling water dissolves one thousandth part of its weight, and becomes sensibly acrid. It is very soluble in ether, and still more so in alcohol. It is not soluble in alkalies, but is so in all the vegetable acids: with these it forms uncrystallizable salts, which, on evaporation, present the appearance of gum. The sulphate alone affords rudiments of crystals when its acid is in excess. Nitric acid combines with it; but, if added in excess, it does not colour it red, as in the case of morphia, brucia, and impure strychnia, but very rapidly resolves the vegetable substance into its elements, and gives rise to a yellow detonating matter.

Veratria has an alkaline reaction. When exposed to heat, it liquefies at a temperature of 122° Fahrenheit, and has a waxy

[1] Pereira, Elements of Mat. Med. and Therap. 2d edit. ii. 961; or 2d Amer. edit. by Carson. Philad. 1846.

appearance. On cooling, it forms a translucent mass, having the appearance of amber. When distilled on the naked fire, it swells up, is decomposed, forms water, much oil, and leaves behind a bulky coal.

According to Couerbe,[1] when prepared in the modes above mentioned, it still contains several other substances, *sabadillina*, *veratria*, gum-resin of sabadilla, and a black greasy substance, which unites the other matters, and conceals their properties. These may be separated from each other by the successive action of water, ether and alcohol, as in the following table:

- *Commercial veratria*,
  - yields to boiling water
    1. *Sabadillina*, which crystallizes on cooling.
    2. *Resin of veratria*, left in the cold solution.
    3. *Veratria*, soluble in ether.
  - insoluble in boiling water . . .
    4. *Gum resin of veratria*, insoluble in ether, but soluble in alcohol.

On account of its very high price, and want of well defined external characters, the veratria of the shops is said to be very subject to adulteration; and there would not seem to be any good criterion for ascertaining its degree of purity.[2]

Simon, an apothecary of Berlin, has affirmed, that he has found two alkaloids in veratrum album; one of which possesses the property of being precipitated from its solution in acetic or phosphoric acid by sulphuric acid and its salts, like baryta; hence he has given it the name *barytin*.[3]

EFFECTS ON THE ANIMAL ECONOMY.

Regarding the effects of veratria on animals, Magendie[4] has the following remarks:—A very small quantity of the acetate placed in the nostrils of a dog, instantly excited violent sneezing, which continued for a long time. One or two grains, placed in the mouth, immediately occasioned profuse ptyalism. When a small quantity was introduced into any part of the intestinal canal, and the body was opened to notice its effects, the intestine was observed to be much indurated, and to relax and contract alternately for a certain length of time. The part of the mucous membrane with which the veratria is made to come in contact, is inflamed; the irritation spreads, and vomiting and purging are excited. In

[1] Annales de Chimie et de Physique, ii. 308.

[2] Christison, Dispensatory, p. 806. Edinb. 1842. See, as regards its adulteration with lime, Versmann, cited in Med. Examiner, Oct. 1845, p. 626.

[3] Pharmaceut. Centralblatt, 1837, p. 191, and Medicinische Annalen, B. iv. H. i.; S. 9. Heidelb. 1838.

[4] Journal de Physiologie Expérimen. i. 56; and Formulaire pour la Préparation, &c. de plusieurs Médicamens.

much stronger doses, the circulation is accelerated, as well as the respiration; and tetanus supervenes, soon followed by death. The effects are still more rapid, if one or two grains be thrown into the cavity of the pleura, or tunica vaginalis. In less than ten minutes death occurs, preceded by tetanic convulsions. The same quantity, thrown into the jugular vein, induced tetanus and death in a few seconds. Dissection showed, that, even in this case, the veratria had acted on the intestinal canal, the mucous membrane of which was found injected. The lungs, also, exhibited traces of inflammation and engorgement.

Veratria, in large doses, would, doubtless, exhibit the same effects on the human organism. The taste is very acrid, but without bitterness: it excites a copious flow of saliva, even when a small quantity only has been introduced into the mouth. Although it has no smell, it must not be brought too close to the nose, when in the state of powder, as it occasions, even in very minute quantity, violent sneezing, which may prove dangerous. A quarter of a grain immediately induces copious evacuations, and, in a somewhat larger dose, more or less violent vomiting.

According to Turnbull, who has immoderately extolled this remedy, its effect is very different, according as it is exhibited internally or externally. Externally, it may be applied for weeks and months, without the supervention of any of the effects that succeed its internal administration. Exhibited in this way, it diminishes internal nervous excitement; assuages pain, but does not act on the intestinal canal. In dropsical cases, it is stated to be one of the greatest promoters of the urinary secretion that we possess. The part of the skin on which it is rubbed, either in solution or ointment, even when the friction has been continued for a long time, exhibits no evidence of irritation; when, however, the dose has attained a certain extent, the patients feel a considerable degree of heat, and a kind of pricking sensation in the rubbed part, whence it may be concluded, that the article is active, pure and genuine: under more prolonged use, this feeling of warmth and pricking extends over the surface of the whole body; and, in some cases, involuntary twitchings have been observed in the muscles of the mouth and eyelids. These symptoms, however, pass off, when the frictions are discontinued for a day or two. Only in a few cases, according to Turnbull, was any eruption induced by its application. The endermic use of the remedy always, however, excited so much irritation as to prevent its repetition.

Thus much for Turnbull:—His views and experience have by no means been confirmed by the generality of observers. The external application of veratria cannot always be used without local irritation ensuing. An English physician, labouring under rheumatism of the arm, rubbed upon it an ointment composed of twenty grains of veratria to an ounce of lard; and, immediately

afterwards, so much pain was induced in the part, that he was obliged to take opium to obtain rest; an eczematous eruption subsequently appeared on the arm, but the rheumatism remained. Ebers applied it endermically, but witnessed nothing more than a violent burning in the part, such as is commonly the case with other agents. He frequently observed the pricking sensation mentioned by Turnbull, and it was often to such an extent as to be almost insupportable. According to the trials of Ebers, its diuretic effect was not restricted to dropsy, but was usually evinced in other diseases. The sensorium appears never to have been implicated, but when applied in small doses over the pit of the stomach, it produced striking effects on the spinal marrow, and the nerves connected therewith,—as the nerves of the thorax and abdomen: violent pain was experienced, which spread through the whole extent of the nerves distributed to the parietes of the abdomen, with a sense of traction along the spinal marrow, twitchings, great anxiety, orthopnœa, nausea and vomiting, and a feeling which the patient was unable to describe, except that it was almost intolerable.

When given internally, veratria speedily caused nausea, retching, vertigo, and complete loss of appetite; so that Ebers soon abandoned its internal use, and, like Turnbull, gave the preference to the external.

Owing to its presumed effects on the nervous system, and especially on the spinal marrow, and the nerves connected with it, it was suggested in *nervous diseases*—particularly in *neuralgia*, *prosopalgia*, and *ischias*—in which it is said to have been most efficacious, by Turnbull, Ebers,[1] Brück, Suffert,[2] Professor S. Jackson,[3] Cunier,[4] Calvé,[5] F. A. Gebhard,[6] and others. In no class of diseases, according to the first of these writers, have the beneficial effects of the ointment of veratria exhibited themselves more strikingly, and by no other remedy has the same amount of relief been induced in so short a time. Even in *tic douloureux*, a single friction is said to have been sufficient to remove the disease without relapse. Two circumstances chiefly have here to be borne in mind,—*first*, the extent of the pain, for when it is not concentrated on a point, but spreads along the branches of the nerves, the cure is easier, and a weaker ointment is needed; and, *secondly*, the duration of the affection. In long protracted cases,

[1] Casper's Wochenschrift. 1837, No. 47.

[2] Berlin, Medicin. Centralzeitung, 1837, p. 673, and Heidelberg. Medicin. Annal. B. iv. H. 1, S. 11.

[3] American Journal of Pharmacy, vol. iii. new series, p. 186. Philad. 1838.

[4] Bulletin Médical Belge, Dec. 1837, and Bullet. Général de Thérap., Dec. 1838. See, also, Forcke, Physiologisch-therapeutische Untersuchungen über das Veratria, Hannov. 1837; cited in Bib. Générale, Encyclog. des Sciences Médicales, Août, 1838.

[5] Cited in Braithwaite's Retrospect, x. 24, Amer. edit. New York, 1845.

[6] Zeitschrift für Therapie und Pharmacodynamik, Freiburg, Dec. 1844; cited in Amer. Journ. of the Med. Sciences, Jan. 1846, p. 203.

a complete cure is far more difficult, and can, in general, be effected only after a long period. The paroxysms, however, may be relieved by an ointment composed of from twenty to forty grains to an ounce of lard. In this case, it must be strongly rubbed in, so as to excite itching,—care being taken, however, that the ointment does not touch the conjunctiva, as the smallest quantity of veratria would induce violent inflammation. In many cases of *prosopalgia* M. Lafargue[1] introduced it by inoculation with singularly good effects. The plan he pursues is nearly the same as that for vaccination. Several punctures are made with the point of a lancet charged with a saturated solution of the alkaloid. Each puncture becomes at once the seat of a sharp pain, which is usually compared by the patient to a continued deep pricking with the point of a needle. This unpleasant sensation lasts for from five to fifteen minutes, and then gradually subsides; and with it the red areola that has formed around the punctured spot. M. Lafargue recommends, that in severe cases the inoculation should be repeated morning and evening; and that as many as ten or twelve punctures should be made at a time. He has used the same method with decidedly good effects, in several cases of *partial paralysis*.

Ebers, likewise, found advantage from its use in *chorea*, *hypochondriasis* and *hysteria;* and Turnbull, and F. A. Gebhard,[2] in *paralysis*. Both Ebers and Turnbull extol it in *rheumatism* and *gout*, in relation to which Ebers remarks, that it has appeared to him more efficacious when the nervous system, or some nervous branches were predominantly affected, and when the gastric affection was entirely removed. In the cases treated with it, relief was sooner obtained, and the cure was more speedy and complete, than when other agents were employed; the secretion of urine was augmented; restlessness disappeared; and sleep returned, without any evidence of narcosis. As regards *acute rheumatism*, Turnbull remarks, that veratria is not to be preferred to antiphlogistics; in these cases, a weaker ointment must be used (ten grains to the ounce:) in chronic cases, the quantity may be carried much higher; and—especially when extensive organic changes have supervened in the parts—it must be continued for a great length of time. In *lumbago*, *ischias* and *rheumatism of the chest*, not more than one or two rubbings were generally necessary. In *gout*, according to Turnbull, it may be exhibited both internally and externally; in the former mode of administration, he compared its efficacy with that of colchicum: the latter has been recommended by Sir C. Scudamore. It was likewise found, by Bardsley,[3] very advantageous in *chronic rheumatism*. In cases of severe local suffer-

[1] Cited in Edinb. Med. and Surg. Journal, Oct. 1843. [2] Op. cit.
[3] Hospital Facts and Observations, illustrative of the Efficacy of Strychnia, Brucia, Veratria, Iodine, &c. Lond. 1830.

ing, the ointment composed of veratria and opium, the form for which is given hereafter, has afforded marked relief. In two epidemics of *hooping cough*, Dr. F. A. Gebhard[1] found that great benefit was experienced, where the second stage was of protracted duration, from rubbing it over the vertebræ of the neck and upper part of the back. Dr. Bushnan has strongly recommended the ointment in *dysmenorrhœa*, which he supposes may be frequently owing to perversion of the nervous action of the lower portion of the spinal nerve; and in *certain spasmodic affections of the larynx*, presumed by Dr. Tunstall[2] to be connected with a morbid condition of the superior portion of the spinal marrow, it is asserted to have been efficacious. It has also been used in *amaurosis*, the ointment being rubbed on the temples and forehead for a few minutes, once or twice in twenty-four hours. The friction should be continued until it causes redness, heat, and stinging. Messrs. Lawrence[3] and Tyrrel, however, affirm, that it is wholly inefficacious.

Veratria would seem to have been most efficacious in cases of *dropsy*. "Unadulterated veratria," says Ebers, "acts often on the urinary secretion with magical powers, and it may seem fabulous, when I state, that friction with a very weak ointment two or three times in the twenty-four hours on the inner part of the thigh, or the back, epigastric region, or around the navel, has excited such a copious secretion of urine, that the patient, under its long continuance, began to feel weak; and the anasarca, and even the dropsical accumulation in the abdomen, in a short time almost disappeared—circumstances which indicate the caution that ought to be observed in apportioning the dose, when we are satisfied of the goodness of the article." He properly remarks, however, that veratria, by augmenting the secretion of urine, may not remove the dropsy; still, by occasioning the absorption of the fluid, it allows the physician to examine as to the existence of organic mischief. Ebers gave it in many of the *lighter hydropic cases, which follow intermittents and other forms of fever*, and often with great and rapid success; likewise, in twenty-four more serious cases, fifteen of which recovered, and one experienced relief: eight very complicated cases terminated fatally, and in four of these diuresis occurred; in four not. Dr. F. A. Gebhard[4] found more marked effects from it in *dropsies consequent upon long and exhausting disease;* and particularly in *cases which supervene on a severe typhoid epidemic*, which he witnessed. Fricker[5]

[1] Op. cit. [2] Provincial Med. and Surg. Journal, Aug. 14, 1841.
[3] A Treatise on the Diseases of the Eye, Amer. edit. by Hays, p. 519. Philad. 1843.
[4] Op. cit.
[5] Würtemb. Medic. Correspondenzblatt, B. vi. S. 157 and 341; and Heidelb. Medicin. Annal. B. iv. H. i. S. 15.

likewise obtained very good effects from the use of an ointment of it in dropsy; but, on the other hand, Späth found it of no avail.

Turnbull observed, from the internal use of veratria, as well as from its application to the pit of the stomach, a diminution in the frequency and force of the pulsations of the heart; and, in cases where they were more excited than natural, restoration of a regular circulation. He exhibited it, consequently, in *heart diseases*, especially in those of *gouty and rheumatic diathesis*, in *simple nervous and gouty palpitation*, and as a diuretic in *organic heart diseases*, in which it frequently seemed to afford relief.

The observation of Turnbull—that the external application of veratria, in *chronic rheumatism with swellings of the joints*, caused them to disappear—induced him to try it in *glandular swellings:* he found, that in *goître, swellings of the mammary glands* unaccompanied with pain, *buboes*, and *scrofulous tumours* of various parts, even in cases in which iodine had failed, it rendered essential service. It has, according to him, the advantage, that the skin is not subsequently irritated by it, and when, after the rubbing, the superfluous ointment is washed off with soap and water, the affected parts can soon afterwards be exposed to the air. Of an ointment formed of ten grains of veratria to half an ounce of lard, a piece, about the size of a nut, is rubbed in for ten minutes twice a day, and every week the strength of the ointment is increased.

Magendie[1] recommends, that veratria should be given, also, as a drastic cathartic, especially where a speedy action on the bowels is needed. Prescribed with this view, it has been found effective in several aged persons, in whom a collection of excrement had formed in the large intestine. Turnbull advises it in the dose of half a grain—in the opposite condition of the bowels—*diarrhœa*—a disease, in which, it is well known, our ordinary cathartics often prove serviceable.

It would appear, as before remarked, that veratria is an article which is frequently adulterated. Such, at least, is the opinion of many practitioners, and in this way they account for the discordance amongst observers as to its virtues.[2] The article with which Ebers made his first trials was obtained from the French laboratories; and it exhibited the whole power of this heroic agent: on employing, however, a new preparation, he found the latter entirely useless; whilst from another he derived all the benefit obtained from the first. The observations of Ebers would induce us to make farther trials with it, but the author must confess that his experience, thus far, has by no means confirmed the eulogiums of

[1] Formulaire pour la Préparation, &c., de plusieurs nouveaux Médicamens.

[2] Ebers; and Riecke, Die neuern Arzneimittel, u. s. w. S. 407, and 2te Auflage, S. 641. Stuttgart, 1840.

Turnbull; and this, he thinks, is the general sentiment of the profession.[1] It has often been used externally by him as well as by other American physicians, but it has almost always fallen short of the mark.[2]

MODE OF ADMINISTRATION.

Veratria may be given either in pill or in spirituous solution; the dose being from one-twelfth to one-sixth of a grain several times a day. Externally, it is best administered in the form of ointment, or endermically.

Liquor veratriæ.

Solution of veratria.

℞. Veratriæ gr. j.
Aq. destillat. f ℥ij. M.

A dessert-spoonful to be taken in one or two ounces of sugared water, in cases of *tic douloureux*. *Magendie.*

Pilulæ veratriæ.

Pills of veratria.

℞. Veratriæ gr. ss.
Acaciæ ℈j.
Syrup. acac. q. s. ut fiant pilulæ vj.

Dose.—One pill, to be repeated two or three times a day, according to circumstances. *Magendie.*

℞. Veratriæ gr. j.
Glycyrr. pulv. gr. xii.
Ext. hyoscyam. gr. vj.
M. fiant pilulæ xij.

Dose.—One, three times a day. *Turnbull.*

Tinctura veratriæ.

Tincture of veratria.

℞. Veratriæ gr. iv.[3]
Alcohol. f ℥j. M.

Dose.—Ten, fifteen, twenty, to twenty-five drops in a glass of water.—Given in *dropsy*. *Magendie.*

Magendie recommends that the tincture should also be used externally, in cases of *dropsy* or *gout*.

Linimentum veratriæ.

Liniment of veratria.

℞. Veratriæ gr. viij.
Solve in
Alcohol.
Tinct. sapon. camphorat. āā f ℥ss. M.

[1] Gully's translation of Magendie's Formulary; and Joy, in Tweedie's Library of Medicine, v. 289. Lond. 1840; or 2d Amer. edit. Philad. 1842.

[2] See, on the preparation, employment, action, and medicinal virtues of Veratria, Ebers, in Hufeland's Journal, B. lxxxvi. 1838.

[3] In the *Pharmacopée Universelle* of Jourdan, (ii. 643,) there is the serious error of directing ℥iv. in the preparation of this tincture, in place of four grains!

(*Huile de Vératrine.*)

℞. Veratriæ gr. xvss. (1 *gram.*)
Olei jecoris aselli ʒviss. (25 *gram.*) M.

Used in the form of friction in *inveterate neuralgia.*[1]
Jourdain.

Unguentum veratriæ.

Ointment of veratria.

℞. Veratriæ gr. v. x. vel xx.
Adipis ℥j.
Misce intimè.

For external use. The size of a hazel-nut to be carefully rubbed in, morning and evening, or oftener, for from five to fifteen minutes. *Turnbull.*

℞. Veratriæ ℈j.
Tere cum
Ol. olivæ ʒj.
Et adde
Unguent. cetacei ʒvij. Misce.

Unguentum veratriæ et opii.

Ointment of veratria and opium.

℞. Veratriæ ʒss.
Opii pulv. ʒi.
Adipis ℥iss. M.

To be rubbed on the part in severe bodily suffering from *rheumatism.*

The uncertainty in the action of the ointment of veratria having attracted the attention of M. Sauvan,[2] he found, by accident, that the difference did not proceed from the veratria, but from the fatty matter employed. With fresh pure lard, the ointment was of bad quality; whilst with bad or rancid lard, a satisfactory ointment was obtained.

Sulphate of Veratria—*Veratriæ Sulphas*—possesses the same virtues as veratria. Magendie gives the following form for internal administration;—

Solutio veratriæ sulphatis.

Solution of sulphate of veratria.

℞. Veratriæ sulphat. gr. j.
Aquæ destillat. f ℥ij. Misce.

Dose.—f ʒj. to f ʒiv. in a mixture. The preparation has been suggested as a substitute for the *Eau médicinale d'Husson.*

[1] Bouchardat, Annuaire de Thérapeutique, &c. pour 1847, p. 36. Paris, 1847.
[2] Ibid. pour 1843, p. 43. Paris, 1843.

CLXXII. ZINCI CHLORIDUM.

Synonymes. Zinci Chloruretum, Zincum Chloratum seu Muriaticum Oxydatum seu Salitum, Chloruretum Zincicum seu Zinci, Chloretum Zinci seu Zincicum, Butyrum Zinci, Murias Zinci seu Zincicus, Chloride, Chloruret, Hydrochlorate, Muriate, or Butter of Zinc.

German. Zinkchlorid, Salzsaures oder Chlorwasserstoffsaures Zink, Salzsaures Zinkoxyd, Chlorzink, Zinkchlorür, Zinkbutter.

METHOD OF PREPARING.

Chloride of zinc results,—when to any given quantity of pure *muriatic acid*, *pure oxide of zinc* is added, by the aid of gentle heat, until no more is dissolved: the solution is then filtered, and evaporated in a porcelain dish to dryness; whereby a jelly-like—and by high drying, firm white, and by careless drying, light brownish—substance, remains, of an austere, sourish, metallic taste, which must be rubbed to powder, and preserved in a closely-stopped vessel. In the last edition of the Pharmacopœia of the United States (1842) it is directed to be prepared as follows:—Take of *zinc*, in small pieces, ℥iiss.; *nitric acid*, *prepared chalk*, each ℥i.; *muriatic acid*, a sufficient quantity. To the zinc, in a glass or porcelain vessel, add gradually sufficient muriatic acid to dissolve it; then strain; add the nitric acid, and evaporate to dryness. Dissolve the dry mass in water, add the chalk, and, having allowed the mixture to stand for twenty-four hours, filter, and again evaporate to dryness.

Chloride of zinc is very deliquescent in the air, forming *butter of zinc* (*butyrum zinci*, German, Zinkbutter.) It is very soluble in water, alcohol, and ether.

EFFECTS ON THE ECONOMY.

Chloride of zinc has been exhibited both internally and externally, but chiefly in the latter mode, especially in this country. Papenguth[1] found a very dilute solution, applied in the form of lotion, useful in *flabby scrofulous ulcerations;* and in *sinuous ulcers*, in the form of injection. It has been especially recommended as a caustic that does not exert any disagreeable influence, like corrosive sublimate, arsenic, or potassa fusa;—neither causing violent pain in the affected parts, nor any kind of irritative fever; nor disordering the digestive organs, as some of the articles just mentioned. Hancke, indeed, advises, that arsenic should be entirely banished from therapeutics as a caustic agent, and that chloride of zinc should be substituted for it. He employed it with success in old *atonic ulcerations* of the feet, in the strength of two grains to the fluidounce of distilled water: with this he wetted lint, and applied it two or three times a day. With like success, he used it

[1] Nouveau Journal de Médecine, 1819.

in *old syphilitic ulcers*, with extremely *morbid surfaces and secretions:* the chloride destroyed the degenerate formations, and effected cicatrization. In *scrofulous* and *malignant herpetic ulcers*, he prescribed a concentrated solution; in *pityriasis* he used it as a wash, and in *wounds* and *ulcerations with fungous formations*, he applied it in a concentrated state: in *phagedenic ulcers of the face*, it effected a more certain cure than the method of Cosme,—the chloride being strewed, a line thick, in a dry state, over the whole surface of the ulcer, the edges surrounded with adhesive plaster, and a plaster placed over the chloride of zinc, with compresses and an appropriate bandage. In *nævi materni*, *angiectasis*, &c., he applied it in the same manner, as well as in the *pustule maligne*, (Milzbrandkarbunkel.) Mr. Carmichael[1] states, however, that he has used it in several instances, and has come to the conclusion, that, although not so objectionable as the arsenious acid, on account of the poisonous nature of the latter, it excites as much pain and inflammation,[2] without destroying, to the same extent, the carcinomatous substance.

A case of *phagedenic ulcer* of the septum narium, which had resisted all the topical applications made to it—corrosive chloride of mercury, arsenious acid, red oxide of mercury, sulphuric acid, nitric acid, &c., was treated by Dr. Zwerina of Vienna, with a solution of chloride of zinc,—a grain and a half of the salt to an ounce of distilled water,—with entire success. The scabs being removed, the sore was pencilled over several times a day with the solution. At the end of a fortnight, a healthy granulating surface was found beneath the thick crust, which now covered the sore, and this being removed from time to time, and the solution reapplied, at the end of five weeks the cicatrix was perfect and the patient well.[3]

The chloride has also been prescribed internally in cases of *cancerous ulcerations*, and with apparent benefit. Mr. Tuson[4] gives cases in which its internal and external use combined was productive of great advantage. He gave half a grain of the chloride every morning after breakfast in a wine-glassful of carraway water.

By Mr. Guthrie, chloride of zinc has been used in *necrosis* to penetrate the hardened case of new bone. It attacks the animal tissue of the bone, destroys it, and thus causes the earthy matter to soften and become detached. The sequestrum is by this means exposed with little pain or disturbance of the part, and may be

[1] Dublin Medical Press, March 4, 1840.

[2] See, also, Vogt, Pharmakodynamik, i. 363, 2te Auflage; cited by Pereira, Elements of Mat. Med. i. 821, 2d edit. Lond. 1842, or 2d Amer. edit. Philad. 1846.

[3] Cited in Lond. and Edinb. Monthly Journal of Medical Science, July, 1843, p. 650.

[4] London Lancet, Jan. 13, 1844, p. 502; and Tuson on the Female Breast, p. 399. Lond. 1846.

dealt with according to circumstances.[1] Mr. Callaway,[2] of Guy's Hospital, London, employed it with considerable success in the cure of *cutaneous* and *subcutaneous nævi materni*. It was directed to be rubbed on the part until the skin became slightly discoloured, and to be repeated at intervals. Mr. Alexander Ure and Mr. Liston,[3] found it extremely useful in the varieties of erosive ulcers called *lupus*, which were often speedily checked, and the disease permanently cured by the local use of it. They applied it in a paste, made with one part of the chloride and two or three parts of the anhydrous sulphate of lime—a modification of Canquoin's formula (see below,) recommended some years ago.[4] One or two applications of the paste were generally sufficient to produce a proper eschar, and when this was detached, the sore was treated with water dressing.[5] A case is related by Dr. Davidson,[6] of *malignant ulcer* under the left ear, which was cured by the unmixed chloride of zinc, applied repeatedly until the ulcer assumed a healthy character. Hancke used it likewise for the *formation of issues*, which it established in from six to eight hours; and, lastly, to excite rubefaction on the surface, either applied in the form of solution of the chloride in water or wine, or mixed with oil or lard into an ointment, and rubbed on the skin: in this way, a gritty kind of eruption of a scarlet hue is induced, which is said to have afforded relief in *paralysis* of the limbs.

Wendt, Vogt, and Canquoin have highly extolled the chloride as a caustic, and it has been largely employed by the physicians and surgeons of this continent, especially in the Philadelphia Hospital, and Pennsylvania Hospital, in similar cases to those mentioned above. Dr. Davidson[7] is of opinion, that it is only superior to many other caustics in cases where the destruction of a considerable thickness of texture is required, or where the removal of an excrescence by a caustic is preferred by the patient to the knife: the nitrate of silver seems, he considers, to be superior in promoting a sound action, when the unhealthy surface or stratum of the ulcer is superficial.

Hancke[8] has used the chloride internally, with advantage, in cases of *epilepsy*, as well as in *St. Vitus's dance;* and has prescribed it, united with hydrocyanic acid, in *prosopalgia*. Hufeland, also, extols a solution of it in all those *neuroses* in which the

[1] James, Retrospective Address before the Provincial Medical Association, in the Transactions of the Association. Lond. 1840.

[2] British Annals of Medicine, May 19, 1837.

[3] London Lancet, Sept. 21, 1844, p. 775.

[4] London Medical Gazette, Dec. 19, 1835.

[5] Lond. Med. Gaz., Dec. 3, 1836. See a case of *noli me tangere* of the nostril, and one of *phagedenic ulcer of the arm*, cured, in London Lancet, cited in Boston Med. and Surg. Journ. Nov. 4, 1840, p. 215.

[6] Edinb. Medical and Surgical Journal, Jan. 1838.

[7] Op. cit., and American Journal of the Medical Sciences, May, 1839, p. 238.

[8] Rust's Magazine, xxii. 373; and Journal de Pharmacie, xvi. 549.

oxide of zinc is indicated, and especially in such patients as are not readily impressible.[1] By Dr. Stanelli,[2] when liquefied by exposure to the air, it is considered an excellent remedy in *toothach*. By means of a camel's hair pencil, a small quantity is applied to the cavity of the tooth, and in the space of a few minutes the most acute sufferings are said to be appeased. Before using it, it is indispensable to surround the tooth carefully with cotton wadding, and when it has been applied, to fill the cavity well with the cotton. The mouth is finally washed with a little warm water.

M. Gaudriot[3] considers, that when properly diluted, it has great effect in curing simple *blennorrhœa of the urethra and vagina*. To remove the disease readily in men, it is generally sufficient to use the injection given below thrice a day for two or three days. The first injections are almost always followed by more or less swelling of the glands, but this does not prevent their continuance. In women, four or six of the suppositories mentioned below are sufficient to produce a cure. The first generally occasions swelling, with more or less heat of the vulva; but these symptoms soon disappear.

Several years since, a patent was obtained by Sir William Burnett for a process, discovered by him, for preserving timber, canvass, &c., from dry rot, mildew, &c. The preserving substance is chloride of zinc in solution. It was entirely effectual. Since then the solution has been employed as a disinfectant of dead bodies, and the testimonials of Messrs. Bowman, Sharpey, and W. V. Pettigrew, have been publicly given in its favour.[4] Mr. Pettigrew, in a letter to Sir William, dated March 24, 1846, says, "I have now used extensively your preparation for the preservation of animal matter, and find that it succeeds most completely. From the 3d to the 28th of February, I lectured upon the superior extremity. The arm, when received, was green in colour, and highly offensive. I injected the arteries with the fluid, mixed in the proportion of one pound of chloride of zinc to three gallons of water, and as the dissection proceeded, the surface of the limb was sponged about every alternate day with the solution. It was perfectly restored to its former fresh condition. I have also placed various portions of the body in the solution, and they at present remain quite free from putrefaction. All our subjects are now injected with the fluid, immediately they arrive; and I do not hesitate to say, that our dissecting room is more free from unpleasant odour than any room of the kind in the metropolis, and the great advantage this fluid possesses over all others we have as yet tried

[1] See Mérat and De Lens, art. Zinc (chlorure de.)
[2] Cited in London Medical Gazette, Feb. 16, 1844, p. 672.
[3] Journ. des Connaissances Méd. Sept. 1840; cited in Brit. and For. Med. Rev. April, 1841, p. 527.
[4] London Medical Gazette, cited in Medical Examiner, June, 1846, p. 374.

is,—that it has no effect upon the knives. I cannot but consider it one of the greatest boons conferred upon the profession. Dissection may be carried on in the hottest weather, without the slightest injury to the breath, or offence from smell."

The value of chloride of zinc as an antiseptic has been fully established in the dissecting rooms of Philadelphia and elsewhere; but there is no reason for believing that it is a disinfectant in the sense of destroying contagious or other morbific miasmata. It is an excellent antibromic, but as it does not give off any antiseptic vapour, its action is restricted to the substances with which it is brought into immediate contact. Dr. Stratton,[1] however, is disposed to believe, that it acted as a true disinfectant by destroying miasmata in the Quebec Marine and Emigrant Hospital, of which he had charge in the autumn of 1847. He found, that one ounce of the strong fluid was sufficient for every ten persons. This strong fluid, known under the name of Sir William "*Burnett's Disinfecting and Antiseptic Fluid*," contains 25 grains of zinc in every fluidram; and in using it one pint is mixed with five gallons of water.[2] He removes the disagreeable odour in hospital wards full of typhus and dysentery cases, by waving flannel cloths wet with a dilute fluid—one part to 40 of water—two or three times a day, for a few minutes at a time, and by sprinkling some of it on the floor. "Next to perfect ventilation," he says, "I would place the use of Burnett's solution of the chloride of zinc. On many occasions, as in badly constructed buildings, in cold weather, and on board ship in stormy weather, ventilation is impracticable, and recourse must be had to some other means of improving the quality of the air, and it appears to me, that the chloride of zinc solution is much superior to all the other artificial methods of doing so, including Ledoyen's solution of the nitrate of lead." (See PLUMBI NITRAS.)

Dr. Stratton saw a case of *lupus*, in which the "Burnett fluid" was as effectual as, and more convenient than, the solid chloride of zinc. The fluid diluted—one to 130 parts of water—was found very beneficial as an application to *chronic* and *scrofulous ulcers* by Dr. Allan, Mr. Erasmus Wilson, and others; and in *mercurial sore throat* by Mr. Flynn. In the proportion of one part to sixty or eighty of water—it is said to be an excellent lotion in *erysipelas*, and a valuable lotion or bath in *psora*, *prurigo*, *pruritus*, and other cutaneous diseases. When introduced of the full strength on the point of a pen into the cavity of a tooth, it has proved serviceable in some cases of *toothach*. Diluted with one hundred and forty parts of water, it removes the fœtor from *gangrenous frost-bites*. Dr. Stratton has no doubt, that it will be found a good remedy, when diluted with one-hundred and forty parts of

[1] Edinb. Med. and Surg. Journ. Oct. 1848, p. 287.
[2] Pharmaceutical Journal vii., 60 and 107, Lond. 1847.

water as an injection in *fetid otorrhœa;* and as a gargle in some *throat diseases.* It has also been used as an injection in *gonorrhœa.* The action of the diluted fluid on *cancerous* and other sores, is like that of other antiseptics; it removes the fœtor, and induces a new action in the part of the system of nutrition implicated in the ulceration.

MODE OF ADMINISTRATION.

Guttæ zinci chloridi.

Drops of chloride of zinc.

Æther Zinci.

℞. Zinci chlorid. gr. j.
Sp. æther. muriat. seu sulphuric. f ʒij. Solve.

Dose.—Five drops, every four hours, in a little sugared water; gradually increasing the dose to ten drops, *in chorea, epilepsy, prosopalgia,* &c. *Hufeland & Hanke.*[1]

Lotio zinci chloridi.

Lotion of chloride of zinc.

℞. Zinci chlorid. gr. viij.
Ext. aloes aquos. ℈ij.
Aquæ destillat. f ℥iv. Solve.

Applied to the dressings, in cases of *atonic scrofulous ulcers.* *Vogt.*

Or, the aloes may be admitted.

Injectio zinci chloridi.

Injection of chloride of zinc.

℞. Zinci chlorid. liquid.[2] gtt. xxiv.—xxxvi.
Aquæ destillat. f ʒiv.

Filter through paper. A small quantity of this to be injected about an inch along the urethra, two or three times a day.
Gaudriot.

Suppositorium zinci chloridi.

Suppository of chloride of zinc.

℞. Zinci chlorid. liquid. gtt. v.
Morphiæ sulphat. gr. ss.

Mix with three drams of the following paste;

℞. Mucilag. tragacanth. p. vj.
Sacchar. pulv. p. iij.
Amyli pulv. p. ix.

One of these must be introduced every day, or every other day.
Gaudriot.

[1] Lincke, Vollständiges Recept-Taschenbuch. u. s. w. ii. 780. Leipz. 1841.
[2] "*Liquid chloride of zinc* consists of a concentrated solution of pure zinc in pure chlorohydric acid."—Lincke, loc. cit.

Chloride of zinc may be applied as a caustic, by means of a moistened hair pencil, either alone or mixed with an equal portion of oxide of zinc, or sulphate of lime, or according to the following forms:—

Pasta zinci chloridi.

Paste of chloride of zinc.

Pâte de Canquoin.

Canquoin's caustic paste.

		A.	B.	C.
℞.	Zinci chlorid.	p. i.	i.	i.
	Farinæ tritici	p. iv.	iij.	ij.
	Aquæ fontan.[1]	q. s. ut fiat pasta.		

℞. Zinci chlorid. p. j.
Farinæ tritici p. iss.
Antimonii chloridi p. ss.
Aq. font. q. s. ut fiat pasta.

CLXXIII. ZINCI CYANURE'TUM.

Synonymes. Zinci Cyanidum, Zincum Cyanogenatum seu Cyanatum seu Borussicum seu Zooticum seu Hydrocyanicum seu Hydrocyanicum sine Ferro, Cyanetum seu Cyanuretum Zincicum seu Zinci sine Ferro, Cyanetum Zinci, Prussias seu Hydrocyanas seu Cyanhydras Zinci seu Zincicus, Hydrocyanate, Prussiate, or Cyanuret of Zinc.

French. Cyanure de Zinc.

German. Cyanzink, Blausaures Zink oder Zinkoxyd, Blaustoffzink, Zinkcyanür.

This preparation was used in Germany for a long time before the process was made known.[2]

METHOD OF PREPARING.

According to Kunze, it is directed in the Leipzic shops to be prepared as follows:[3]—Any quantity of pure *sulphate of zinc* is dissolved in ten times as much *distilled water;* the fluid is then filtered, and decomposed by a solution of *cyanuret of potassium*, or *cyanuret of calcium*, added by drops so long as a precipitate is formed. This precipitate, which consists of cyanuret of zinc, must be carefully washed, dried, and preserved in a glass jar, from which the entrance of light is prevented.[4]

It is admitted into the Parisian "Codex."

Cyanuret of zinc has the appearance of a white, tasteless powder, which is insoluble in water and alcohol, but dissolves in the stronger acids, with the disengagement of hydrocyanic acid. Well

[1] To each ounce of the chloride of zinc twenty-four to thirty drops of water may be added.

[2] Magendie, Formulaire pour la Préparation, &c.. de plusieurs nouveaux Médicamens, &c.

[3] Riecke, Die neuern Arzneimittel, u. s. w. S. 410. Stuttgart, 1837.

[4] For M. Pelletier's method, see Magendie, Formulaire, &c.

prepared and rubbed, it has a strong odour of hydrocyanic acid, and when moistened, or exposed to heat, it gives off hydrocyanic acid.

As to its medicinal effects, and mode of administration, they are analogous to those of the following preparation: they are therefore given together.

CLXXIV. ZINCI FERROCYANURETUM.

Synonymes. Zinci Ferrocyanidum seu Ferrohydrocyanas, Cyanetum seu Cyanuretum Zinci et Ferri seu Ferrosozincicum, Cyanuretum Ferrozincicum, Zincum Ferrohydrocyanicum seu Ferroborussicum seu Ferrocyanogenatum seu Ferrocyanatum, Prussias Zinci et Ferri, Hydrocyanas Zinci Ferruginosus, Ferrohydrocyanas Zinci, Ferrocyanuret, Ferro-hydrocyanate or Ferrocyanate of Zinc.

German. Eisenblausaures Zink, Blausaures Eisenzink, Eisenhaltiges Blausaures Zink, Blausaures Eisenoxydul-Zinkoxyd, Zinkeisencyanür, Eisenzinkcyanür, Cyaneisenzink.

METHOD OF PREPARING.

According to Schindler,[1] this preparation is best made by the mutual decomposition of boiling hot solutions of eighty-three parts of *sulphate of zinc*, and sixty parts of *ferrocyanuret of potassium*. If the sulphate of zinc be not entirely free from iron, the salt will have a bluish lustre, which, after long washing with lime water, becomes of a reddish hue. If the bluish colour be manifested, some more sulphate of zinc must be added, and it must be digested until the precipitate appears entirely white.

Ferrocyanuret of zinc forms a white, insoluble, almost inodorous powder, which is somewhat soluble in the stronger acids, without exhaling a smell of hydrocyanic acid in the cold; but by boiling, hydrocyanic acid is slowly disengaged.

EFFECTS ON THE ECONOMY.

Hufeland recommends the cyanuret, or perhaps, the ferrocyanuret of zinc in *nervous diseases*. According to him, from one to four grains may be given for a dose, two or three times a day, without any injurious effects;—the only inconvenience being, at times, slight nausea, but no diarrhœa, or disposition to obstructions, and no narcotic symptoms. In *cardialgia*, it afforded, in his hands, essential service, as well as in some cases of *epilepsy* and in *paralysis*. Henning,[2] likewise found it useful in *cramp of the stomach*, *hysteria*, and *spasmodic diseases of children induced by worms*. In *epileptic attacks from teething*, he also gave it with advantage; the dose being from half a grain to a grain, three or four times a day. Clarus gave cyanuret of zinc in

[1] Riecke, op. cit. S. 411, und 2te Auflage, S. 646. Stuttgart, 1840.
[2] Hufeland's Journal, 1823.

epilepsy, but he observed no other result than less frequent and less severe attacks. Pohl saw no very decided effect from it in the dose of from one-fourth to half a grain. In the Berlin Polyclinic Institute, advantage accrued from it in two cases of *St. Vitus's dance;* it was begun with in the dose of one-third of a grain twice a day, which was gradually raised to fourteen grains a day. Klokow gave the cyanuret of zinc—which Riecke suggests[1] was the cyanuret of zinc and potassium, (Cyanzinkcyankalium,) in *spasmodic affections*,—beginning at first with one-tenth of a grain,—as larger doses occasioned colic, diarrhœa, and vomiting—and, when the patient became accustomed to it, gradually augmenting the dose to half a grain. Success, he affirms, followed its administration.[2] Muhrbeck gave it in violent *periodical cephalalgia* in the region of the left frontal sinus with great benefit. He began with one-twelfth of a grain, and gradually raised the dose to a grain and a half. Müller and Günther confirm the reports of its efficacy in *St. Vitus's dance:* the first gave daily a grain; the latter, from half a grain to a grain, four times a day. Kopp, who distinguishes the two preparations from each other, instituted experiments with both. He used the ferrocyanuret of zinc with advantage in *cramp of the stomach, general nervous disorder, nervous debility, neuralgia, nervous headach*, and *nocturnal pains in the bones*. He gave it in the form of powder, with sugar of milk, every two hours, or four times a day, in doses of one-twelfth to one-eighth of a grain, gradually increasing them. According to his observations, it occasions, with many persons, obstructions, but does not disorder the stomach. Kopp found the cyanuret still more efficacious in the same disorders. Impressible patients, who suffered under *unusual sensibility of the abdomen*, took four powders daily, of one-sixteenth of a grain each, with marked benefit. In one case of *neuralgia*, in a man, he raised the dose very gradually to half a grain, four times a day. When, however, this quantity was exceeded, and the patient took five-eighths of a grain four times a day, hyperæmia occurred in the head, with constipation. In two cases of *chorea* of one side of the body, the ferrocyanuret had no effect whatever. Riecke[3] asserts that his father used it several times with advantage in *scirrhus of the pylorus*.

The cyanuret was applied externally, by Von Ammon, in *scrofulous* and *incipient rheumatic inflammation of the eyes*, as well as in *catarrhal inflammation of the eyelids:* he prescribed it suspended by means of gum Arabic in a mixture of cherry-laurel water and laudanum. M. Carrier[4] believes, that preparations of hydrocyanic acid have great efficacy in healing *ulcers of the cornea*, and causing the absorption of *opacities*. The compound

[1] Op. cit. S. 413. [2] Hufeland und Osann's Journal, B. lxx. St. 2. [3] Op. citat. S. 414.
[4] Cited in Provincial Med. and Surg. Journal, Feb. 10, 1844, p. 378.

which he prefers is one part of cyanuret of zinc to twenty-five of lard.

MODE OF ADMINISTRATION.

On account of the insolubility of both the cyanuret and ferrocyanuret, they are best given in pill or powder.

The common dose of the cyanuret is from one-sixteenth to one-twelfth of a grain several times a day, gradually increasing it to a quarter of a grain: of the ferrocyanuret, the dose is from one to four grains, two or three times a day. Riecke[1] advises—to prevent confusion—that when these articles are ordered, they should be respectively denominated *Zincum hydrocyanicum sine ferro* and *Zincum ferro hydrocyanicum*.

Pilulæ zinci cyanureti.

Pills of cyanuret of zinc.

R. Zinci cyanur. gr. xv.
Ext. glycyrrh. ʒij.
Misce et fiant pilulæ lx.

Dose.—One, morning, noon, and night, gradually increasing the quantity. *Kopp.*

R. Zinci cyanuret. gr. vj.
Magnesiæ gr. iv.
Cinnam. pulv. gr. iij. Misce.

This dose to be repeated every four hours, in *nervous affections of the stomach, especially in cases of cramp.* *Henning.*

Mistura zinci ferrocyanureti.

Mixture of ferrocyanuret of zinc.

R. Zinci ferrocyanur. gr. iv.
Aquæ destillat. fʒij. M.

Dose.—A fourth part, four times a day, in *chorea.* *Lincke.*[2]

Pulveres zinci ferrocyanureti.

Powders of ferrocyanuret of zinc.

R. Zinci ferrocyanur. gr. ij.—viij.
Sacchar. ʒj. M. et divide in part. vj.

Dose.—One to be given every two hours in *cardialgia.*
Von Hildenbrand.

Pilulæ zinci ferrocyanureti.

Pills of ferrocyanuret of zinc.

R. Zinci ferrocyanuret. gr. xv.
Valerian. pulv. ʒss.
Extract. valerian. q. s. ut fiant pil. lx.

Dose.—One, morning and evening, in *chorea.*
Rosensteil & Heckenroth.[3]

[1] Op. citat.
[2] Vollständiges Recept-Taschenbuch, ii. 778, Leipz. 1841.
[3] Lincke, op. cit.

CLXXV. ZINCI IO'DIDUM.

SYNONYMES. Zincum Iodatum, Zinci Ioduretum, Iodetum Zinci seu Zincicum, Protoioduretum Zinci, Iodide or Ioduret of Zinc.
German. Iodzink, Zinkiodür.

This preparation is made by boiling together *iodine* and *zinc* in atomic proportions, or rather with an excess of zinc, in a flask of water, to dryness, and subliming the residue. Iodide of zinc is thus procured in beautiful, colourless, prismatic crystals.[1] It is very deliquescent, and cannot easily be retained in the solid form. When heated in open vessels, it is resolved into iodine and oxide of zinc. It is very liable to undergo spontaneous decomposition, and, to prevent this, Dr. A. T. Thomson proposes that a syrup should be made of it, on the same plan as the syrup of iodide of iron.

EFFECTS ON THE ECONOMY.

Iodide of zinc has a caustic taste, and when applied to a denuded surface gives rise to considerable smarting. Dr. Ure[2] recommends an ointment, formed of a dram to an ounce of lard, in cases where the external use of iodide of potassium is indicated. Proutet advises it as a collyrium in *scrofulous ophthalmia*, of the strength of fifteen grains to six fluidounces of distilled water; and it has been employed to form an astringent injection, in the proportion of one or two grains to an ounce of water, in *gonorrhœa*. Dr. J. J. Ross[3] used a solution of from 10 to 30 grains to the fluidounce of water, with much advantage, in *enlarged tonsils*. It was applied by means of a sponge tied to a quill. After the use of the solution for some time, he applied the iodide, rendered liquid by deliquescence, by means of a camel's hair brush.

A DOUBLE IODIDE OF ZINC AND MORPHIA; French, *Iodure double de zinc et de morphine*, is described by M. Bouchardat.[4] It is obtained by boiling a *gramme* (gr. 15.44,) of *iodide of iodhydrate of morphia*, with 59 *grammes* (nearly f ℥ij.) of *water*, and 10 *grammes* (ʒiiss.) of *zinc*, after they have acted upon each other for some days. The boiling liquor is filtered; and a salt is obtained, which crystallizes readily in needles arranged in beautiful radiated groups. The salt is the iodide of zinc and morphia, which is very soluble in water and in alcohol. The compound is considered to combine the properties of morphia and the salts of zinc. M. Bouchardat has prescribed it as an anodyne and anti-spasmodic. He makes about a grain and a half into eight pills, of which he

[1] Annales de Chimie, xci.
[2] Dictionary of Chemistry, 2d edition, p. 516.
[3] Cited in United States Dispensatory, 6th edition, p. 1267. Philad. 1845.
[4] Nouveau Formulaire Magistral, p. 70. Paris, 1845.

gives one or two in the day, in *gastralgia* "and other nervous affections."

For the DOUBLE IODIDE OF ZINC AND STRYCHNIA, see STRYCHNIA.

CLXXVI. ZINCI VALERIA'NAS.

SYNONYMES. Zincum Valerianicum, Valerianate of Zinc.
French. Valerianate de Zinc.
German. Valeriansaures Zinkoxyd, Baldriansaures Zink.

This salt was first proposed by Prince Louis Lucien Bonaparte. It has been much used by the Italian physicians, and has been more recently introduced into medical practice in France and elsewhere.

METHOD OF PREPARING.

Valerianate of zinc is prepared by saturating *valerianic acid* with the *carbonate*, or, still better, with perfectly pure *oxide, of zinc* recently precipitated. The action is assisted by heat; and the hot solution is filtered, and allowed to crystallize on a gently heated sandbath.[1] It may also be prepared by double decomposition from *valerianate of baryta* and *sulphate of zinc*,[2]—or, after the formula of the Dublin college, by the double decomposition of *valerianate of soda* and *sulphate of zinc*.[3]

The crystals form light pearly plates of a brilliant white colour. Cold water dissolves one-fiftieth of its weight of the salt, and boiling water one-fortieth. It is scarcely soluble in ether. One hundred parts of boiling alcohol dissolve six parts.[4] On these points, however, chemists are not in exact accordance.

EFFECTS ON THE ECONOMY.

The "physiological effects" of the valerianate of zinc, according to M. Devay,[5] are scarcely more marked than those of valerian or zinc taken separately. A dose of 15 *centigrammes* (gr. 2.316) which would be sufficient to check a paroxysm of neuralgia, and to moderate an attack of violent hemicrania, produces on the healthy economy only slight headach, transient giddiness, and slight depravation of hearing. It has been chiefly prescribed in *facial neuralgia* and *hemicrania*, which have resisted the ordi-

[1] See a note on the preparation of the valerianate of zinc, by Wm. Procter, Jr., in the American Journal of Pharmacy, April, 1845; and Bouchardat, Annuaire de Thérap. &c., pour 1845, p. 95. Paris, 1845.
[2] Bouchardat, op. cit. p. 87. Paris, 1845; and in Nouveau Formulaire Magistral, p. 107. Paris, 1845.
[3] The Pharmacopœia of the King and Queen's College of Physicians in Ireland, 1850. p. 169. Dublin, 1850.
[4] Journal de Pharmacie, Août, 1844: Chemical Gazette, Nov. 1, 1844; and Lond. and Edinb. Monthly Journ. of Med. Science, Jan. 1845.
[5] Gazette Médicale de Paris, 29 Juin, 1844.

nary antispasmodics and antiperiodics, and M. Devay, in such cases, has found it eminently successful. Four cases of *obstinate neuralgia* are recorded by Mr. Joseph Bell,[1] which yielded to this remedy after the failure of other powerful agents. He gave it in half-grain doses every six hours. It has also been prescribed in other neuroses,—*nervous headach*, for example, by Boccacini and Heiberg.[2] In *epilepsy*, M. Devay prescribed it, but had not given it for a sufficiently long period to be able to deduce any thing positive in regard to its action. M. Cerulli[3] gave it in three cases of *supra-orbitar* and *infra-orbitar neuralgia*. It proved successful in doses of a grain and a half daily, taken at the moment of the accession of the paroxysm. Its effect does not seem, however, to have been energetic; for, in one case, the cure was not complete under thirty days; in another under forty, and in the third under fifty. It has been suggested, however, that notwithstanding its reputed brilliant success, it may be questioned, whether it be in reality a more efficacious remedy than the ordinary salts of zinc, and whether much of its success amongst a certain class be not in a great degree attributable to the rarity, and the high price of the drug.[4] That such is the case, Dr. Johnson says, is to a certain extent proved by the observations of Dr. Fario, an Italian physician, cited and commented on in a French periodical.[5] Dr. Fario has employed it externally in *certain affections of the eye*, as *blennorrhœa of the eyelids*, *ulcers*, or *recent spots on the cornea*, as well as in cases of *chronic conjunctivitis*, in which a mild astringent and sedative agent is indicated.[6]

MODE OF ADMINISTRATION.

The dose of valerianate of zinc given by M. Devay was 10 *centigrammes* (gr. 1.54) in the day; but there is no reason, he says, why it should not be carried much higher—to 40 *centigrammes* (gr. 6.17) for example. The Italian physicians, who would seem to have obtained the most success from its administration, do not, however, give it in a larger dose than a grain and a half. It is best administered in the pilular form. For external use, as a collyrium, from two to four grains may be dissolved in two ounces of distilled water.

[1] Cited in Ranking's Half-yearly Abstract, January to June, 1846, p. 173.
[2] Aschenbrenner. Die neueren Arzneimittel, u. s. w. S. 281, Erlangen, 1848.
[3] Gazette Médicale de Paris, Jan. 1844.
[4] Dr. Geo. Johnson, in Ranking, op. cit. p. 348.
[5] Gazette Médicale de Paris, Jan. 1844.
[6] Aschenbrenner, op. cit. S. 282.

SUPPLEMENT.

CLXXVII. Ac″idum Chro′micum, *Chromic acid, Peroxide of Chromium:* French, *Acide chromique;* German, *Chromsäure.* Chromic acid nearly pure may be obtained by the following process. One hundred measures of a cold saturated solution of *bichromate of potassa* are mixed with one hundred and fifty measures of *oil of vitriol*, and the whole is suffered to cool. The chromic acid crystallizes in brilliant crimson-red prisms. The mother liquor is poured off, and the crystals are placed to drain upon a tile closely covered by a glass or bell jar.[1] They are of a ruby-red colour, prismatic and deliquescent, of a sour, acrid, and metallic taste, soluble in water,—the solution being constantly reduced by contact with organic matter.

It is in consequence of chromic acid being a powerful oxygenizing agent,—yielding half its oxygen readily to organic substances, and being reduced to sesquioxide,—that Dr. Ure[2] has employed it as an escharotic. It is, he says, exceedingly convenient of application, as it consists of a thick crystalline pap, which, when rightly managed, does not spread beyond the prescribed limits: and its erodent operation terminates with its passing into the state of inert pulverulent sesquioxide. In a case of *external hemorrhoids*, the acid was applied twice at an interval of two days. It caused acute burning pain both times, destruction to a considerable amount of the diseased texture, consolidation of the remainder, and permanent relief. The *troublesome sores* produced on the hands and arms of dyers, who use bichromate of potassa, are ascribed by Dr. Ducatel,[3] of Baltimore, to the action of the free chromic acid.

CLXXVIII. Ac″idum Ni′tricum, *Nitric acid;* French, *Acide nitrique;* German, *Salpetersäure.* Nitric acid, of the specific gravity 1.500, destroys instantaneously the vitality of the surface to which it is applied. The depth of the slough which is to follow may be regulated, in some degree, by the quantity of acid laid on the part; and its extent, laterally, may be confined with sufficient precision to the limits of its first application by instantly smearing the whole over with olive oil, which neutralizes its farther corrosive powers by combining and forming with it a new, but no longer corrosive, compound. The separation of the slough after the application of nitric acid leaves a healthy suppurating surface, which contracts and heals over very quickly.

[1] Warrington, Proceedings of Chem. Soc. i. 18, cited in Fownes's Elementary Chemistry, Amer. edit. p. 245. Philad. 1845.
[2] London Medical Gazette, March 21, 1845, p. 787.
[3] Manual of Practical Toxicology. Baltimore, 1833.

Such is the testimony of the late Dr. Houston, of Dublin,[1] in regard to the action of nitric acid as an escharotic. He has proposed it as such in certain forms of *hemorrhoidal affections*, and especially in that which he terms "*vascular tumour*," and which he regards as an affection of the mucous and submucous tissue exclusively, having usually for its basis a knuckle or bunch of varicose veins; but it may also be a distinct and independent growth, the result of some other irritation in the region, but giving rise ultimately to the formation of a varicose condition of the part. In such cases, he has found the application of nitric acid, s. g. 1.500, of eminent service. It combines, he affirms, all the advantages possessed by excision or ligature, without any of the disadvantages. He directs the application to be made in the following manner:—Let the patient strain as in the night chair, so as to bring the tumours fully into view: and while they are so down let him either lean over the back of a chair, or lie down in the bent posture, on the side on which the disease exists, with the nates over the edge of the bed. Let a piece of wood, cut into the shape of a dressing-case spatula, be dipped in the acid; and then, with as much of the acid adhering to it as it will carry without dripping, let it be rubbed on the tumour to the desired extent. The due effect of the acid on the part is shown by its becoming of a grayish white colour. If a superficial slough be all that is required, a single application may be enough; if a more deep one, then two or three applications may be required; and if a still more deep one, two or three applications of the wood dipped in the acid may be made in quick succession, which being finished the part may be well smeared over with olive oil. The prolapsed parts should then be pushed back within the sphincter, the patient put to bed, and an opiate administered. The pain is sharp and burning at first, but it goes off in two or three hours, and does not return again in the same form. In no case has he heard of serious consequences from the use of the remedy; and the symptoms usually following its application are so mild as not absolutely to require confinement to bed more than a few hours. On the third or fourth day, Dr. Houston recommends that a cathartic draught should be given; when the bowels will be found to yield to the medicine, generally without either pain or prolapsus of the rectum. In a subsequent communication,[2] he urges, that the only case which the nitric acid will serve is the *internal bleeding pile*;—"that soft, red, strawberry-like elevation of the mucous membrane," for which he uses the term, "*vascular tumour*."

The safety and efficacy of this mode of practice have been confirmed by the testimony of Mr. Cusack, of Dublin.

CLXXIX. Adansonia Digitata, *Baobab Tree.* The bark of this tree is a native of Senegal; of the Natural Order, *Bombaceæ:* Sexual System, *Monadelphia Polyandria.* It has been brought forward as a valuable antiperiodic by Duchassaing, who thinks it a fit substitute for cinchona. It is mucilaginous, and has scarcely any taste or smell. It

[1] Dublin Journal of Medical Science, March, 1843.
[2] Ibid. Sept. 1844, p. 32.

is recommended by M. Duchassaing in decoction; half an ounce of the bark being boiled in a pint of water until the liquid is reduced to two-thirds. From the quantity of mucilage it contains, it is apt to undergo decomposition. This may be prevented by adding a small quantity of sulphuric acid, which precipitates the mucilage, or by the addition of spirit. In a great many cases in which it was prescribed by him, it rendered eminent service.[1] Its employment was suggested by the negroes, who make constant use of it in the *marsh fevers* of the country. M. Saint-Pierre[2] has prescribed it in the last two years in a locality in Burgundy, where intermittents are endemic. He was only able, however, to give it in seven cases, owing to his not being possessed of a sufficient quantity of the remedy; but they all terminated favourably. According to him, "the taste of the decoction is in no respect disagreeable, and its action is unaccompanied by any of the inconveniences that may follow the action of the sulphate of quinia."

CLXXX. Apis Mellif'ica, *A. Domestica, Bee, Honey Bee;* French, *Abeille mellifique, A. Domestique;* German, *Biene, Honig-biene.* The bee appears to have been employed in medicine in the middle ages in cases of *alopecia.* It was dried or grilled and reduced to powder;[3] and in this form was mixed, in the dose of half a dram, with extract of juniper, and extolled as an excellent diuretic. "No one ventures at the present day," says M. H. Cloquet,[4] "to propose such a remedial agent; for although the Materia Medica has still need of an extensive reform, both in its agents and language, it no longer admits such absurdities; and scarcely dare we add, that the *distilled water of bees* has been also recommended, and in the same cases,—that an infusion of them in diuretic wine or in œnogala was all-powerful in *dropsy* and *calculous affections*, and cured *ischuria;* that the remains of those found dead in honey *strengthened* the eyes and the ears, and was applied with success in *cancerous ulcers of the lips.* All these follies and a thousand others which Pliny and Galen first published, have been repeated by Houiller, Alexander Benedictine, and a crowd of other authors of the middle age of medicine, who have given us their reveries in the place of theories founded on experience, and have contributed to perpetuate errors rather than dissipate them. The belief that the prolonged use of those insects might produce sterility; that by immediately crushing them upon a wound all its consequences might be obviated, and that they were capable of inciting to love, was not less ridiculous."[5]

Yet the employment of the bee as a therapeutical agent has been revived. Dr. F. H. Gordon,[6] of Wilson County, Tennessee, affirms, that he succeeded in removing the *strangury*, which was a common attendant on an epidemic metritis by an infusion of the bee, made as

[1] Pharmaceutical Journal, cited in American Journal of Pharmacy, Oct. 1848, p. 328.
[2] Archives Générales de Médecine, Août, 1850, p. 535.
[3] Schroderi Dilucidati Zoologia; and the second volume of the works of Ettmuller; fol. Latin, p. 304. Lyons, 1690; cited in Faune des Médecins, par H. Cloquet, i. 93. Paris, 1822.
[4] Op. cit.
[5] See, also, Mérat and De Lens, art. Abeille, Dict. de Mat. Méd. et de Thérap.
[6] Western Journal of Medicine and Surgery, Nov. 1845, p. 392,

follows:—"Sweep forty to sixty *bees* into a pan of *water*, so as to make them manageable: put the whole into a teacup: pour one gill of *boiling water* on them, and cover the cup securely. When it has remained twenty minutes, pour off the infusion, and let the patient take the whole at a draught." This remedy, he asserts, relieved the strangury in from two to fifteen minutes with great certainty. He refers to other practitioners, who have "given the remedy numerous fair trials," and, so far as he has learned, all estimate it highly. He has tried it repeatedly in *retention of urine* from inflammation of the bladder, and from the effects of cantharides, and found it to be more prompt and certain than any other remedy; and he says, "there can be no question that 'bee tea' will prove a valuable accession to our Materia Medica. How far it may be found useful in *ischuria* and *dysuria* from every variety of cause remains to be tested; and its known value affords abundant encouragement for farther investigation." Dr. Gordon affirms that it was introduced into medicine some years ago by an old woman in the habitual practice of midwifery, in the County of Smith, Tennessee; but it is doubtless one of those cases in which a remedy formerly in use has been abandoned by the profession, but retained by the people.

Since the publication of Dr. Gordon's communication, the infusion has been used by others. Dr. Flint, of Buffalo,[1] states, that it had been recently tried in that city with immediate relief, in a case in which the introduction of the catheter had been attempted without success; and that it was subsequently repeated daily, with the same results, until the occasion for its administration ceased.

Dr. Gordon considers the infusion to act as a narcotic; and that its properties are probably owing to the virus ejected with the sting. The tea, when recently made, has a smell identical with that of the incensed bee, and is then efficacious; but if the infusion be permitted to stand and cool, and especially to remain uncovered, the characteristic odour and taste disappear, and it is correspondingly inefficient. Hence, he infers, the virus is volatile, and requires care to prevent its escape. "Whether," he adds, "this valuable virus may not be collected and concentrated, or combined with some chemical element, so as to render it portable and convenient, is a matter of interest, and well worth the attention of the chemist."

CLXXXI. Bismu'thi Valeria'nas, *Bismuthum Valerianicum*, German, Valeriansaures Wismuth—is formed by mixing a neutral solution of *nitrate of bismuth* with *valerianate of soda*, washing the precipitate with water, and drying with a gentle heat. It forms a white powder, which is insoluble in water; and has been recommended by Righini[2] in *gastrodynia*, *chronic gastralgia*, and especially in *neuralgia* and *nervous palpitation*.

The dose is from half a grain to two grains, three or four times a day, in the form of powder or pill.

[1] Buffalo Journal, cited in New York Journal of Medicine, Sept. 1846, p. 265.
[2] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 51. Erlangen, 1848.

CLXXXII. Cadmi'i Sulphas, *Sulphas Melini* seu *Klaprothii, Cadmium* seu *Klaprothium* seu *Melinum Sulphuricum, Sulphas Cadmicus, Sulphate of Cadmium;* French, *Sulfate de Cadmium;* German, Schwefelsaures Cadmium, Schwefelsaures Klaprothium, is obtained by dissolving *carbonate of cadmium* in *dilute sulphuric acid*, and evaporating the neutral liquid so that it may crystallize. The crystals are colourless, rectangular prisms, which effloresce in the air, and are readily soluble in water.

Sulphate of cadmium, which was referred to in a former edition of this work,[1] has been almost exclusively prescribed of late in different *diseases of the eyes.* Rosenbaum,[2] Kopp,[3] Gräfe, Ansiaux, Radius[4] and others,[5] employed it successfully in *specks of the cornea.* In *chronic ophthalmia*, accompanied by a scrofulous, syphilitic or other dyscrasia, it was used with advantage by Daynac and Giordano; and by Lincke,[6] it was prescribed as an injection in *torpid chronic inflammation* and *blennorrhœa of the meatus auditorius, membrana tympani* and *middle ear*, being thrown both into the meatus and the Eustachian tube.

It does not appear to differ materially in its medicinal properties from sulphate of zinc.

To form a collyrium, from one to eight grains may be dissolved in an ounce of water. As an eye ointment, Radius used it in the quantity of from one to two grains to ℈iv. or ʒj. of lard. As an injection in *otorrhœa*, Lincke employed it in the strength of from ℈j. to ʒss. in ℥iv. of infusion of roses.

CLXXXIII. Carbo'nis Trichlo'ridum, *Carbonis Sesquichloridum, Carboneum Trichloratum, Trichloretum Carbonei, Carbonicum Chloratum, Terchloride or Sesquichloride of Carbon;* French, *Trichlorure ou Sesquichlorure de Carbon;* German, Dreifach Chlorkohlenstoff, Kohlenstofftrichlorid, is formed by the action of *chlorine* or *chlorohydric ether*, under the influence of sunlight. It is in needle-shaped crystals, pulverizable, colourless or white; tasteless, and of a peculiar camphoraceous aromatic odour. It is very sparingly soluble in water; soluble in alcohol, and still more so in ether; and dissolves in fixed and volatile oils. It may be obtained, likewise, by the action of *chlorine* on the *Dutch liquid* or *chloride of olefiant gas.*

Terchloride of carbon has been employed by Dr. King with advantage in *cholera morbus*, and it is affirmed by Dr. Jones Lamprey,[7] that it was originally used as a remedy in the treatment of *cholera* by a physician of Calcutta. It had been also prescribed, in 1843, in

[1] Third edit. preface, p. iv., Philada. 1841.
[2] Mérat & De Lens, Dictionnaire Universel de Mat. Méd. i. 320. Bruxelles, 1838.
[3] Dierbach, Die neuesten Entdeckungen in der Mat. Med. i. 541. Heidelb. und Leipz. 1837.
[4] Auserlesene Heilformeln, S. 123. Leipz. 1836.
[5] Riecke, Nachträge zur ersten Auflage der neuern Arzneimittel, S. 27, Stuttgart, 1840; Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 54. Erlangen, 1848; and Pereira, The Elements of Mat. Med. and Therap. 3d edit. i. 722. Lond. 1849.
[6] Vollständiges Recept-Taschenbuch, i. 311. Leipz. 1840.
[7] Medical Times, Jan. 6, 1849.

London, as an excitant and antiseptic. Mr. Tuson had found it effectual in *correcting the fœtor of foul ulcers.*[1] M. Troschel, chief physician to a cholera hospital in Berlin, having read the observations of Dr. King, determined upon submitting it to trial in cholera, and he was encouraged to this course by the results of experiments made by the Russian physicians in St. Petersburg. The substance being, at first, of high price, and obtainable only in small quantity, M. Troschel administered it in the moderate dose of about four grains, repeating it every half hour, or every two or three hours, according to circumstances; and he affirms, that in many cases he succeeded in breaking and shortening the asphyxial period, and establishing reaction.[2] M. Manget also appears to have found it of great advantage under the same circumstances; and he had numerous opportunities for testing its efficacy as physician to the *Bureau de Bienfaisance* of the fifth arrondissement of Paris, where cholera made great ravages. He gave it in the same dose, in a spoonful of syrup of gum. M. Manget regards it as one of the most powerful diaphoretics we possess.[3]

Like many other anticholeric remedies, its merits have doubtless been greatly exaggerated.

CLXXXIV. Coni'a, *Coniinum, Conicinum, Cicutinum, Coneïne, Conine, Conicine, Cicutine;* French, *Conéine;* German, Coniin. The active principle of conium or hemlock was discovered and carefully examined by Geiger, in 1831; but it had not attracted much attention from therapeutists. It is most easily obtained, according to Dr. Christison,[4] by cautiously distilling from a muriate of lime bath a mixture of strong *solution of potassa* with the *alcoholic extract of the unripe fruit.* The alkaloid passes over with the water, and floats upon it like an oil. It contains some water, which may be removed by chloride of calcium, and also a little ammonia, which is separated by keeping it for a few hours in vacuo. It is a colourless oleaginous fluid, of an intense, peculiar, suffocating odour; and an extremely acrid benumbing taste; is sparingly soluble in water; very soluble in alcohol and ether, and in fixed and volatile oils. It is a most energetic poison, appearing to act on the nervous centres—the spinal cord particularly—like hemlock, but unlike strychnia, which irritates the spinal marrow, and induces violent and permanent spasms of the muscles.[5] A few drops kill a small animal in a few minutes—the effects being gradual paralysis, slight convulsive tremors, and death from suspension of the respiration, without any apparent alteration in the blood, or depression of the heart's action. The salts of conia, from being more soluble, are even more energetic than it.[6]

When conia is administered in medicinal doses, it acts as a sedative on the nervous centres; and may cause incoherence and even delirium; the movements are enfeebled, and paralysis may succeed; the pulsations of the heart are less strong and less frequent, and the re-

[1] Medical Times, Dec. 2, 1848.
[2] Dr. Lamprey, op. cit.
[3] Annuaire de Thérapeutique pour 1850, p. 50.
[4] Dispensatory, Amer. edit. by R. E. Griffith, p. 410. Philad. 1848.
[5] Richard, Elements d'Histoire Naturelle Médicale, iii. 184. Paris, 1849.
[6] Christison, op. cit; and A Treatise on Poisons, Amer. edit. p. 655. Philad. 1845.

spiratory organs feel the influence of this state of nervous stupor. According to Nega,[1] the phenomena that indicate the narcotic influence succeed each other in the following order :—feebleness, paralysis of the voluntary muscles, anæsthesia, general indisposition, vomiting, paralysis of the stomach, diminished frequency and force of the pulsations of the heart, stupor, vertigo and syncope.

The diseases in which Nega employed it with benefit were *hyperæsthesia*, *neuralgia*, and *spasmodic affections*.—He instances particularly, *hyperæsthesia of the fifth and tenth pairs of nerves*, and the accidents resulting from them, *otalgia*, *odontalgia*, *tic douloureux* of the face, *photophobia* and *spasms of the eyelids*, for which it had been recommended by Fronmüller, and has since been given by Spengler,[2] *asthenic nervous affections of the larynx*, *brachial*, *intercostal*, and, particularly, *sciatic neuralgia;* and, in short, all diseases in which pain is a symptom, or a complication of any gravity; and it is affirmed that, like conium, it renders *ulcers of a malignant nature* less painful, and of a better appearance; aids in the resolution of *scrofulous tumours*, and prolongs the first stage of the *development of tubercles*, and he found it of service in *hooping-cough*. In *intermittent fever*, it produced no result. Such, however, was not the result of the observations of Wertheim,[3] of Vienna, who appears to have obtained excellent effects from it in that disease, when the pulse was full and hard, indicating an inflammatory state. On the other hand, when it was feeble and accelerated, and the fever was asthenic, he prescribed leukolein, described hereafter.

Conia may be given either in watery, alcoholic or ethereal solution, or united with dilute acids. Wertheim always prescribed it in watery solution,—one sixty-fourth or one thirty-secondth to one-sixteenth of a grain in six ounces of distilled water, of which two spoonfuls (*cuillerées à bouches*) were given every two hours. Fronmüller dissolved three or four drops in a scruple of alcohol; and added half an ounce of distilled water. Of this, from fifteen to thirty drops were given three times a day. It has also been used endermically—in the dose of two drops mixed with acetic acid—and in enemata, to the extent of three drops.[4]

CLXXXV. Cotyle'don Umbili'cus, *Cotyledon Umbilicus Veneris*, *Navelwort*, *Venus's Navelwort;* French, *Nombril de Vénus;* Family, Crassulaceæ; Sexual System, Pentandria Pentagynia. This plant, which grows in Europe on old walls and rocks, has been long used in medicine, but was almost unknown to practitioners of the present day, when its employment was revived in a new direction. The leaves are emollient, and have been applied externally to *hemorrhoids* and to *inflamed parts*. Of late, the inspissated juice has been brought

[1] Zeitschrift für Klinische Medicin. H. 1. Breslau, 1850; cited in Archives Générales de Méd. Juin, 1850, p. 224.

[2] Cited by Von Gorup-Besanez, in Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre 1849, v. 171. Erlang. 1850.

[3] Archives Générales de Méd. loc. cit.; Gazette Médicale de Paris, 1849, p. 748, and Bouchardat, Annuaire de Thérapeutique pour 1850, p. 177.

[4] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 89. Erlangen, 1848.

forward to swell the uncertain crowd of antiepileptic remedies, by Mr. Salter[1] and Dr. Bullar. "*Encore un remède contre l'épilepsie!*" exclaims M. Bouchardat.[2] The juice was first used with advantage; and afterwards an extract was prepared from it, which exerted the same effects. Dr. Bullar[3] urges its protracted use. He has prescribed it in a considerable number of cases—several of which were of a very hopeless kind,—and in all there was a marked diminution in the violence and frequency of the attacks. In many cases he thought it was "certainly" nervo-tonic,—the improved nervous tone being shown by quieter sleep, fewer dreams, better spirits, more ability to take exercise, and a consciousness of general improvement. He is not aware that it has any other action on the body.

The juice is obtained by bruising the leaves and leaf-stalks in a mortar, and expressing it from the bruised mass through a cloth. One tea-spoonful of this is given twice a day. Of the extract, Dr. Bullar has prescribed five grains twice, and occasionally, thrice, a day.

As in the case of artemisia,[4] it is to be feared, that the virtues of cotyledon umbilicus have been exaggerated. Dr. Ranking[5] is properly of opinion, that the cases given in illustration are too few in number to be worthy of much confidence; and he is "disposed to agree with Dr. Marshall Hall, that there is no 'medicine specially adapted to the cure of epilepsy; and that the only rational treatment consists in a judicious employment of hygienic measures, including diet, exercise,'" &c. It was not necessary to affiliate this view on Dr. Hall, as most intelligent practitioners had arrived at the same conclusion, and not a few had promulgated it to the world. In a note from the author's friend, Dr. Francis G. Smith, dated, Philadelphia, Jan. 9, 1851, he states, that he had used the extract in two cases,—the one, that of a female approaching puberty;—the other, that of a young man twenty-five or twenty-six years of age; but in neither case was the slightest benefit perceptible:—the young lady, indeed, became worse whilst taking it; "for whilst there was no diminution in the frequency or severity of the paroxysms, she became desponding in the highest degree—in this last respect the case resembling some reported by the English practitioners." Dr. Smith gave the extract in doses of five grains three times a day. The author has never used it.

CLXXXVI. Fel Bovi'num, *Fel bovis*, *Fel tauri*, *Bilis taurina*, *Ox gall*, *Ox bile;* French, *Bile ou Fiel de Bœuf;* German, Ochsengalle, Rindsgalle. Ox-gall is by no means of modern introduction. It, as well as the bile of many other animals, has been employed in medicine in all ages;[6] but as its administration appears to have been somewhat revived, it may be worthy of a passing notice. It has long entered into many officinal pharmacopœias and

[1] Medical Gazette, March 2, 1849.
[2] Annuaire de Thérapeutique pour 1850, p. 59.
[3] Provincial Med. and Surg. Journ. May 23, 1849. [4] Page 111.
[5] The Half-Yearly Abstract of the Medical Sciences, No. 9, from Jan. to June, 1849; Amer. edit. p. 200.
[6] H. Cloquet, Faune des Médecins, ii. 365. Paris, 1822; and C. Clay, cited in Medico-Chirur. Rev. July, 1842, p. 279.

formularies of the continent of Europe; and has been regarded as a stomachic and anthelmintic. The *Fel tauri inspissatum*, *Extractum Bilis* seu *Fellis*, is referred by Jourdan[1] to no fewer than seventeen pharmacopœias; and the *Globuli carminativi* seu *Pilulæ bilis* are in the pharmacopœias of Manheim and Wirtemberg.

Ox-gall is a greenish-yellow fluid, more or less thick and viscid, of a peculiar nauseous smell, and a bitter disagreeable taste. The chemical characters of bile, respecting which, as Simon[2] has remarked, there is no subject in the whole domain of animal chemistry that is more perplexing and intricate, have been given—so far as known—in another work.[3] Its uses in the economy have been inquired into in the same.[4] The author has there remarked, that as to the mode in which the biliary fluid acts on the chyme, we have not much more than conjecture to guide us; and that it is more than doubtful, whether it has the property of soliciting the peristaltic action of the intestines so as to produce the evacuation of their contents. It was natural, however, that it should be regarded as a plausible remedy for cases in which a deficiency of bile is presumed to exist, although it may be by no means easy to discriminate them; and that therefore it should be given in cases of intestinal torpor, which have so often been hypothetically regarded as dependent upon a deficiency of secretion from the liver. Its bitterness, and alkalinity, too, suggested its employment as a tonic, and antacid.

Of late years, ox-gall has been strongly advised in various diseases, and often on very loose physiological and pathological notions.[5] *Jaundice*, it is known, when not owing to organic disease of the biliary apparatus, generally terminates spontaneously in health. Dr. Johnson[6] ascribes the cure of several cases to inspissated ox-gall given in the dose of five grains, gradually increased to ten, three times a day; and he explains the action of the remedy on the principle, that ox-bile is the best substitute which can be found for the human secretion; as if jaundice necessarily consisted in a deficient secretion of that fluid!

Many years ago, ox-gall was employed by Dr. Copland,[7] who speaks highly of its therapeutical properties, both when given in clysters, and when combined with aloes, taraxacum,[?] soap, extract of gentian, &c., in restoring the healthy functions of the bowels, and digestive organs generally. One of the strongest advocates for its use is Dr. Charles Clay,[8] of Manchester. He was first led to test its powers to relieve pain in *cancer*, from noticing the fact that Dr. Peacock, of Darlington, had observed, when the system was impregnated with bile in cancerous affections, that the pain was remarkably relieved.(?) In a case of *cancerous ulcer*, that had destroyed the greater portion of the nostrils, he ordered, as a forlorn hope, a mixture com-

[1] Pharmacopée Universelle, i. 268. Paris, 1828.
[2] Animal Chemistry, Sydenham edition, i. 49. Lond. 1845.
[3] Human Physiology, 7th edit. ii. 318. Philad. 1850. [4] Vol. i. p. 611.
[5] Lincke, Vollständiges Recept-Taschenbuch, i. 594. Leipz. 1840.
[6] London Lancet, Dec. 19, 1840, p. 447.
[7] Art. Constipation, in Dict. of Practical Medicine.
[8] Op. cit., cited in Braithwaite's Retrospect, vi. 94. Lond. 1843.

posed of *inspissated ox-gall*, two drams; *oil of caraway*, ten minims; *carbonate of magnesia*, enough to form a mass,—to be divided into thirty-six pills. Of these two were given three times a day. Marked relief was afforded after the pills had been taken for one day; and in four the pain had ceased. He states, that before giving it in this case, the evacuations were peculiarly white; and the bowels very much constipated with acid eructations. Dr. Clay, likewise, refers to its beneficial influence in *dyspepsia*. In all the cases reported by him, he considered "deficiency in quality or quantity of bilious secretion was the prominent and prevailing accompaniment," and he regards the ox-gall to be "not a cathartic," but "a direct solvent to the accumulated hardened fæcal mass, the *consequence of deficiency of quality or quantity of bile in the alimentary canal!*"

Dr. Clay observed, also, that inspissated gall has a remarkable tendency to counteract the *constipating effects of opium*. He recommends it, moreover, in all cases of atrophy, whether of children or of adults. In *acidity of the stomach in children*, he says, it affords "most decided, effectual, and immediate relief." Its action on the system, is not, as before remarked, cathartic, but is a mere solvent of the material contained within the intestinal canal, producing no excitement to propel, but facilitating excretion by liquidizing the mass. It is also, he says, tonic; and in children, to a moderate extent, diuretic; but less so in the adult.

The views of Dr. Clay are, in the main, concurred in by Dr. R. H. Allnatt,[1] especially those in regard to the use of ox-gall in *constipation* and its effects in obviating the constipating tendency of opium. The latter gentleman[2] gave it in a case of *constipation during pregnancy*, in the form of enema, which succeeded in relieving the bowels, after warm water enemata had failed. A dram of inspissated ox-gall was dissolved in about a pint of warm water. The relief was instantaneous:—a mass of scybala being expelled, which had evidently lain impacted in the colon. Dr. Chapman[3] also has found it beneficial as "a laxative" in constipation.

The preparation used by Dr. Clay and Dr. Allnatt is simply the recent gall of the ox slowly evaporated to the consistence of an extract—the *Fel tauri inspissatum*, *Extractum Bilis* seu *Fellis*; French, *Extrait de Bile* ou *de Fiel:* Germ. *Eingedickten Galle.* This may be made into pills. One gall-bladder of a moderate-sized ox, according to Dr. Clay, will afford as much extract as will make one hundred four grain pills, and it is an article both cheap and easy to procure.

Dr. Lane[4] desiccates the gall and makes it into pills. To desiccate it he allows it to remain at the same temperature used in forming the inspissated article, until there remains a dry, bright green, friable, purulent, slightly aromatic mass, in which state the substance loses none of its medicinal virtues; its deliquescent character is nearly lost. It can be easily preserved in closely stopped bottles, and is readily made

[1] London Lancet, June 7, 1845, p. 635; and Lond. Med. Gaz. June 20, 1845, p. 343.
[2] London Medical Gazette, Feb. 6, 1846, p. 253.
[3] Lectures on the more Important Diseases of the Thoracic and Abdominal Viscera, p. 301. Philad. 1844.
[4] London Lancet, July 5, 1845, p. 27.

into pills, particularly with any spirituous fluid or essential oil. M. Blanch[1] has tried both the inspissated and the desiccated ox-gall, and very decidedly deposes in favour of the latter as the more efficacious, and less nauseous. The pills, too, he says, do not run together as when made of the inspissated article.

As an addition to simple clysters it has been recommended to *weak, emaciated, nervous individuals, who are subject to pains in the bowels.*[2]

The dose of ox-gall is ʒss. to ʒi. in the day, made into pills.

CLXXXVII. Inspissated Bile of the Swine, *Bilis Porcina*, has been used in the same cases as the bile of the ox, by Dr. Mettauer,[3] of Virginia, who thinks its employment as a therapeutical agent original with him. It has, however, been long used in medicine! so long ago as the time of Pliny,[4] who extolled it in diseases of the spleen. "At the present day," says M. H. Cloquet,[5] "it is, we may say, out of use, and will never probably resume any share of favour." It is said to contain neither picromel nor any nitrogenized matter; but in addition to several salts is formed principally of resin and soda. It differs, consequently, considerably from the bile of man, and that of the ox: yet, according to Dr. Mettauer, it seems to be adapted for *cases of diseases in which the biliary secretion is defective.* "We were induced to resort to it first," he says, "in the low depressing states of *continued fever*, with the design of acting especially on the gastro-intestinal mucous membrane, which, we believed, became disorganized in such cases in a great measure from the want of the biliary influences, and in these cases it always acted with decided benefit. It served to substitute the action of the bile. Simply heating the bile over a sand-bath until it became dry and pulverizable was our mode of preparing it. It is a valuable agent in dyspepsia, and in many chronic affections attended with defective biliary secretion. In chlorosis, amenorrhœa, some forms of dysmenorrhœa, and constipation, we have also employed it with decided advantage. Dr. Mettauer gave it with benefit in the *adynamic stage of fever* above referred to—two or three grains of the inspissated, or more properly desiccated, bile, being associated with one of ipecacuanha, and two of carbonate of potassa. "This compound," he says, "seemed to act with decided effect, as a supporting and secerning remedy upon the mucous membrane of the stomach and intestines, and as a diaphoretic at the same time." It was especially valuable in cases attended with a denuded raw tongue, which always becomes more healthy after its administration. In such a combination, however, it is obviously impracticable to test the precise agency of the bile.

CLXXXVIII. Ferri et Aluminæ Sulphas, *Sulphate of Iron and Alumina.* This salt has been introduced by Sir James Murray,[6] of

[1] Cited in Braithwaite's Retrospect, xii. 93, Amer. edit. New York, 1846.
[2] Ann. Thérap. Juin, 1848; cited in Schmidt's Jahrbücher, u. s. w. No. 5, S. 160. Jahrgang 1849. [3] American Journal of the Med. Sciences, July, 1843, p. 52.
[4] Hist. Nat. xxviii. 13.
[5] Faune des Médecins, ii. 377. Paris, 1822. See, also, Mérat and De Lens, Dict. de Mat. Méd. &c., art. Sus. [6] Dublin Medical Press, Mar. 14, 1849.

Dublin, as a valuable addition to the class of astringent remedies. The *bisulphate of iron and alumina*—as he terms it—is readily made by treating *bicarbonated solution of soft iron* and *carbonated solution of pure washed alumina* with *sulphuric acid* after separating the arsenic and other ingredients, which are too often found in the vitriolic acid of commerce.

Sir James considers this salt to be a superior astringent in the treatment of *chronic diarrhœa, dysentery* and *cholera morbus; leucorrhœa*, and the *colliquative diarrhœa* and *sweats* of the consumptive. It is also a valuable anthelmintic; destroying the *parasites*, and correcting the morbid condition of the alimentary canal, which favours their generation. Occasional cathartics are needed during its administration as an anthelmintic. Applied externally it is a powerful styptic, and may be used in *epistaxis*, and in *hemorrhage from leech bites*. It has been found, too, an excellent gargle in *relaxation of the uvula and fauces*, in the *cynanche of scarlatina;* and in *diphtheritis*. It forms, likewise, a good *collyrium;* abates *salivation*, and improves the appearance, and corrects the fœtor of *foul* or *flabby ulcers*. Injections of the salt are good astringents in *excessive hemorrhage* from outlets with which they can be made to come in contact.

The dose is from five to ten grains in any aromatic water, or in molasses.

CLXXXIX. Hæmospa'sia; French, *Hémospasie*. This is a mode of revulsion which has been strongly urged of late years by M. Junod, for his essays on which he has twice received the Monthyon prize. It has been properly described as a means for producing a powerful derivation of the blood from one part of the body, by removing the atmospheric pressure from a large extent of surface, as from one or both extremities. It is, as the author has expressed it elsewhere,[1] dry cupping on a large scale.

An *air pump bath* has been employed, in which the atmospheric pressure is diminished over a greater or less surface of the body, and the application of vapour has been associated with this, constituting the *air pump vapour bath*, which has been used in *gout*, *paralysis*, and other affections. In 1832, Sir James Murray,[2] gave a description of an apparatus for abstracting part of the atmospheric pressure from almost the entire surface of the body. For the purpose of insulating the patient's body from the external air, a small oval bath of tin, zinc or copper, was employed by him,—its lip furnished with a groove to contain luting for connecting the lid or cover. In this lid is an aperture to pass over the patient's head, and around this opening is fitted a margin of air-tight cloth, which applies itself so as to embrace the top of the chest, and the back of the neck. The patient sits upon a seat, with his head uncovered, the body and limbs only being enclosed. When the bath is thus adjusted it is to be partially rarefied, either by the condensation of a little hot air or steam, or by a few strokes of a suction pump.[3]

[1] General Therapeutics and Mat. Med. 4th edit. ii. 254. Philad. 1850.
[2] London Medical and Surgical Journal, July 14, 1842.
[3] Observations on the Medical and Surgical Agency of the Air-pump, p. 41. Dub. 1836.

At a meeting of the south-western branch of the Provincial Medical and Surgical Association held at Plymouth in 1844, Dr. Marsden[1] exhibited M. Junod's apparatus for exhausting the air over a large surface, or for his "System of Dry Cupping," as it has been termed. It is made of copper, in the shape of a boot, and is applied as one, having an Indian rubber tip to tie around the thigh, and render it air-tight. The air is then exhausted with a syringe. By the application of this apparatus, the leg may be distended to double its ordinary size: the pulse is at first quickened, but is gradually reduced both in frequency and strength, and even syncope may supervene. Very little pain attends the operation. After the removal of the apparatus, the blood gradually returns to its course, and in a couple of hours the swelling of the leg subsides. Experience has proved that sixty operations on the same leg, with one or two days' interval, may be attended with no injurious effects on the nervous system. Dr. Marsden described an establishment under the superintendence of M. Bonnard, of Paris, entirely devoted to the application of this instrument. He referred to the success which had attended its employment by M. Cerise, and detailed the histories of several cases in which he had himself witnessed beneficial results,—as of *amaurosis, deafness, sore throat, chlorosis, amenorrhœa, croup, phthisis*, &c. In 1835 M. Magendie greatly extolled it in cases in which it is important to attract the blood from the internal parts towards the surface of the body without causing any loss of the vital fluid;—and its effects certainly entitle it to great attention. It has been objected, that when the apparatus is removed, a violent reaction will ensue, and the blood be propelled with greater force than ever to the seat of the disease; but the results of experience do not confirm this; "for as the hæmospastic injection or plethora takes place chiefly in the capillary vessels, the turgescence induced by it is found to subside very slowly and gradually."[2] The effects of hæmospasia resemble those of hæmostasis; the diminished pressure, induced over a greater or less surface, must not only affect the circulation, but induce a new action in the nervous system, and hence act as an energetic revellent.

CXC. Hæmos'tasis, French, *Hémostase, Hémostasie;* Germ. *Stockung des Blutes in den Gefässen*, has been long used to signify "stagnation of blood," and also any agency which arrests the flow of blood, but it has been applied by Dr. Thos. Buckler of Baltimore,[3] to a particular mode of arresting the flow of blood in the superficial vessels, which he brings forward as a novel therapeutical agency.

It has been long the custom at the commencement of the cold stage of intermittents, to apply ligatures—as the tourniquet,[4]—to the extremities; and this unquestionably has appeared, in many cases, to give occasion to a subsequent mild hot stage, and abridged duration of the whole paroxysm. As to the mode in which the ligature of vessels acts

[1] Provincial Med. and Surg. Journal, July 10, 1844, p. 224.
[2] Gazette Médicale, cited in Med. Chir. Rev. Jan. 1844, p. 281.
[3] Maryland Medical and Surgical Journal, March, 1843, p. 265.
[4] Kellie, Annals of Medicine, vols. i. and ii.

under such circumstances, there has been difference of sentiment. By some, as by Dr. Kellie, it has been supposed, that the obstruction to the circulation in the veins of the extremities causes an accumulation of blood in these vessels, and a consequent increase in the action of the heart; but the true *modus operandi* is probably that suggested by Dr. Mackintosh;[1] the tourniquet or ligature, by confining the blood in the extremities, "prevents so much at least of the congestion in internal organs;" and in this manner exerts an analogous effect to the withdrawal of the same quantity of fluid from the vessels. A case described by Sir Geo. Lefevre, and referred to elsewhere,[2]—in which a disposition to syncope in the erect attitude, appeared to be owing to varicose veins of the lower extremities robbing the brain of its usual quantity of blood, and which was prevented by the application of appropriate bandages,—is confirmatory of this view of the subject.

Dr. Buckler applies his ligatures upon one or more of the extremities, according to the effect which he desires to induce. If a bandage, he remarks, be applied around a limb sufficiently tight to arrest completely the venous circulation, and at the same time allow the arteries to pulsate, the blood within the distended vein is cut off, as it were, from the general circulation; a depletory effect is in this manner induced, and if the arrest of the venous circulation be practised on all the extremities at once, the skin becomes relaxed; the force of action of the heart and arteries is weakened; and if the ligatures be applied when the heart and arteries have been deprived of a portion of their ordinary amount of blood, owing either to anæmia or to bleeding, so that the vessels are partially empty, it is found, according to Dr. Buckler, that the exhalants of the skin pour out the most copious perspiration,—that the patient complains of a feeling of lightness in the head; of weakness and sickness of the stomach; and if the carotids be pressed upon, they are found to be scarcely pulsating, and all the phenomena of syncope supervene.

An agent possessed of such powers at once suggested itself as a valuable remedy in the *phlegmasiæ* more especially; and it has been so urged upon the attention of the profession by Dr. Buckler. He considers it capable of exerting, under given conditions, a more powerful control over the circulation than the lancet, antimony or digitalis,—controlling the action of the heart, without exhausting the vital forces, or giving rise to any other inconvenience.

Many cases are brought forward by Dr. Buckler, in elucidation of the beneficial action of hæmostasis and its power of sedation. He suggests, also, another application of it,—bandaging the extremities from the fingers to the toes, in *cases where an individual has lost so much blood*, that there is only enough left in his system to supply the organs essential to life—the heart, brain, and lungs,—and to the extremities of *anæmic females in protracted labour*, where, owing to the pressure of the uterus on the iliac veins, so much is cut off from the central circulation, as to deprive the brain of its normal supply, and thus render the pains weak, feeble, and inefficient.

[1] Principles of Pathology and Practice of Physic, 2d Amer. edit. by Morton, i. 155. Philad. 1837.

[2] The author's General Therapeutics and Mat. Med. 4th edit. ii. 177. Philad. 1850.

CXCI. Hura Brasilien'sis, *Assacou*, *Assacù* or *Ussacù*, is a poisonous tree of Brazil, belonging to the family Euphorbiaceæ, the juice of which, and the decoction of its bark, cannot be employed without danger, in a high dose. The juice is anthelmintic, and at Santarem, in Brazil, the bark is given in *elephantiasis*, and at Para, the natives regard it as a specific in *lepra*. The physicians of Brazil administer the extract of assacou in pills, in the dose of a sixth of a grain to a grain in the day, gradually augmenting it still farther. They have also prescribed it as a drink in the form of infusion—a scruple of the bark to a quart (*pinte*) of water; and in baths. When given in too large a dose it excites vomiting.

The bark—*Casca de Assacù*—is hard, thick, of a grayish colour, and inodorous: the epidermis is covered with a lichen of the genus lecanora.[1] It had not been subjected to investigation until recently, when having been taken by a leper to Saint-Marie-de Belem, Para, it was examined by a commission of medical men appointed by the authorities of the country, who reported upon it favourably as a remedy in *lepra*. The results were communicated by Dr. Malcher, through the French consul at Saint-Marie-de Belem, to the Académie de Médecine, of Paris; to which body M. Gibert reported, that the active properties of assacou, and its marked effects on the solids and fluids, and especially on the diseased skin, and the acrid emetic and cathartic properties it possesses, prove it to be a powerful remedy, and encourage hopes that it has the remedial powers ascribed to it by the Brazilians.

M. Bouchardat[2] is of opinion, that if introduced into the *pharmacies*, it may render great service to therapeutics.

CXCII. Hydrar'gyri et Qui'niæ Protochlo'ridum. A combination of mild chloride of mercury and quinia, has been prepared by Mr. M'Dermott, which has been found beneficial in some *obstinate skin diseases* that had resisted other remedies. The bichloride employed in the combination is said to perform the part of an acid,—the alkaloid quinia forms the base; hence a double salt, a protochloride of mercury and quinia, is obtained—not mechanically, but chemically combined. On subjecting it to the strictest analysis, no trace of the bichloride could be detected.[3] Several cases are reported by Mr. Hamilton, which had been treated at the Richmond Hospital, Dublin. A grain of the protochloride was given three times a day. In a case of *lupus superficialis* of the arm of a labourer, aged forty, a rather profuse salivation set in when twenty-one grains had been taken. A great improvement, however, had occurred in the local disease. The medicine was omitted for a few days, and then resumed in the dose of a grain night and morning. He was cured,—nothing but a simple dressing having been applied to the ulcers. The disease had existed twelve months before the treatment was commenced.

[1] Mérat and Gibert, Journal de Pharmacie, xiv. 422.
[2] Annuaire de Thérapeutique pour 1849, p. 71; and Ibid. pour 1850, p. 26.
[3] Dublin Medical Press, No. 275.

CXCIII. Ibe'ris Ama'ra, *Bitter Candytuft;* French, *Passerage;* of the *Family* Cruciferæ, is found plentifully in the gardens of Great Britain, where it is cultivated for its brilliant milk-white flowers. According to Dr. Silvester,[1] it was known to the ancients, and is mentioned by Pliny, Aëtius, Paulus of Ægina, and Oribasius, by whom it is extolled as an excellent internal and external remedy in various diseases. It may admit, however, of question, whether the chapter in Aëtius, headed "De Iberide sivè Cardamine quæ et Lepidium vocatur,"[2] refers to the plant in question. Mr. Adams regards the Lepidium of Paulus to be *Lepidium latifolium* or Pepperwort.

The leaves, stem, and root of Iberis amara, appear to possess similar properties; but from convenience and greater relative strength, the seeds were chiefly employed. Dr. Williams, of St. Thomas's Hospital, London, appears to have brought to light the properties of the plant, in a course of therapeutical researches at that hospital. He observed its good effects in *asthma*, *bronchitis*, *dropsy*, and more especially in *hypertrophy of the heart*. It did not seem to diminish the velocity of the heart's action like digitalis, but controlled the violence and sharp action of the organ, and softened the pulse: hence its great value in *hypertrophy with dropsy*. Dr. Silvester had prescribed it for ten years in numerous cases of the diseases above mentioned, "always with some benefit, and sometimes with almost magical efficacy." Its properties appeared to him to be analogous to those of digitalis and belladonna. It occasionally caused sickness, giddiness, or diarrhœa; but its control over the abnormous action of the heart was equally evinced, whether these effects were present or absent.

Iberis amara was prescribed in powder in the dose of from one to three grains, generally mixed with bitartrate of potassa, which concealed the nauseous taste, and secured a perfect trituration and division of the tough seed.

CXCIV. Leukolei'num, *Chinoleinum*, *Leukol*, *Leucoleine*, *Leukoleine*, *Leucolein*, *Ghinoleine*, *Chinolein*, *Chinolin*. This substance has not been found ready formed in nature. A. Hoffmann obtained it as the product of the dry distillation of coal, mixed with picolin, anilin, and other substances, in mineral tar. Subsequently, it was procured by Gerhardt and Bromier, by heating *quinia*, *cinchonia*, and *strychnia* with as concentrated a ley of *potassa* as could be made. In whatsoever manner obtained, it is heavier than water; of an oleaginous consistence; and, in the state of purity, is completely colourless, and limpid as water. Its specific gravity is 1.081; and it is slightly soluble in water, and miscible in all proportions with alcohol, ether, and essential oils.[3] Wertheim prescribed it internally in combination with sulphuric acid—the pure leucolein being dissolved in a very small quantity of pure sulphuric acid. Externally, he applied a solution of pure leucolein in a small quantity of alcohol, diluted with a considera-

[1] Provincial Medical and Surgical Journal, July 28, 1847.

[2] The Seven Books of Paulus Ægineta, translated, &c., by Francis Adams. Sydenham Soc. edit. iii. 212. Lond. 1847.

[3] Fownes, Elementary Chemistry, 3d Amer. edit. by R. Bridges, p. 437. Philad. 1850.

ble quantity of water. The most evident effect produced by leucolein is on the pulse, which, like conia, it depresses. Wertheim affirms, however, that conia acts in this manner when the pulse is full and hard; and when the fever has a sthenic character;—leucolein on the contrary, when the pulse is feeble and accelerated, and the fever assumes an asthenic form.[1]

Like conia, it has been given in intermittents as a substitute for the sulphate of quinia; but observations thus far made are inadequate to fix its therapeutical value.[2]

CXCV. LITH'IÆ CAR'BONAS, *Lithium Carbonicum*, *Carbonate of Lithia;* French, *Carbonate de Lithine;* German, Kohlensaures Lithon oder Lithion. This substance has been found in various mineral waters, as those of Töplitz, Franzensbad, Marienbad, Karlsbad, some of which have proved serviceable in *calculous affections*. This fact suggested to Mr. Ure,[3] as it had done to Lipowitz, to investigate the solvent powers of carbonate of lithia with reference to lithic or uric acid and its compounds, at the ordinary temperature of the human body; and he found that its solvent power is more than double that of carbonate of potassa or borate of soda, and about eight times that of bicarbonate of soda, which is the active ingredient in the Vichy water. An experiment was made on a *human urinary calculus*, composed of uric acid with alternate layers of oxalate of lime. It was allowed to stand for four hours in two ounces of the natural Vichy water, from the Hôpital spring, which contained three grains and a half of carbonate of soda; when it was found to have parted with two-tenths of a grain of uric acid; whilst a portion of the same calculus, placed under precisely similar circumstances, at the same time, in a solution of gr. 1.6 of carbonate of lithia to two ounces of distilled water, afforded nine-tenths of a grain of uric acid; thus demonstrating its superior solvent agency. Mr. Ure is of opinion, that of all the various menstrua hitherto recommended, none appears to promise more favourably than the carbonate of lithia, from the promptitude and energy with which, in dilute solution, it attacks calculi of the uric acid description; and he adds: "If by means of injection we can reduce a stone at the rate of a grain or more an hour, we shall not merely diminish the positive bulk of the calculus, but farther loosen its cohesion, disintegrate it, so to speak, causing it to crumble down and be washed away in the stream of the urine."

The extreme scarcity of the carbonate of lithia has prevented it from being much employed in practice. It may be obtained by adding a strong solution of *carbonate of ammonia* to a solution of either *sulphate of lithia* or *chloride of lithium;* or by decomposing *sulphate of lithia* by *acetate of baryta*, and calcining the acetate of lithia formed, which is thus converted into the carbonate. As usually met with, it is a white powder, like carbonate of magnesia; has a slight alkaline taste; and is soluble both in hot

[1] Bouchardat, Annuaire de Thérapeutique pour 1850, p. 177.
[2] See Conia, p. 706.
[3] Pharmaceutical Journal, iii. 2, cited in Medical Examiner, Oct. 28, 1843, p. 250.

and cold water, but insoluble in alcohol. About 100 parts of cold water dissolve one part.

It has been suggested as an internal remedy in *lithuria;*[1] and, according to Aschenbrenner,[2] may be given in the dose of from five to ten grains in the day.

CXCVI. Lupuli'na, *Lupulinum, Lupulin, Lupulinic glands;* French, *Lupuline;* German, Hopfenmehl, Hopfenstaub. Of this substance, presumed to possess all the virtues ascribed to the hop, the author has spoken in another work.[3] As a bitter tonic he has made favourable mention of it, but as a hypnotic both it and hops have disappointed him. It is introduced here, however, in consequence of its having been recently brought forward in a new relation. Some years ago, Dr. Wm. Byrd Page[4] introduced it to a limited extent into the Blockley Hospital as a preventive of *nocturnal erections* in different forms of acute venereal disease. It was successful in the prevention of *chordee;* and by preventing erection in *acute gonorrhœa*, it exercised a soothing influence on the inflamed urethra, and facilitated the operation of curative agents; relieved the troublesome perineal pain in *chronic gonorrhœa*, and during the treatment of *stricture* by the bougie; prevented the occurrence of erections during treatment of chancres of the male organ, which interfere so much with the process of cure; and after the *operation for phimosis* had an excellent effect in the same manner. In *spermatorrhœa* it prevented the occurrence of nocturnal emissions so long as the patient was freely under its influence. Dr. Page refers to Dr. F. G. Smith, and Dr. Edward Hartshorne, in confirmation of its antaphrodisiacal virtues. The dose he prescribes is from five to ten grains, to be repeated as occasion may require. The latter dose rarely requires a repetition during the night. It may be given in powder or pill. It causes no headach, constipation, nervousness, or any other unpleasant consequence.

CXCVII. Mangane'sii Sulphas, *Manganum sulphuricum oxydulatum, Sulphas Manganesii* seu *Manganosus, Sulphate of manganese;* French, *Sulfate de manganèse;* German, Schwefelsaures Manganoxydul. The salts of manganese have been employed chiefly as external remedies in *cutaneous diseases;* but they have almost fallen into disuse. "The sulphate of manganese"—say MM. Mérat and de Lens,[5] "appears to have been used externally, under the form of ointment, in the treatment of cutaneous diseases; but on this head, as on the whole therapeutical history of the preparations of the metal in question," [manganese,] "we may say, that we have many more assertions than proofs; many more chimerical views, based upon the large quantity of oxygen, which the oxide of manganese is supposed to be able to furnish to the living economy, than well observed facts or truly practical deductions."

[1] Pereira, Elements of Mat. Med. and Therap. 3d edit. p. 571. Lond. 1849.
[2] Die neueren Arzneimittel. u. s. w. S. 178. Erlangen, 1848.
[3] General Therapeutics and Mat. Med. 4th edit. i. 378. Philad. 1850.
[4] Medical Examiner, May, 1849, p. 284.
[5] Dict. de Mat. Méd. &c., art. Manganèse.

By the Germans, this salt—which may be obtained by dissolving *carbonate of manganese* in *diluted sulphuric acid*, filtering and evaporating the solution so as to yield crystals—has been given internally in *syphilitic affections*, and in *chronic cutaneous diseases*, in the dose of two or three grains [!] in watery solution. It has been used also externally in *itch*, in the form of ointment, made of a dram of the salt to an ounce of fresh unsalted butter—a piece of the size of a bean being rubbed on the affected part four times a day.[1] Dr. A. Ure,[2] who has proposed many articles as therapeutical agents on chemical considerations chiefly, but few of which will probably stand the test of accurate therapeutical observation, has recommended the sulphate of manganese as a *cholagogue* cathartic. If a dram, he says, be dissolved in about half a pint of water, and swallowed before breakfast, it will generally occasion, after the lapse of an hour or so, one or more liquid evacuations. With the view of testing whether bile was thus discharged to any amount, a portion of loose feculent matter was digested with strong alcohol, in order to separate the mucus, and thrown upon a filter; a limpid olive-coloured solution was obtained, which, after evaporation in a water bath to the consistence of honey, yielded, on the addition of boiling chlorohydric acid, a notable quantity of biliary resin, together with a little fatty matter,—affording unequivocal proof of the excretion of bile. He does not show, however, that the quantity was greater than when other or no agents were administered; but he infers, that the salt is "essentially cholagogue in the strict sense of the word." Its action is said to be prompt, and soon over; and it is recommended by Dr. Ure as a valuable cathartic in *gout*, in which, he says, there is generally a deficient action of the liver.[?]

The communication of Dr. Ure attracted the attention of Dr. Gooldens[3] to this salt, who instituted some trials to test its virtues. When taken upon an empty stomach, in the dose of one or two drams, he found it invariably induced vomiting in less than three hours, generally within one hour, and the matter vomited consisted of a very large quantity of yellow bile. After a meal, the same effect took place, but not invariably. It very rarely acted as a cathartic alone; and after it had been given for several days he was often obliged to have recourse to other cathartics. After the first dose, it seldom acts as an emetic. The evacuations, which are sometimes dark-coloured, soon become yellow and loaded with healthy bile; but if it be continued for four or five days, they become lighter, and ultimately show a total absence of bile, "appearing like jaundiced stools of the colour of parchment; but there is no jaundice either in the skin or urine. If the medicine be discontinued, the yellow colour of the stools returns."

The dose, according to Dr. Thomson,[4] may be from half an ounce to an ounce as a cathartic; but Dr. Ure has always found a much smaller quantity suffice. Like other saline cathartics, it acts most efficiently when dissolved in a considerable quantity of water.

[1] Kapp, in Hufeland's Journal der Pract. Heilkund. Bd. xix. St. 1, S. 176; and Bd. x. St. 4, S. 178: cited by Osann, in Encyclopäd. Wörterb. der Medicin. Wissenschaft. xxii. 358. Berlin, 1840. [2] Lond. Med. Gazette, Nov. 8, 1844, p. 190.

[3] London Medical Gazette, Feb. 14, 1845, p. 646.

[4] Chemistry of Inorganic Bodies, ii. 587, cited by Dr. Ure.

Of late, the preparations of manganese have been brought forward by M. Hannon[1] and M. Pétrequin, either as adjuvants or succedanea to the preparations of iron. As a succedaneum for iron the peroxide of manganese had been employed by M. Gendrin. It would appear, too, that a formulary, printed at Leipzig in 1847, under the title *Vademecum Clinicum*, by Dr. J. Kovasy, contains formulæ for the employment of the oxide of manganese in *chlorosis* and *amenorrhœa*, and according to M. Ducoux, the mineral waters of Cransac, which are well-known to be efficacious in anæmia, chlorosis, &c., contain a considerable amount of sulphate of magnesia and sulphate of iron. M. Hannon has recommended manganese most extravagantly as an almost infallible specific (?) in anæmia, whatever may be its origin. M. Pétrequin more judiciously suggests it as a succedaneum for iron in *chlorosis*, where the latter fails or loses its influence; or where the disease removed by iron returns. It would appear, however, that in only one of the four cases published by him was the salt of manganese, the subcarbonate, used alone; in the other three, the manganese was associated with iron.[2]

Kapp has used it externally in the form of ointment composed of ʒj. of the sulphate to ℥ij. of lard.

CXCVIII. Naphthali'na, *Naphthalinum*, *Naphthalen*, *Naphthalin;* French, *Naphthaline;* German, *Naphthalin*. In the distillation of coal-tar, when the last portion of the volatile oily product is collected apart, and left to stand, a quantity of solid crystalline matter separates, which is principally composed of naphthalin. This substance forms large, colourless, transparent, brilliant, crystalline plates, which exhale a faint and peculiar odour, compared to that of the narcissus. It is insoluble in cold water, but soluble in it to a slight degree at a boiling temperature. Alcohol and ether dissolve it readily.[3]

When applied to the tongue, naphthalin causes a peculiar hot and pricking sensation, which extends down the throat and bronchial tubes, exciting a spasm of the latter, and ultimately inducing cough "of a kind very efficacious in clearing the air cells and canals of accumulations of mucus. It is, therefore, a remedy highly suitable in the *asthmatic coughs* of old people, and others, who, from debility, are unable to expel the matters which clog the pulmonary membrane."[4]

According to M. Rossignon,[5] naphthalin possesses many of the physical and medical properties of camphor; for which it may be substituted. With weak alcohol it forms a tincture, which has all the properties of camphorated spirit at one half the price.

[1] Etudes sur la Manganese, &c. Bruxelles, 1849; cited in Canstatt und Eisenmann's Jahresbericht, u. s. w. im Jahre 1849. S. 162. Erlang. 1850. See, on some pharmaceutical preparations of manganese, W. Procter, Jr. in American Journal of Pharmacy, Oct. 1850, p. 297.

[2] Gazette Médicale de Paris, Sept. 1849, and Archives Générales de Méd., Janvier, 1850, p. 97.

[3] Bouchardat, Annuaire de Thérapeutique pour 1844, p. 46. Paris, 1844.

[4] London Lancet, July 8, 1843, p. 515.

[5] Bouchardat, op. cit. pour 1843, p. 64. Paris, 1843.

M. Emory,[1] of the Hôpital Saint Louis, Paris, had his attention directed to the different products of tar as remedial agents in *skin diseases*, from the successful employment of tar in these diseases, and its unpleasant odour. Of these the concrete naphthalin appeared to him to be the best. He employed it in 14 cases. In two, one of *psoriasis gyrata*, and another of *lepra vulgaris*, it failed; but in 12 it proved more serviceable; of these, two were *lepra vulgaris*, and ten *psoriasis*.

The dose is from 8 to 30 grains, given in emulsion or syrup, and repeated *pro re natâ*. M. Dupasquier employs a looch, a syrup, and lozenges. The ointment of M. Emory consists of two parts of naphthalin to 30 parts of lard.[2]

CXCIX. Oleum Cadinum, *Juniperi oleum empyreumaticum;* French, *Huile de Cade ou de Genévrier;* German, *Brenzliches Wachholder-Oel, Cade-Oel.* This oil is obtained by the combustion of the wood of Juniperus phœnicea and J. oxycedrus; French, *Cade, Oxycèdre.* A sort of liquid tar results, which is of a blackish colour, fetid, and has been employed in France by farriers in the itch and ulcers of horses, as well as in the itch of sheep. It would appear, however, that the oil of turpentine has been very generally substituted for it, and has received the name of *huile de cade.*[3] The true oil has been long employed in *toothache*, and M. Serres[4] states, that he has seen the most excruciating pain relieved by the introduction of a drop into the cavity of a carious tooth. It is also a popular domestic remedy in cases of *worms*, in the dose of from 20 drops to a dessert-spoonful, according to the age of the child. It is rubbed, too, on the upper lip, the interior of the nostrils, temples and neck, in order that it may enter the lungs with the air of inspiration.

It has been long prescribed by Alibert and Cartheuser as an *antiscrofulous* and *antiscorbutic* remedy, given internally; and was employed with advantage in *chronic ophthalmia* by Van Wij; and by Rosenstein in *scabies* and *eczema.*[5]

Of late, M. Serres has revived its use in scabies, and now employs it altogether in that disease; three or four frictions with it being generally sufficient in recent cases. It is affirmed, too, by him, that various *cutaneous affections,—eczematous, papular, lichenoid,* &c.—are cured by its application every other day. A pellicle appears to be formed by it, which falls off on the ninth or tenth day, leaving the diseased surface healed or in the way of cure. It is in *scrofulous ophthalmia*, however, that M. Serres has observed the best effects—in those obstinate cases that had resisted other means. In infants, he applies it on the forehead, temples, or cheeks, and on the outer surface of the eyelids; and at times he adds the introduction of a drop into each nostril. He has used it too with advantage in *tinea, otorrhœa,*

[1] Cited in London and Edinburgh Monthly Journal of Medical Science, Jan. 1843, p. 68.

[2] Bouchardat, op. cit., and Nouveau Formulaire Magistral, p. 122. Paris, 1845.

[3] Mérat and De Lens, Dict. Univ. de Mat. Méd. ii. 489. Bruxelles, 1838.

[4] Bouchardat, Annuaire de Thérapeutique pour 1847, p. 65.

[5] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 162. Erlangen, 1848.

pruritus ani, &c.' It effectually destroys, according to M. Sully, the *parasites* which infest the hairy scalp in tinea; and he affirms, that it occasionally cures this loathsome and obstinate disease almost miraculously.

As a remedy in chronic cutaneous diseases it has been extolled also by M. Devergie,[2] who has found it most successful, however, in *eczema*, both in the *simple* and *impetiginous* form. In *squamous affections* and in *lupus* he has also used it; but beyond this, he thinks, "there is uncertainty or deception."

M. Sully[3] prescribes the following ointment in *tinea*:

℞. Olei cadin. ℥iss.
Essent. anis. gtt. v.
Adipis ℥ij. M.

CC. Piscid'ia Erythri'na, *Jamaica Dogwood.* Dr. Hamilton,[4] during a visit to the Antilles, was struck with the powerfully narcotic effects produced on fish by the bark of the root of this tree. Inferring that it might be useful as a medicine, he prepared a tincture, made by macerating the bark of the roots, gathered during the period of inflorescence, and before the appearance of the leaves, in four times "its weight by measure" of rectified spirit for 24 hours, and filtering. Of this mixture he took, when much afflicted with *toothache*, a fluidram in a tumblerful of cold water, drank it off, and watched its effects, which were anodyne and hypnotic; and on awaking from sleep, his pain had wholly disappeared. He subsequently used it as a topical application to *carious teeth*, introducing it on a dossil of cotton into the diseased cavity; and after a single application, he never heard of a return of pain in that tooth.

The formula for Dr. Hamilton's tincture is one ounce of the bark to four fluidounces of alcohol. Dose, f ℥j. and less, in a glass of water.

CCI. Plumbi Chlo'ridum, *Chloride of Lead*; French, *Chlorure de Plomb*; German, *Chlorblei*, *Hornblei*. Chloride of lead is formed when *oxide of lead* is digested in *muriatic acid*. It also falls as a white precipitate when a *salt of lead* is added to any *soluble chloride*. In the London Pharmacopœia it is directed to be formed as follows:—Take of *acetate of lead*, 19 ounces; *boiling distilled water*, three pints, (imperial measure;) *chloride of sodium*, six ounces. Dissolve separately the *acetate of lead* and *chloride of sodium*—the former in three pints of *distilled water*, the latter in one pint. Mix the solutions; wash the precipitate after it has become cool with *distilled water*, and dry it. The chloride crystallizes in long, flattened acicular crystals, which are anhydrous. Its solubility in water is variously stated. Generally, it is said to dissolve in 135 times its weight of cold water, and to be more soluble in hot.[5] By the London Col-

[1] Bouchardat, Annuaire de Thérap. pour 1849, p. 122.
[2] Ibid. pour 1850, p. 65. [3] Ibid. pour 1849, p. 122.
[4] Pharmaceutical Journal. Aug. 1, 1844; cited in Med. Chir. Rev., Oct. 1844.
[5] Graham's Elements of Chemistry, Amer. edit. p. 409. Philad. 1843; Fownes's Elementary Chemistry, American edit. p. 242. Philad. 1845.

lege, it is said to be soluble in 30 parts of water at 60°, and in 22 parts at 212°.[1] It was admitted into the London Pharmacopœia as one of the substances employed in the preparation of the muriate of morphia.

Mr. Tuson,[2] has employed chloride of lead in *cancerous ulcerations*, both in the form of lotion and ointment, with some success. As a lotion, it is of use, he says, in producing a healthy surface of the sore, removing fœtor, and relieving pain; and when the ulcer has not been extensive, it has healed under its application. In "*painful neuralgic tumours*" it proved very beneficial in relieving the pain. When applied to any great extent by rubbing it over the part in the form of ointment, it has produced a numbness of the arm; and from the observations which Mr. Tuson made, on watching the effect of the application, he was induced to think, that the pain was removed by paralyzing the nerves of the adjacent parts. From what he has seen of the effect of the remedy he is inclined to believe, that combined with other applications and assisted by internal treatment, it may be of very considerable service in *certain cancerous affections*.

CCII. Plumbi Nitras, *Plumbum nitricum*, *Nitras plumbicus*, *Nitrum saturninum*, *Nitrate of Lead;* French, *Nitrate de Plomb;* German, Salpetersaures Bleioxyd. This salt is officinal in the Edinburgh college; and is directed to be prepared as follows:—Take of *litharge*, ℥vss., *diluted nitric acid*, a pint. Dissolve the acid to saturation with the aid of a gentle heat. Filter, and set the liquid aside to crystallize. Concentrate the residual liquor to obtain more crystals. It forms beautiful tetraëdral and octaëdral crystals, nearly opake, white, and of adamantine lustre, which are permanent in the air, and soluble in somewhat more than four parts of water.[3]

Hitherto, nitrate of lead has not been much used in Great Britain or this country, in medical practice; and it was introduced into the Edinburgh Pharmacopœia merely as the best salt of lead from which to prepare the iodide. It has the same constitutional and local action as the other soluble salts of lead. The property, however, which it possesses, of coagulating albumen, and of decomposing the compounds of chlorine, and the sulphohydrates, renders it a valuable antibromic; and it has been prescribed as an excitant antiseptic to wounds. In 1773, it was in use as an antiepileptic, and was especially recommended by Osterdyk-Schacht and Gessner.[4] Dr. Pereira[5] states, that in *active hæmoptysis* he has sometimes prescribed a pill of sugar of lead and opium, and a mixture containing nitric acid. Nitrate of lead would thus be formed in the stomach. With this combination

[1] The Dispensatory of the United States of America, by Wood and Bache, 6th edit. p. 1075. Philad. 1845.

[2] London Lancet, Jan. 13, 1844, p. 502; and The Structure and Functions of the Female Breast, p. 426. Lond. 1846.

[3] Christison, Dispensatory, Amer. edit. by R. E. Griffith, p. 739. Philad. 1848.

[4] Dierbach, Die neuesten Entdeckungen in der Mat. Med. 3er Band, 1ste Abtheil. S. 610. Heidelb. und Leipz. 1845.

[5] Elements of Mat. Med. and Therap. 3d edit. i. 745. Lond. 1849.

he has succeeded in getting the system under the influence of lead in a much shorter time than by the sugar of lead only.

Its main use, until of late, has been as an application to *wounds, ulcers, cancerous affections, chronic cutaneous diseases, chaps*, &c. According to Volz, it is the active constituent of a secret remedy by Liebert, of Paris, for *cracked nipples*.[1] Volz employed it with advantage in these and similar cases, in the quantity of ten grains to the ounce of water.

The most recent circumstance of interest connected with the nitrate of lead, owing to which it is introduced here, is, that it is the admitted basis of "*Ledoyen's disinfecting fluid*," which attained so much celebrity a few years ago, that the British government directed experiments to be instituted with it for disinfecting the subjects of spreading diseases, as well as infected localities. It is a solution of one dram of *nitrate of lead* in a fluidounce of *water;* and it certainly destroys the unpleasant odour of animal and vegetable substances that are evolving sulphuretted hydrogen and hydro-sulphates of ammonia; but there is no evidence that it has any destructive power over the emanations that give occasion to disease.[2] Dr. Stratton[3] is of opinion, from observation of the effects of the two fluids, that the Ledoyen is inferior to the Burnett fluid.[4] He affirms, too, that it is liable to exert a depressing influence when applied to the body, or used in the room in cases of *typhus;* and two cases of lead colic, arising from its application to ulcers, have been recorded.[5]

By Lemaître de Rabodanges the nitrate of lead has been employed both as a destroyer of putrid odours, and for the preservation of animal substances,—of the dead body, for example,[6] as in *embalming;* yet its antiseptic power has been denied.[7] The commission, consisting of Dr. Southwood Smith, Mr. Toynbee and Mr. Grainger, to whom, in connexion with the discoverer, the fluid was submitted for examination by Lord Morpeth, reported, that it does not possess any peculiar power in preserving the dead body from decomposition, whilst they admit its efficacy as an antibromic.[8]

CCIII. Potassæ Nitras, *Nitrate of potassa, Nitre;* French, *Nitrate de potasse;* German, Salpetersaures Kali. This salt is noticed here in consequence of the revival of its use in large doses, within the last twenty years. As a general rule, nitrate of potassa is a dangerous and rapid irritant poison in the dose of an ounce; yet there are cases in which this and even a larger quantity have been borne with impunity,[9] especially when dissolved in a large quantity of water.

As long ago as the year 1764, Dr. Brocklesby, a celebrated British

[1] Dierbach, op. cit. 2er Band, S. 1224. Heidelb. und Leipzig, 1843.

[2] British Amer. Journal of Med. and Phys. Sciences, December, 1847, and the author's General Therapeutics and Mat. Med., 4th edit. ii. 371. Philad. 1850.

[3] Edinb. Med. and Surg. Journal, Oct. 1848, p. 293.

[4] See page 691.

[5] Brit. Amer. Journal, March, 1848.

[6] Pereira, op. cit.

[7] Académie des Sciences, 8 Juin, 1846; cited by Pereira; and Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 230. Erlangen, 1848.

[8] Amer. Journal of Pharmacy, November, 1847, p. 269.

[9] Christison, Treatise on Poisons, Amer. edit. p. 189. Philad. 1845.

army physician, urged the value of this salt, in large doses, in *acute rheumatism*,—as much as ten drams being given during the day and night. The practice was followed by others,—and, in 1833, Messrs. Gendrin and Martin Solon revived it in Paris; sixteen cases are recorded, the average period of treatment of which was eight days. The mean quantity given in one day was an ounce in three quarts of water,—the total average quantity, eleven ounces They recommend, that it should be begun in the quantity of two drams and a half to a quart of fluid.

Twelve successful cases are also recorded by M. Aran.[1] The mean dose was thirty-six grains in three pints of fluid, and the average total quantity, 374 grains. The mean duration of the disease was also eight days.[2] Dr. Henry Bennet, who was clinical clerk and house physician under M. Gendrin, at La Pitié, states, that for nearly three years, which he spent there, all the cases of *acute rheumatism* which came into the wards were treated with nitre, in doses varying from six to twelve, or sixteen drams in the twenty-four hours, according to the age, sex, or constitution of the patient; so that Dr. Bennet thinks he must have seen treated at La Pitié, in this manner, at least seventy or eighty persons. The salt was always administered dissolved in a large quantity of barley water, sweetened with sugar, —the proportion being about half an ounce to a pint and a half or two pints of fluid. This was the only beverage allowed the patient. The secretions of the skin and kidneys were generally augmented, and sometimes those of the intestinal canal; but the principal action of the nitrate appeared to be sedative, the pulse generally falling rapidly, both as regarded frequency and strength—or, in other words, the salt seemed to act as a contrastimulant. Neither M. Gendrin, nor M. Martin Solon, nor Dr. Bennet, observed any renal inflammation induced by it, as had been stated by some. Dr. Bennet[3] states, that he has not only administered an ounce or more of nitre in the twenty-four hours, for many days consecutively in acute rheumatism, but also in *puerperal fever* and *other inflammatory diseases*, with, he thinks, marked benefit, and without observing any toxical phenomena; and in a subsequent communication[4] he asks, whether nitre, thus administered, may not prove a valuable sedative in *febrile* and *inflammatory diseases*. In *chronic rheumatism* he found it of little avail. Dr. W. R. Basham[5] gave it in *acute rheumatism* in the quantity of one, two and three ounces, largely diluted—in two quarts of water—in the twenty-four hours.

The testimonies in favour of large doses of nitrate of potassa in acute rheumatism are certainly not few; but, as the author has remarked elsewhere,[6] it must be borne in mind, that the disease is self-limited in many instances, or, in other words, appears to run a defi-

[1] Journal des Connaissances Médico-Chirurg. 1841, or Gazette Médicale, Mars, 1841.
[2] Cowan, Provincial Med. and Surg. Journal, May 20, 1843, p. 144.
[3] London Lancet, Feb. 10, 1844, p. 638. [4] Ibid. June 15, 1844, p. 374.
[5] Proceedings of the Royal Medical and Chirurgical Society, Nov. 14, 1848; cited in Amer. Journ. of the Med. Sciences, Jan. 1849, p. 184.
[6] General Therapeutics and Mat. Med. 3d edit. ii. 212. Philad. 1850.

nite course, greatly uninfluenced by medicine. The action of sedation, ascribed to it, may result indirectly from its revellent operation on the stomach; but farther observations are needed to establish the fact of such action, before we attempt to explain the *modus operandi*.

It may be proper to add, that Dr. Young,[1] of Chester, Pa., has found that nitrate of potassa, given in ten grain doses, every three hours, to the adult, had an excellent effect in *incontinence of urine*. It succeeded in several cases, in which the tincture of cantharides had failed. To a boy between nine and ten years of age, "who rarely in his life had escaped wetting the bed one or more nights in the week," Dr. Young ordered ten grains three times a day for a week. During this time he escaped. It was now omitted for three days, and then directed to be given four days in the week, omitting it three. It was thus continued five weeks, when it was entirely abandoned. The boy had no incontinence from the time of taking the nitre, nor whilst he was under Dr. Young's notice, for more than a year after. Dr. Young supposes, that the *modus operandi* of the nitre in these cases may consist in increasing the irritating properties of the urine, so as to make it more stimulating to the bladder or its sphincter. If so, he suggests, whether other preparations of potassa and soda may not succeed, in cases in which the nitrate fails. M. Delcour, however, who speaks favourably of the nitrate, as recommended by Dr. Young, thinks it acts rather by diminishing the excitation of the bladder.[2] Here, again, farther experience is desirable.

The fumes produced by the deflagration of nitrate of potassa with paper have been inhaled with advantage in *asthma*. For this purpose bibulous paper may be dipped in a saturated solution of nitre, and afterwards dried; in this way is obtained what is called *touch paper*. The fumes may be inhaled either by setting fire to the paper on a plate, or rolled up and placed in a candlestick, and permitting the fumes to escape into the room; or by smoking the paper in a tobacco pipe. The beneficial effects are generally experienced in ten or fifteen minutes.[3]

CCIV. Sanic'ula Mariland'ica, *Sanicle, Maryland Sanicle, Black Snakeroot;* French, *Sanicle du Maryland*. This plant—of the umbelliferous family—is indigenous, and common in woods and copses.[4] Dr. Stephen W. Williams[5] says, "it is supposed to be astringent, partially tonic and diuretic, and it has been used with success in *dropsy;* and in decoction in *dysentery*, *leucorrhœa* and *hemorrhages*. It is also pulmonary and balsamic." The Indians—it is affirmed—and, after their example, physicians of the country, employed it "in

[1] American Journal of the Medical Sciences, April, 1843, p. 371.

[2] Journal de Médecine de Bruxelles, cited in Medical Times, Jan. 4, 1845, p. 303.

[3] Lond. Med. Gazette, Sept. 4, 1846, p. 431; and Pereira, Elements of Mat. Med. and Therap. 3d edit. i. 514. Philad. 1849.

[4] Gray's Manual of the Botany of the Northern United States, p. 156. Boston and Cambridge, 1848.

[5] Report on the Indigenous Medical Botany of Massachusetts, in Transactions of Amer. Med. Association, ii. 871. Philada. 1849.

syphilis and *diseases of the lungs*."[1] It is introduced here, however, in consequence of its having been highly recommended by J. B. Zabriskii[2]—[in some of the French works metamorphosed into Labriski,]—in cases of *chorea*. The root is fibrous, aromatic, and possesses the active matter of the plant. Dilute alcohol extracts the active principle in some degree; but the best form of administering it, according to Dr. Zabriskii, is the powder of the dried root. He regards it as highly tonic, and states, that it is used in popular practice as a favourite remedy in *intermittent fever*.

In *chorea* he gives it to children eight or ten years of age in the dose of half a dram three times a day.

CCV. Sodæ Hyposulph'is, *Hyposulphite of Soda;* French, *Hyposulfite de Soude*. There are several modes of preparing this salt, which is largely used for photographic purposes. One of the best is to form neutral sulphite of soda, by passing a stream of well washed *sulphurous acid gas* into a strong solution of *carbonate of soda*, and then to digest the solution with *sulphur* at a gentle heat for several days. By careful evaporation at a moderate temperature, the salt is obtained in large and regular crystals, which are very soluble in water.[3]

It is said to have been administered with constant success by physicians of Paris, who are the most versed in the treatment of *cutaneous diseases*. It was first employed by MM. Chaussier, and Biett, under the name *sulfite sulfuré de soude*, but it had fallen into neglect when its use was revived by M. Quesneville, and the results have been entirely conformable to those obtained by MM. Chaussier and Biett. It is highly extolled by them in *chronic cutaneous*, and in *scrofulous affections*, and is said to be a most efficacious auxiliary to external sulphurous preparations.[4]

The best mode of exhibiting it is in syrup, the formula for which is given below,—Hyposulphite of soda, 45 *grammes*, (about ʒxiss.;) Distilled Water, 255 *grammes*, (about f ℥viij.;) Sugar, in coarse powder, 1000 *grammes*, (about ℔ij.) Dissolve the hyposulphite in the distilled water when cold; and form into a syrup at the ordinary temperature.

Thirty parts of the syrup contain one part of the hyposulphite. From 30 to 125 grammes, (one ounce to four,) may be given in the twenty-four hours.

℞. Sodæ hyposulph. ʒxiss. (45 *grammes.*)
Aq. destillat. f ℥viij. (255 *grammes.*)
Sacchar. in pulv. crass. Oij. (1000 *grammes.*)
fiat syrupus.

Emile Mouchon.[5]

[1] Mérat and De Lens, Dict. Universel de Mat. Méd. iv. 142. Bruxelles, 1838.
[2] Amer. Journ. of the Med. Sciences, Oct. 1846, p. 374.
[3] French Codex for 1839, and Fownes's Elementary Chemistry, p. 198. Phila. 1845.
[4] Abeille Médicale, 1844, p. 210, and Juin, 1845, p. 151.
[5] Journal de Pharmacie du Midi, cited in Abeille Médicales, Septembre, 1845, p. 237.

CCVI. Sodæ Phosphas, *Phosphate of Soda;* French, *Phosphate de Soude;* German, Phosphorsaures Natron. This salt has been long known under the name of "*tasteless purging salt*," and a formula for its preparation is given in the Pharmacopœia of the United States. It has been urged as a remedy in *lithuria*, under similar views to those that suggested the employment of phosphate of ammonia. If sufficiently diluted, according to Dr. Golding Bird,[1] it is sure to enter the circulation, and be excreted by the kidneys, thus furnishing to the urine an energetic solvent of uric acid, as Liebig has shown it to be. It is true, he says, that this indication can generally be fulfilled by the pure alkalies and their carbonates; "but they too often exert the injurious effect of materially interfering with the digestive organs, and thus directly affecting the integrity of those functions most intimately connected with the production of the morbid deposit." The phosphate of soda, according to Dr. Bird, may be given in doses of ℈j. to ʒss. thrice a day in broth or gruel, without any other apparent effect than that of slightly relaxing the bowels, and the urine becomes charged with the salt. We may thus, he says, hope to obtain uric acid in solution, and gain time for the enjoyment of those remedies which are best adapted for the treatment of the uric acid diathesis; "for it must never be forgotten, that in merely giving a remedy to hold a urinary deposite dissolved, we are merely treating an effect and not a cause." Dr. Bird states, that he has administered the salt in two very chronic cases of *uric acid gravel*, and in one with the effect of rapidly causing a disappearance of the deposit. The triple salt, ammonia-phosphate of soda, he thinks, might perhaps be a more active remedy than the simple phosphate, but its disagreeable flavour constitutes one objection to its employment. Dr. Buckler suggests the phosphate of ammonia in preference to the phosphate of soda; the urate of soda formed by the latter in the blood being insoluble; whilst, when phosphate of ammonia is given, "a double reaction and decomposition take place, and two new salts are formed, both of which are readily soluble and capable of being evolved."[2]—(See Ammoniæ Phosphas.)

CCVII. Succus Limo'nis, *Lemon juice;* French, *Suc de Limon;* German, Citronensaft. This familiar article has been brought forward by Dr. Owen Rees on chemical considerations, to swell the catalogue of undoubted cures of acute *rheumatism*.[3] Dr. Rees first had recourse to it in *rheumatic gout*, from a belief that the vegetable acids—probably owing to the excessive quantity of oxygen entering into their composition—contribute to effect the transformation of the tissues generally, and because lemon juice was the most palatable form in which such class of remedies could be applied. Moreover, it appeared to him probable that the supercitrate contained in the juice, although in small quantity, was a form of alkaline

[1] London Medical Gazette, Aug. 23, 1844, p. 689; and Urinary Deposits, &c., Amer. edit. Philad. 1845.

[2] American Journal of the Medical Sciences, Jan. 1846, p. 120.

[3] See Cimicifuga, page 214, and Colchicum, page 228.

salt likely to contribute to the alkalinity of the blood in its transformations; as the examination of the urine shows that such organic compounds become converted into carbonates. He seems to regard retained uric acid as the materies morbi in rheumatism; and thinks that the citric acid of the lemon juice yields oxygen, which, with the elements of water, converts uric acid into urea and carbonic acid;—an hypothesis which is by no means admitted.[1]

In his earliest communication, Dr. Rees[2] reported several prominent cases of cure; and stated that the early relief from pain was such, that had any one unacquainted with the remedy in use watched the progress of the cases, they would almost inevitably have concluded that sedatives had been resorted to. Subsequently, he published a pamphlet,[3] in which he gives eight cases illustrative of the practice. The forms of rheumatic disease in which the greatest benefit was derived were *acute rheumatism* and *rheumatic gout*. In *pure gout*, with highly inflammatory symptoms, more advantage was obtained than in the chronic forms of the disease. In doses of half an ounce to an ounce, three times a day, it appeared to exert a marked sedative influence on the circulation. In the cases of rheumatism related by Dr. Rees, the urine was never rendered alkaline by the use of the lemon juice; and in one case, in which the urine was alkaline before treatment, it became acid after the juice was employed. Dr. Ranking[4] speaks favourably of the article; and others have afforded similar testimony.[5]

Additional evidence is however needed, before this article—which every gouty individual is, from experience, afraid of—can be regarded as an appropriate remedial agent in arthritic affections; as Mr. Dalrymple, however, has remarked, "should it stand the test of time and hospital practice, and we be able to avoid either half poisoning our patients with colchicum, stupifying them with opium, or enervating them with mercury, a great boon will be conferred on the suffering multitudes of this variable climate,"—(that of England.)

CCVIII. Sum'buli Radix, *Sumbul root, Jatamansi;* German, Sumbulwurzel, Moschuswurzel, Spicanard. A root introduced into notice of late years—the mother plant undetermined, but presumed to belong to the Umbelliferæ Family, and allied to Archangelica officinalis.[6] According to Erdmann and Von Ledebour, and the English botanist, Mr. Robert Brown, it comes from Bucharia; whilst Guibourt says it is obtained from Siberia.[7] It ap-

[1] British and Foreign Medico-Chirurgical Review, Oct. 1849, p. 530.
[2] London Medical Gazette, Jan. 26, 1849.
[3] The Treatment of Rheumatic Diseases by Lemon Juice, with Illustrative Cases, from Hospital Practice. Lond. 1849.
[4] The Half-yearly Abstract of the Med. Sciences, No. 11, Jan. to July, 1850. Amer. edit., p. 19; and No. 12, July to Dec. 1850, p. 33; Amer. edit. Phila. 1851.
[5] Lond. Med. Gaz. June 15, 1849, and Mr. D. Dalrymple, Lancet, Sept. 1850.
[6] Aschenbrenner, Die neueren Arzneimittel, u. s. w. S. 256. Erlangen, 1848.
[7] Dierbach, Die neuesten Entdeckungen in der Materia Medica, 3er Band, 2te Abth. S. 1153. Heidelb. und Leipz. 1847.

pears in commerce either uncut or in slices from one to four inches in diameter, and from half an inch to two inches thick; having a strong, musky odour, and a strong, bitter calamus-like taste. When examined by Reinsch, it was found to contain an odorous ethereal oil, which did not smell of musk; a colourless balsam, and two peculiar acids, (Sumbulamsäure and Sumbulolsäure;) aromatic resin, bitter principle, &c. According to Schnitzlein and A. Frickinger,[1] a soft resin oozes from the wood and concretes, which possesses the characteristic smell of the root in a high degree, and has a taste between that of musk and calamus. It is soluble in alcohol, and is in great part thrown down in a milky form by the addition of water.

Sumbul is said to have been used in *dropsy* and *atrophy;* but it has recently been brought forward in Germany as a gentle excitant of the nervous system, and through it of all the organic actions. Thielmann prescribed it in the nervous stadium of *typhoid fever;* and in *chorea, delirium tremens, flatulence of the stomach* as a consequence of tonic spasms, in *anæsthesia of the nerves of the bladder, enuresis, ischuria renalis spastica, diarrhœa* and *cholera morbus;* and he suggests that it may be found a valuable prophylactic and curative agent in *cholera.* He prescribed it also in a case of *violent vomiting in the convalescent stage of typhus;* in *diabetes insipidus;* and in *tubercular phthisis;* and it seemed to him to improve the condition of a patient in the last period of *profuse suppuration from caries* with *hectic fever.* It has been prescribed, indeed, in the most heterogeneous cases;[2] and there is too much reason to believe that effects have been assigned to it to which it is little or not at all entitled. It was given by Dupuis,[3] of Mainz, in *cardialgia, colic, disordered digestion in pregnancy,* and in *convalescence;* and Von Kieter,[4] of Kasan, prescribed it generally with advantage in *cholera typhus* and in the later periods of *cholera.* Recently, it has been introduced into England, by Dr. Granville, of London, with a title to his essay on it which is sufficient to cast distrust on his testimony,—"The Sumbul; a new Asiatic remedy of great power against *nervous disorders, spasms of the stomach, cramp, hysterical affections, paralysis of the limbs* and *epilepsy;* with an account of its physical, chemical and medicinal characters, and specific [?] property of checking the progress of collapse-cholera, as first ascertained in Russia!" In this, Dr. Granville gives a history of the article, and of its various applications to the treatment of disease.[5] "We do not find," says Dr. Ranking,[6] "that Dr. Granville's observations have been confirmed. Should there be any thing in the medicine, it will doubtless soon be known."

[1] Dierbach, Die neuesten Entdeckungen in der Materia Medica, 3er Band, 2te Abth. S. 1156.

[2] Aschenbrenner, Ibid. S. 257.

[3] Schmidt's Jahrbucher, Jahrgang 1849, S. 294. [4] Ibid.

[5] A full notice of Dr. Granville's pamphlet is contained in Edinburgh Medical and Surgical Journal, for Oct. 1850, p. 459.

[6] The Half-yearly Abstract of the Medical Sciences, No. 12, July to December, 1850, Amer. edit. p. 184. Philada. 1851.

It has been given as an antispasmodic in *epilepsy*, by Dr. Todd;[1] but the results have not been published.

It is prescribed in powder, in the dose of half a scruple and more, several times a day; in infusion—half an ounce of the root to six ounces of water—dose, a table-spoonful.—In decoction, in water or hock, half an ounce of the root to eight ounces of water or wine, boiled down to six ounces,—dose, a table-spoonful; and in infuso-decoctum—half an ounce of the root being infused in five ounces of boiling water; digested for a quarter of an hour in a closed vessel; strained; and the residue boiled for a quarter of an hour in sufficient water to leave three ounces. The strained liquors must then be mixed, and given like the infusion and decoction. A tincture of it is also prepared, like the tinctura valerianæ; dose—fifteen to twenty-five drops; and an extract, the dose of which is from five to ten grains.[2]

[1] Cited. from London Lancet, in Med. Examiner, July, 1850, p. 437.
[2] Aschenbrenner, loc. cit.

INDEX

OF

DISEASES AND THEIR REMEDIES.

(*For* INDEX OF REMEDIES, *see the commencement of the volume.*)

Abdomen, inflammation of the (hydrarg. cyanur. 416.)
Abortion, hemorrhage from (matico, 510.)
Abrasions (collodion, 234, 235.)
Abscess, mammary (compressio, 241.)
Abscesses, large, (chlorin aq. 194; iodinum, 482.)
Suppurating (creasoton, 265.)
Absorbents, inflammation of the (iodinum, 482.)
Acidity of the stomach (argilla, 102, fel bovinum, 710.)
Acne (acid. hydrocyan. 33, 36; sulphur. iodid. 674.)
Indurata (sulphur. iodid. 674.)
Rosacea (acid. hydrocyan. 33. creasoton, 271.)
Vulgaris (collodion, 234.)
Adiposis (ballota lanata, 131; iodinum, 476.)
After pains (ergota, 322; sulphuris carburetum, 671.)
Air passages, diseases of the (chlorinum, 184.)
Inflamed, (iodin, 485.)
Albuminuria, (acid. gallic. 22; acid. tannic. 41; benzoate of ammonia, 19; urea, 677.)
Alopecia, (glycerin, 402.)
Amaurosis (acid. hydrocyan. 34; acupunctur. 56; ammoniated counter-irritants, 250; electro-magnetism, 296, 298; electro-punctura, 304; galvanismus, 392, 396; hæmospasia, 712; nux vomica, 541; strychnia, 658, 662.)
Incomplete (electro-punct. 304.)
Amblyopia (strychnia, 658.)
Amenorrhœa (artemisia, 111; auri præparat. 119; brominum, 144; caincæ radix, 149; calendula, 151; electro-magnetism, 296;
Amenorrhœa
ergota, 323; galvanismus, 392; hæmospasis, 713; ferr. protocarbonas, 373; ferr. iodid. 354; iodinum, 469; manganes præpar. 720; potassii bromid, 586; potassii iodohydrargyras, 594; strychnia, 661; sulphuris carburetum, 594.)
Anæmia (ferri pulvis, 335; ferri iodidum, 356; ferri subcarbonas, 379.)
during parturition (Hæmostasis, 714.)
Anæmic habits (ferri subcarbonas, 379.)
Anæsthesia, local (nux vomica, 542; sulphuris carburetum, 671; sumbuli, 730.)
Anasarca (acid. hydrocyan. 32; compressio, 237; acupunct. 56; colchicum, 229; ferri citras, 343; ferri iodid. 356; urea, 677.)
Anchylosis spuria (iodin. 462.)
Aneurism (acupunct. 57; electro-puncture, 307.)
Angiectasis (zinci chlorid. 689.)
Angina pectoris (galvanism, 394; magnes. 499.)
Anthrax (iodinum, 482.)
Malignant (chlorin. aq. 192.)
Aphonia (chlorin, 185; cubeb. 283; galvanism, 392; ol. tiglii, 564; strychnia, 658.)
Aphthæ, asthenic (chlorin. aq. 194.)
Aphthous sores (liq. ferr. persesquinit. 363.)
Ulceration (creasoton, 280.)
Apnœa, see Asphyxia.
Apoplexy (ol. tiglii, 566.)
Arsenic, poisoning by (ferri oxidum hydratum, 367.)
Arthritis (brominum, 144; compressio, 238; morphiæ acetas, 524.)

Arthrocace (ol. jecinor. aselli. 552.)
Ascarides vermiformes (ferri ferrocyanuretum, 348; fuligo, 387.)
Ascites (acupunct. 56; caincæ radix, 148; compressio, 237; electropunctur. 307; euphorb. ol. 334; ferri iodid. 356; ferri subcarb. 378; iodinum, 463, 479; potassii bromidum, 587.)
Asphyxia (acupunct. 56; electromagnetism, 302; galvano-punctur. 305; soda chlorinata, 645; sulphuris carburetum, 671.)
Neonatorum (electro-magnetism, 302.)
Asthenia, chronic (potassæ chloras, 583.)
Asthma (æther. 70; bignonia catalpa, 137; chloroform, 198, 199, 203; creasoton, 278; galvanism, 392; iberis amara, 716; naphthalin, 720; ol. tiglii, 564; potassæ nitras, 726; quinia sulphas, 623.)
Humoral (colchicum, 229; sulphur iodid. 675.)
Nervous (magnes. 499.)
Pulverulentum (acid. hydrocy. 32.)
Spasmodic (acid. hydrocyan. 32; iodinum, 463; ol. tiglii, 564.)
Atheromatous cysts (electro-punctura, 307.)
Atony from venereal excesses, (compressio, 241.)
Atrophy (brucia, 146; ol. jecinor. aselli, 552; sumbul, 730.)
Of children (oleum jecoris aselli, 552.)
Partial (nux vomica, 540.)
Bed-sores (collodion, 236; creasotum, 266.)
Biles (iodinum, 482; ammoniated counter-irritants, 250; ol. jecor. aselli, 555.)
Bites of serpents (cainca, 149.)
Black eye (calx chlorin. 156.)
Bladder, atony of the (diosma, 295.)
Catarrh of the (acidum benzoicum, 18; cort. adstring. Brazil. 253.)
Diseases of the (diosma, 294.)
Inflammation of the (fuligo, 386.)
Irritation of the (acid. benzoic. 19.)
Paralysis of the (diosma, 295.)
Bleeding from leech bites (collodion, 235; creasoton, 263.)
Blennorrhagia, acute (morphia, 523.)
Blennorrhœa (acid. hydrocyan. 34; acidum tannicum, 45; calx chlorin. 159; chimaphila, 180; cort. adstring. Brazil. 253; cubeba, 283, 287; diosma, 295; iodin. 472; ferr. iodid. 358; monesia, 515; piperina, 575; salicina, 640; zinci chloridum, 691.)
Of the bladder (diosma, 295.)
Of the eye (calcis chlorid. 158.) See Gonorrhœa.
Blepharitis glandulosa (hydrargyri cyanuretum, 416.)
Blotches, syphilitic (argent. præparat. 93; hydrarg. iodid. rubr. 423.)
Boils, see Biles.
Bones, diseased (iodinum, 474.)
Pains in the (zinci ferrohydrocyanas, 696; iodin. 474.)
Tumours of the (auri præpar. 119; potass. iodid. 602.)
Bowel complaints (iodinum, 485.)
Bowels, painful affections of the (acid. hydrocyan. 32; fel bovinum, 710.)
Irregular action of the (electromagnetism, 298.)
Brain, chronic affections of the (ammoniated counter-irritants, 250.)
Breast, cancer of the (arsenic. iodid. 107.)
Bronchia, dilatation of the (chlorin. 184.)
Inflammation of the (ammoniated counter-irritants, 250.)
Bronchial affections (colchicum, 229.)
Bronchitis (acid. hydrocyan. 31; chloroform, 204; iberis amara, 716; iodinum, 460; lactucarium, 498; mannita, 504; spiritus pyro-aceticus, 648; strychnia, 661.)
Chronic (aq. picea, 91; Chlorin. 184; cimicifuga, 214; colchicum, 229; creasoton, 274; ferri citras, 343; galeopsis, 390; juglans regia, 494; monesia, 513; salicina, 640; spiritus pyro-aceticus, 648; strychnia, 658.)
Convalescence from (mannit. 504.)
Summer (nux vomica, 542.)
Bronchocele (ferr. iodid. 354.) See Goître.
Bronchorrhœa (creasoton, 275; monesia, 513.)

Brow-ague (ammoniated counter-irritants, 250.)
Bruises (glycerin, 402.)
Bubo (chlorin. aq. 194; iodinum, 456, 482; veratria, 685.)
Ulcerated (creasoton, 269.)
Burns (calcis chlorin. 156, 163; collodion, 234; creasoton, 265, 281; fuligo, 386; iodinum, 484; glycerina, 402; sodæ chlorid. 645; sulphuris carburetum, 671.)
Severe (compressio, 238.)
Bursæ, inflammation of the (iodinum, 485.)
Enlarged (iodinum, 478.)
Cachexia (acid. acet. empyr. 14; chlorin. 187; fuligo, 385; iodide of iodhydrate of quinia, 611.)
Marsh (quiniæ sulphas, 624.)
Mercurial (auri præpar. 119; juglans, 494.) See Dyscrasy.
Tuberculous (ol. jecor. aselli, 554.)
Calculous diathesis (acidum benzoicum, 18.)
Pains (diosma, 294.)
Calculus (chimaphila, 180; lithiæ carbonas, 717.)
Biliary (chloroform, 204.)
Expulsion of fragments of (ergota, 326.)
Phosphatic (acid. lact. 38.)
Uric acid (ammoniæ phosphas, 77.)
Vesical (chimaphila, 180.)
Cancer (acid. acet. empyr. 15; aur. nitrico-muriat. 127; auri præpar. 119; calcis chlorid. 155; calendula, 150; electro-punctura, 307; fel bovinum, 708; ferr. arseniat. 337; ferr. subcarb. 376; ferr. iodid. 354; fuligo, 388.)
Of the breast (arsenici iodidum, 107; calendula, 150; creasoton, 268; fuligo, 385.)
Of the face (calx chlorin. 155; creasoton, 268; fuligo, 385.)
Of the integuments (calendula, 151.)
Of the lip (creasoton, 268.)
Of the nose (fuligo, 385.)
Open (carbo animalis, 174; chloroform, 199.)
Of the pylorus (chloroform, 198.)
Of the skin (creasoton, 268.)
Of the tongue (iodin. 471.)
Of the uterus (acidum hydrocyanicum, 33; auri nitromurias, 127; calendula, 150; cannabis, 171; creasoton, 268; ferri subcarb. 376; morphiæ acetas, 526.)
Cancerous tumour (auri nitro-murias, 127.)
Ulcers (acid. hydrocyan. 36; acid. tannic. 42; calendula, 151; calx chlorin. 155; carbo animalis, 175; chlorini aq. 194; fel bovin. 708; ferri subcarb. 376; plumbi chlorid. 723; potass. iodid. 601; zinci chlorid. 689, 693.)
Of the face (creasoton, 268.)
Cancrum oris (acid. acet. empyr. 15; calcis chlorin. 156; chlorin. aq. 194; creasoton, 267; potassæ chloras, 583; potassii iodidum, 599.)
Carbuncle, sloughing (creasoton, 267.)
Carbunculus malignus (aq. chlorin. 192, 194.)
Carcinoma of the face (auri chlorid. 121.)
Cardialgia (argenti oxidum, 99; artemisia, 111; calendula, 151; creasotum, 276; nux vomica, 542; quiniæ sulphas, 624; sumbul, 730; zinci ferrohydrocyanas, 695.)
Carditis (ammoniated counter-irritants, 250.)
Caries of bones (acid. acet. empyr. 15; juglans, 493; ol. jecor. aselli, 555.)
Of the fibula, &c. (creasoton, 268.)
Scrophulosa (ol. jecoris aselli, 552; creasoton, 267, 280; iodin, 457.)
Syphilitica (iodinum, 488.)
Of the teeth (calcis chlorid. 157; creasotum, 279; monesia, 515.)
Catalepsy (strychnia, 660.)
Catamenia, obstruction of the. See Amenorrhœa.
Cataract (atropia, 114.)
Disintegrated (carbo animalis, 175.)
Incipient (ammoniated counter-irritants, 250.)
Catarrh, chronic (acid. hydrocyan. 31; aq. tannicum, 41; aq. picea, 90, 91; chimaphila, 180; chlorin. 184, 187; emetia, 390; galeopsis grandiflora, 390; iodin. 459.)

Catarrh, pulmonary (galeopsis, 312; mannitum, 504.)
Catarrhus urethræ (cubebæ, 284.)
Vesicæ (acid. benzoic, 18; aq. picea, 92; caincæ radix, 149; cubebæ, 284; diosma, 295; matico, 509.)
Cellular membrane, sloughing of the (iodinum, 482.)
Cephalalgia (acupunct. 57.)
Chronic (artemisia, 111.)
Intense (potassii cyanuretum, 591.)
Intermittent (quiniæ sulphas, 629.)
Nervous (acid. hydrocyan. 33; chloroform, 203; zinci ferrocyan. 696; zinci valerianas, 700.)
Periodical (zinci ferrohydrocyan. 696.)
Syphilitic (hydrarg. cyanur. 416.)
See Headach.
Cerumen, defective (acid. acet. empyr. 16; creasoton, 273; glycerin, 401.)
Chalkstones (acidum benzoicum, 18.)
Chancre (acidum tannicum, 43; argenti præparat. 416; collodion, 235; creasoton, 269, 280; hydrarg. cyanur. 416; iodinum, 484.)
Phagedenic (iodinum, 484.)
Chaps (collodion, 234; glycerin, 402; ol. jecin. aselli, 556.)
Chest, diseases of the (chlorin. 184.)
Affections of the (fuligo, 387.)
Neuralgic affections of the (galvanism, 394.)
Chilblains (calx chlorin, 156, 164; creasotum, 266, 281; iodinum, 483.)
Ulcerated (monesia, 515.)
Chlorosis (artemisia, 111; ferri citras, 343; ferri pulvis, 335; ferr. iodid. 354; ferr. protocarbonas, 373; ferr. lactas, 360; ferri tannas, 380; ferri valerianas, 381; hæmospasia, 713; manganesium, 720; paullinia, 570.)
Cholera (cannabis indica, 170, 172; carbonis trichloridum, 705; chloroform, 204; creasotum, 276; diosma, 295; guaco, 408; morphiæ acetas, 524; ferri nitras, 363; iodin. 468; nux vomica, 542; quiniæ sulphas, 625; strychnia, 660; sumbul, 730.)
Cholera morbus (artemisia, 111; chloroform, 204; carbonis trichloridum, 705; ferri et alumin. sulph. 712; sumbul, 730.)
Infantum (argilla pura, 102; fuligo, 385; monesia, 514.)
Chordée (iodinum, 485; lupulina, 718.)
Chorea (acid. hydrocyan. 32; cannabis indica, 170; chloroform, 203; cimicifuga, 213; ferri subcarb. 378; ferri ferrocyanur. 346; ferri iodidum, 355; iodinum, 467; nux vomica, 542; ol. jecor. aselli, 556; potassii cyanuretum, 592; sanicula marilandica, 726; strychnia, 659; sumbul, 730; veratria, 683; zinci chlorid. 690; zinci ferrohydrocyanas, 696.)
Colic (fuligo, 385; sumbul, 730.)
Flatulent (æther, 70; chloroform, 199, 203.)
Hysterical (ol. sinapis, 561.)
Nephritic (æther, 70; chloroform, 203.)
Colica pictonum (æther, 70; nux vomica, 541.)
Coma (strychnia, 658; ol. tiglii, 566.)
Concretions, tophaceous, (nux vomica, 542; acid. benzoic. 18.)
Condylomata (argent. præparat. 93; creasoton, 269; Hydrarg. deutoiodid. 423.)
Congestions (electro-magnetism, 302; electro-puncture, 307.)
In the head (ammoniated counter-irritants, 250.)
Conjunctivitis (collodion, 236; lactucarium, 497; zinci valerianas, 700.)
Scrofulous (hydrargyri cyanuretum, 416; potassii iodidum, 603.)
Constipation (aq. picea, 91; colchicum, 230; electro-magnetism, 298; fel bovinum, 710; galvanism, 399; mannit. 504; nux vomica, 542; ol. tiglii, 566; strychnia, 661; veratria, 685.)
Consumption, see Phthisis.
Contagion (calx chlorin. 160; chlorin, 188; plumbi nitras, 724; zinci chlorid. 691.)
Contractions, muscular, (acupunct. 56.)

Contusions (acupunct. 57; creasoton, 266; iodinum, 484.)
Convalescence (berberina, 137.)
Tedious (paullinia, 570.)
Convulsions (æther sulphuric. 69; cimicifuga, 213; ammoniated counter-irritants, 250; auri præpar. 116; magnes. 499; moxa, 533; compression of arteries, 242; potass. cyanur. 592.)
During dentition (chlorin. aq. 191.)
Hysterical (compressio, 242; electro-magnetism, 298; indigum. 433.)
Parturient (chloroform, 205; ergota, 322; ether, 72.)
Convulsive affections (acupunct. 56.)
Diseases of childhood (artemisia, 111.)
Cornea, granulations on the (fuligo, 386.)
Inflamed (collodion, 236.)
Obscurity of the (calx chlorin, 158.)
Opacity of the (acid. hydrocyan. 34; hydrarg. iodid. rubr. 423; iodinum, 485; ol. jecor. aselli, 553, 556; zinci ferrocyanuret. 696.)
Sparks on the (iodinum, 485.)
Specks on the (cadmii sulphas, 705; fuligo, 386.)
Scrofulous ulcers of the (ol. jecor. aselli, 556.)
Spots on the (fuligo, 386; zinci valerianas, 700.)
Ulcers of the (argenti oxidum, 100; ol. jecor. aselli, 553; zinci ferrocyanuret. 696; zinci valerianas, 700.)
Coryza (cubebæ, 283.)
Cough (chloroform, 199; potassii iodidum, 603; cimicifuga, 214; lactucarium, 498.)
Asthmatic (naphthalin, 720.)
Nervous (acid. tannic. 41.)
Spasmodic (chloroform, 198; chondrus, 211; lactucarium, 198.)
Spasmodic, dry (fucus crispus, 211.)
Coxalgia (iodinum, 476.)
Coxarthrocace (ol. jecor. aselli, 556.)
Cramp (ammoniated counter-irritants, 250; magnes, 499; Sumbul. 730.)
Cramp of the stomach (nux vomica, 515; zinci ferrohydrocyanas, 695.)
Writers' (electro-magnetismus, iv.)
Croup (hæmospasia, 713; iodinum, 485; quiniæ sulphas, 624.)
Hysteric (creasoton, 271, 278.)
Crusta lactea (creasoton. 271.)
Cutaneous diseases (acid. hydrocyan. 33; anthrakokali, 80; arsenias ammoniæ, 105; aqua picea. 89; arsenic. iodidum, 107; auri chlorid. 121; auri cyanidum, 125; calx chlorin. 157; chlorin. 187; chlorin. aq. 194; creasoton, 270; ferr. carbur. 339; fuligo, 385; fuligokali, 389; glycerina, 400; hydrarg. deuto-iodid. 422; hydrargyri-protonitras, 427; hydrarg. deutonitras, 428; hyd. et arsen. iodid. 431; hyd. et quiniæ protochloridum, 715; iodidum ammoniæ, 490; iodid. sulph. 674; iodinum, 468; juglans, 494; manganesii sulphas, 719; naphthalin, 721; oleum cadinum, 722; ol. jecor. aselli, 555; potassæ chloras, 583; potassii cyanuret. 592; quiniæ arsenis, 607; soda chlorin. 645; sodæ hyposulphis, 727; sulphur iodid. 674.)
Syphilitic (hydrarg. iodid. rubr. 592.)
Cynanche (chlorin. aq. 193; cort. adstring. Brazil. 253.)
Tonsillaris, see Sore Throat.
Of scarlatina (ferri et aluminæ sulphas, 712.)
Cyst, serous, &c. (electro-punctura, 307; iodinum, 478.)
Dacryocystitis (iodinum, 477.)
Dartrous eruption (hydrarg. iodid. rubr. 423; iodinum, 477.)
Deafness (acid. acet. empyr. 15; creasoton, 273; cubeba, 283; electro-magnetism, 296; electro-punctura, 296; galvanism, 392; glycerin, 401; hæmospasia, 713; injections of air, &c., in, 437; sulphuris carburetum, 671.)
Erethitic, nervous (injections of vapour of acetic ether, 437.)
Nervous, torpid (injections of vapour of ether, 437.)

Debility (ferr. iodid. 356; nux vomica, 539; piperina, 575.)
General (quiniæ et cinchonæ tannas, 635.)
Nervous (acid. tannic, 41; quiniæ sulphas, 630.)
Paralysis (ammoniated counter-irritants, 250.)
Decubitus gangrænosus (plumb. tannas, 581.)
Delirium tremens (æther sulphuric. 69; animal magnetism, 399; ol. tiglii, 565; chloroform, 203; sumbul, 730.)
Dentition (chlorin. aq. 191.)
Depositions, morbid (electro-puncture, 308.)
Diabetes insipidus (sumbul, 730.)
Mellitus (creasoton, 277; acid. tannic. 40; ferri iodidum, 355; urea, 677.)
Diarrhœa (acid. acet. empyr. 15; acid. tannic. 44; aq. picea, 91; argilla, 101; artemisia, 111; carbo animalis, 174; chondrus, 211; ferri et alumini sulph. 712; fuligo, 385; indigum, 432; liq. ferr. persesquinit. 363; monesia, 514; nux vomica, 542; paullinia, 570; Spiritus pyroaceticus, 648; strychnia, 660; sumbul, 730; veratria, 685.)
Bloody (acid. gallic, 21.)
Choleric (nux vomica, 542.)
Chronic (acid. tannic. 41; argent. chlorid. 95; argent. oxid. 100; emetia, 312; ferr. cyanuret. 347; ferri iodid. 363; ferri et alumin. sulphas, 712; matico, 509; morphiæ acetas, 526; nux vomica, 542.)
Of phthisis (ferri nitras, 363; monesia, 514.)
Of infants (iodinum, 485.)
Diathesis phthisica (chlorin. aq. 194.)
Digestive function, torpor of the (cainca, 148; chimaphila, 180; gentiana chirayita, 399; hippocastanum, 410; monesia, 514.)
Diplopia (acupunct. 57.)
Discharges from the meatus auditorius (acid acet. empyreum. 15.)
Mucous (cortex adstringens Brazil. 253; creasoton, 270; hippocastanum, 410; ferri et aluminæ sulph. 712; fuligo, 385.)
Discharges from the nose and ear (iodinum, 458, 472.)
Offensive (acid. acet. empyr. 15.)
From the vagina (fuligo, 386.)
Disinfection (chlorin. 188; chlorin. aq. 194; zinci chlorid, 691.)
Districhiasis (collodion, 236.)
Dropsy (acid. hydrocyan. 32; acid. acet. empyr. 15; aur. chlorid. 121; auri et sodii chlorid, 124; auri præparat. 119; ballota lanata, 131; benzoate of ammonia, 19; caincæ radix, 148; chimaphila, 180; chlorin. aq. 194; cimicifuga, 213; colchicum, 229; compressio, 237; electro-punctura, 307; ferr. iodid. 356; hippocastanum, 411; iberis, 716; iodinum, 480; ol. sinapis, 463; ol. tiglii, 563; potassii iodohydrargyras, 594; sumbuli radix, 730; urea, 677; veratria, 684, 686.)
After intermittents (quiniæ sulphas, 623; ferri iodid. 363.)
Of the bursæ (iodin, 465.)
Encysted (acupunct. 58.)
Of the joints (electro-punct. 307.)
Of the ovary (compressio, 237; iodin. 479.)
Of the pericardium (electro-puncture, 307.)
After scarlatina (colchicum, 229; iodin. 464; potassii iodid. 597.)
Drunkenness (sulphuris carburetum, 671.)
Dumbness (galvanism, 392.)
Dyscrasy (ferr. iodid. 356; sulphuris carburetum, 671.)
After intermittents (ferr. cyanur. 347.) See Cachexia.
Dysentery (aq. brocchieri, 89; argenti chloridum, 95; argilla, 100; artemisia, 111; calx chlorinata; 154; chondrus, 211; eau hémastatique de Tisserand, 89; ergota, 323; ferr. cyanur. 347; ferri et aluminæ sulphas, 712; fuligo, 385; nux vomica, 542; paullinia, 570; strychnia, 660.)
Camp (creasotum, 277.)
Chronic (creasotum, 277.)
Putrid (chlorin. aq. 193.)
Dysmenorrhœa (æther, 70; chloroform, 204; ergota, 323; electromagnetism, 300; potassii iodohydrargyras, 594; veratria, 684.)

Dyspepsia (acid. lact. 41; acid. tannic. 41; argil, 102; berberina, 137; carbo animalis, 174; chimaphila, 180; diosma, 294; fel bovinum, 710; ferr. iodid. 354; fuligo, 387; gentiana chirayita, 399; hippocastanum, 410; matias, 505; nux vomica, 542; ol. sinapis, 561; piperina, 574; potassii iodohydrargyras, 593; quiniæ sulphas, 618; salicina, 640; strychnia, 659; sumbul, 730.)
Dysphagia (artemisia, 111.)
Spasmodic (acid. hydrocyan. 32.)
Dyspnœa (galvanism, 392; potass. cyanur. 592.)
Dysuria (acidum benzoicum, 18; apis mellifica, 704; chimaphila, 180.)
Ear affections (cadmii sulphas, 705.)
Middle, affections of the mucous membrane of the (iodinum, 477.)
Pain in the (morphia, 523.)
Eclampsia infantum (artemisia, 111.)
Ectropion (collodion, 236.)
Eczema (auri chlorid. 121; brominum, 144; ferri arsenias, 337; juglans, 494; ol. cadinum, 72; ol. jecoris aselli, 556; sulphur. iodid. 675.)
Effused fluid (electro-magnetism, 302.)
Effusions, rheumatic (electro-magnetism, iv.)
Elephantiasis (ferri arsenias, 337; iodinum, 469; hura Brasiliens. 715.)
Emaciation (chondrus, 211.)
Empyema (iodinum, 480.)
Engorgements, visceral (ferr. iodid. 356.)
Enlargements, glandular, scrofulous (potassii iodohydrargyras, 593.)
Enteralgia (acid. hydrocyan. 32.)
Enteritis (acid. hydrocyan, 31.)
Chronic (monesia, 514.)
Entropion (collodion, 236.)
Ephelis (hydrarg. et arsen. iodid, 431.)
Epilepsy (acid. hydrocyan. 32; acupunct. 57; ammoniated counter-irritants, 250; argenti chloridum, 95; artemisia, 108; compression of arteries, 242; conia, 708; creasoton, 277; ferr. cyanur. 346; galvanism, 393; granatum, 407; indigum, 432; iodinum, 467; magnes. 499; nux vomica, 542; monesia, 515; platinum, 577; Sumbul, 730; strychnia, 660; iodide of zinc and strychnia, 666; zinci valerianas, 700; zinci chlorid. 690; zinci ferrohydrocyanas, 695.)
Epistaxis (argento oxidum, 100; cort. adstring. Brazil. 253; creasoton, 263; ergota, 325; matico, 510; ferri et alumini sulph. 712; monesia, 515.)
Erectile tumours (collodion, 235; electro-punctura, 307; ol. tiglii, 565.)
Erections, nocturnal (lupulina, 718.)
Erethism, morbid (creasotum, 278; potassæ chloras, 582.)
Ergotism, 316.
Erysipelas (argilla, 101; chlorin. aq. 193; colchicum, 229; compressio, 238; creasoton, 270; iodin. 481; ol. jecoris aselli, 596; zinci. chlorid. 692.)
Of the face (cort. adstring. Brazil. 253.)
Erythema, chronic (collodion, 234.)
Eustachian tube, obstructed (injections of air, &c. 437.)
Exanthemata, febrile (chlorin. aq. 192.)
Exanthematous diseases (cort. adstring. Brazil. 253.)
Excitability (acid. tannic. 41.)
Excoriation from lying (creasoton, 266.)
Of the skin (oleum jecoris aselli, 556.)
Syphilitic (aurum metallicum, 129.)
Excrescences, adventitious (iodinum, 485.)
Syphilitic (aurum metallicum, 129.)
Exostosis (fuligo, 385.)
Expectoration, excessive (acidum gallicum, 22.)
Of phthisis (argenti oxidum, 100; iodin. 461.)
Fetid (calx chlorinata, 154.)
Eye, black (calcis chlorid. 156.)
Cancer of the (morphia, 523.)
Diseases of the (cadmii sulphas, 705; iodinum, 458; potass. cyanuret. 59.)

Eye, painful affections of the (morphia, 523)
Strumous ulcerations of the (æther sulphuric. 71.)
Eyelid, inflammation of the (creasoton, 272; ol. jecoris aselli, 553; zinci ferrocyanuret, 696; zinci valerianas, 700.)
Granular (auri chlorid, 121; calx chlorin, 158; iodin, 485; ol. jecoris aselli, 553.)
Perverted states of the (collodion, 236.)
Fainting, hysteric (sulphuris carburetum, 671.)
Fauces, ulcerated, (iodinum, 485.)
Febrile affections (chlorin. aq. 193; colchicum, 227; potass. nitras, 725.)
Diseases (morphia, 520.)
Feigned diseases (æther sulphuricus, 71; chloroform, 204.)
Fetid discharges (aluminæ sales, 76.)
Fever, brain (compression of arteries, 242.)
Congestive (quiniæ sulphas, 621.)
Of Edinburgh (calx chlorinata, 154.)
Gastric (artemisia, 111; chlorin. aq. 193.)
Hectic (acid. hydrocyan. 31; chlorin. aq. 194.)
Intermittent, see intermittent.
Irritative (chlorin. aq. 191.)
Masked (salicina, 640.)
Malignant (quiniæ sulphas, 620.)
Nervous (chlorin. aq. 192.)
Paroxysmal (quiniæ sulphas, 620.)
Pernicious, (quiniæ sulphas, 620.)
Petechial (aq. chlorin. 192.)
Putrid (acid. acet. empyr. 15; chlorin. aq. 192.)
Puerperal (potass. nitras, 725.)
Remittent, see Remittent.
Summer (quiniæ sulphas, 630.)
Typhoid, see Typhoid.
Typhous (sodæ chloridum, 644.)
Yellow (guaco, 409; quin. sulphas, 621.) See Typhus.
Fissures of the anus (acid. tannic. 42, 44; monesia, 515.)
Of the nipple (collodion, 235.)
Of the lips (glycerin, 402.)
Of the skin (creasoton, 266; ol. jecor. aselli, 556.)
Fistulæ (acid. hydrocyan. 33; calcis chlorid. 155; galvanism, 395; ol. jecoris aselli, 559; potass. iodid. 602.)
Fistulous openings (iodinum, 485.)
Flatulence (creasoton, 277; juglans regia, 494; sumbul, 730.)
Fluor albus, see Leucorrhœa.
Fluxes (acid. gallic. 22.)
Fœtor oris (calx chlorin. 154, 161, 162; chlorin. aq. 194; chloroform, 199; creasotum, 279.)
Follicular affections of the skin (collodion, 234.)
Fractures, ununited (acupuncture, 59; iodinum, 485.
Freckles (hydrargyri deutonitras, 428.)
Frost bites (calx chlorin. 157, 163.)
Gangrenous, (zinci chlorid. 692.)
Fungoid disease (chloroform, 198.)
Fungous tumour (creasoton, 268; galvanism, 395; zinci chlorid. 689.)
Fungus of the neck of the uterus (aur. nitrico. muriat. 127.)
Furunculous swellings (aq. chlorin. 192.)
Ganglion (acupunct. 59; hydrarg. iodid. rubr. 423; iodinum, 485.)
Ganglionic system, disorder of the (ferr. cyanur. 348.)
Gangrene (acid. acet. empyr. 14; calcis chlorid. 156; soda chlorinata, 645.)
Hospital (calx chlorin. 154, 156, 163; creasoton, 267.)
Of the lungs (chlorin. 185.)
Of the scrotum (calx chlorin. 156.)
Gangrenous sloughs (monesia, 515.)
Gastralgia (bismuthi valerianas, 704; cinchona, 217; morphiæ acetas, 524; strychnia, 661; zinci iodid. 698)
Gastricism (carbo animalis, 174; mannitum, 504.)
Gastritis (codeia, 222.)
Gastrodynia (acid. hydrocyan. 32; acupunct. 57; argenti oxidum, 99; bismuthi valerianas, 704; creasoton, 276; nux vomica, 542; ol. sinapis, 561.)
Gastromalacia (acid. acet. empyr. 15; chlorin. aq. 193.)
Genital organs, atony of the (cubebæ, 282; cort. adstring. Brazil. 253; nux vomica, 539.)

Genital organs, catarrh of the (cortex adstringens, 253.)
Glanders, chronic (creasoton, 278.)
Glands, enlarged (carbon. sesquiiodid. 177; iodinum, 457, 459; plumbi iodid. 580.
Induration of the (fuligo, 385; hydrarg. deuto-iodid. 422, 424.)
Mammary, enlarged (veratria, 685.)
Meibomian, copious secretion from the (calx chlorin. 158.)
Mesenteric, enlarged (iodinum, 456.)
Of the neck, inflamed (hydrarg. iodid. rubr. 423.)
Scrofulous swellings of the (calx chlorin. 157; chlorin. aq. 194; iodide of chloride of mercury, 492; iodinum, 457, 483.)
Submaxillary, enlarged, (carbo animalis, 175; iodinum, 456.)
Tumefied, strumous (hydrarg. iodid. 419; potassii hydrargyro-iodid. 594.)
Glandular affections (auri chlorid. 121; fuligo, 385; iodinum, 455; veratria, 685.)
Gleet (calx chlorin. 159; creasoton, 269; cubebæ, 284; ergota, 330; nux vomica, 544; potassii iodidum, 599.)
Old (tanninum, 144; strychnia, 661.)
Goître (brominum, 144; calcis chlorin. 164; electro-punctura, 307; hydrarg. deuto-iodid. 423; iodinum, 454, 475; potassii bromid. 586; potass. iodid. 600.)
Scirrhous (carbo animalis, 174, 176; sulphuris carburetum, 671; veratria, 685.)
Gonorrhœa (acidum tannicum, 41; argenti præparat. 93; auri præpar. 118; calcis chlorin. 154, 159, 161, 162; chlorin. aq. 194; colchicum, 229; creasoton, 269; cubebæ, 282; diosma, 295; ergota, 323; ferri iodid. 358; hydrargyri deuto-nitras, 428; iodin. 471; lupulina, 718; matico, 509; platinum, 576; zinci chlorid. 693; zinci iodid. 698.) See blennorrhœa.
Gout (aconit. 49; acupunct. 56; ammon. phosphas, 77; ammoniated counter-irritants, 250; ballota
Gout
lanata, 131; benzoate of ammonia, 226, 231; colchicum, 131; compression of arteries, 242; creasoton, 275; glycerin, 402; hæmospasia, 712; iodinum, 475; magnes. 482; manganesii sulphas, 719; moxa, 531; ol. tiglii, 564; ol. jecinor. aselli, 549; spiritus pyroaceticus, 648; succus limonis, 729; sulphuris carburetum, 670; veratria, 683.)
Atonic (creasotum, 276, 279; hippocastanum, 410.)
Chronic (chimaphila, 180; colchicum, 228; diosma, 294; ol. tiglii, 564; succus limonis, 728.)
Irregular (strychnia, 659.)
Rheumatic (auri chloridum, 121.)
Suppressed (ammoniated counter-irritants, 250.)
Gouty diathesis (acidum benzoicum, 18; veratria, 685.)
Swellings of bones (iodin. 475; ol. jecoris aselli, 558; potass. iodid. 602.)
Of the joints (iodinum, 475.)
Gravel (diosma, 295.)
Gravel, uric acid (ammon. phosphas, 78; sodæ phosphas, 728.)
White (acid. lact. 38.)
Growths, morbid (barii iodidum, 132; electro-magnetism, 302; galvanism, 395.)
Gums, affections of the (chloroform, 199.)
Sponginess of the (acid. tannic. 41, 44.)
Gums, scorbutic ulcerations of the (creasoton, 267, 280; iodin. 476; monesia, 515.)
Gutta rosacea (fuligo, 385; sulph. iodid. 674.)
Hæmatemesis (argent. oxid. 100; creasoton, 265; ergota, 332; matico, 510.)
Hæmatocele (iodinum, 479.)
Hæmaturia (acidum gallicum, 21; creasoton, 265; diosma, 294; ergotæ, 323.)
Hæmoptysis (acidum gallicum, 21; chondrus, 212; aq. Brocchieri, 89; argent. oxid. 100; cort. adstring. Brazil. 253; creasoton, 265; eau hémastatique de Tisserand, 89; ergota, 323; galeopsis, 391; lactucarium, 498;

Hæmoptysis
monesia, 513; plumbi nitras, 723; tannin, 42.)
Hair, thinness of the (glycerin, 402.)
Headach, intermittent (bebeeria, 35; quiniæ sulphas, 632.)
Rheumatic, (creasoton, 276.)
Nervous (strychnia, 659; ammoniated counter-irritants, 250; iodin. 467.) See Cephalalgia.
Hearing, defective, from otorrhœa (cubebæ, 283.)
Heart, diseases of the, (aconitia, 50; veratria, 685.)
Enlargement of the (acid. hydrocyanic. 32.)
Hypertrophy of the (brominum, 144; iodin. 470; potass. bromid. 587; potass. iodid. 599.)
Neuralgia of the (aconitia, 50.)
Spasmodic affections of the. (acid. hydrocyan. 32.)
Hectic fever (acid. hydrocyan. 31; chlorin. aq. 194.)
Helminthiasis (juglans, 494.)
Hemicrania (acid. hydrocyan. 33; æther. sulph. 70; aconit. 51; compression of arteries, 242; ferri subcarb. 377; paullinia, 570; potassii cyanuretum, 592; zinci valerianas, 699.)
Hemiplegia (electro-magnetism, 296; nux vomica, 540; strychnia, 657.)
Rheumatica (electro-magnetismus, iv.)
Hemorrhage (acid. hydrocyan. 31; aq. Binelli, 82; aq. Brocchieri, 89; acid. tannicum, 40, 44; argilla, 101; cort. adstring. Brazil. 253; creasoton, 261; ergota, 323, 332; ferr. iodid. 356; ferri et alumin. sulphas, 712; matico, 507.)
After abortion (creasoton, 265.)
From arteries of the lower limbs (compression of the aorta, 243.)
Active (acid. hydrocyan. 31; ergota, 330.)
Capillary (creasoton. 264; matico, 505.)
From the gums (creasoton, 264.)
Intestinal (aqua Brocchieri, 89; argenti oxyd. 100; creasoton, 265; eau hémastatique de Tisserand, 89; ferri nitras, 363; matico, 509.)
Hemorrhage from leech-bites (creasoton, 263; ferri et aluminæ sulphas, 712; matico, 508.)
From the lungs. See Hæmoptysis.
Passive (acid. gallic. 22.)
Traumatic (creasoton, 265.)
Uterine (acidum gallicum, 21; acid. tannic. 40, 43, 44; cannabis indica, 171; creasoton, 264; argent. oxidum, 99; compression of the aorta, 243; electro-magnetism, 299; ferr. iodid. 355; hæmostasis, 714; matico, 510; monesia, 514; ergota, 322, 332; ferri citras, 343.)
From the vagina, and tongue (matico, 508.)
Hemorrhagic diathesis (acid. tannic. 41; matico, 508.)
Hemorrhoids (acid. tannic. 41, 42; acid. chrom. 701; acid. nitric. 702; cotyledon umbilicus, 707; matico, 509; monesia, 515.)
Hepatic diseases. See Liver Affections.
Hernia humoralis. See Orchitis.
Incarcerated (sulphuris carburetum, 671.)
Reducible (iodinum, 479.)
Herniary sacs (acupunct. 58.)
Herpes (acid. hydrocyan. 33; aqua picea, 89; calcis chlorin. 157; chlorin. aq. 194, 195; creasoton, 271; collodion. 234; ferr. carbur. 339; fuligo, 385; hydrarg. cyanur. 416; hydrarg. deuto-iodid. 423; iodin. 468; juglans, 494; ol. jecinor. aselli, 555; potass. bromid. 587; potass. iodid. 598; sulphur. iodid. 674.)
Circinnatus (ferri tannas, 380.)
Exedens (creasoton, 271; potassii iodidum, 601.)
Phagedenic (arsenic. iodat. 107; potassii iodidum, 603.)
Scrofulosus exedens (hydrargyri deuto-nitras, 428.)
Herpetic ulcers (acid. acet. empyr. 14; creasoton, 267.)
Hiccough, spasmodic (æther, 70; compressio, 243; ferri nitras, 363; magnes. 499; quiniæ sulphas. 624.)
Hip-joint disease (moxa, 534.)
Hoarseness (chondrus, 211; iodic acid, 491; ol. tiglii, 564.)

Hooping-cough (acid. hydrocyan. 31, 35; acid. tannic. 41; æther hydrocyan. 61; æther sulphur. 70; argent. iodid. 98; conia, 707; chloroform, 203; emetia, 312; ferr. carb. 376; iodin. 463; ol. tiglii, 564; veratria, 684.)
Hordeolum (hydrarg. iodid. rubr. 424.)
Hydrarthrosis (electro-punctura, 307; iodinum, 478.)
Hydrocele (acupunct. 58; electro-magnetism, 302; electro-puncture, 307; chlorin. 187; iodinum, 463, 477.)
Hydrocephalus (compressio, 237; electro-punctura, 307; hydrargyri cyanuretum, 416; iodinum, 464.)
Hydrocyanic acid, poisoning by (chlorin. 186; chlorin aq. 190.)
Hydropericardium (electro punctura, 307; iodinum, 479.)
Hydrophobia (æther sulphuric. 69; cannabis indica, 170, 172; chlorin. aq. 194; chloroform, 203; compression of the arteries, 244; guaco, 408; morphiæ acetas, 525.)
Hydrothorax (acid. hydrocyan. 32; colchicum, 229; electro-punct. 307; ferri iodid. 356; iodinum, 463, 479.)
Hygroma (iodinum, 465.)
Hyperæmia (ammoniated counter-irritants, 251.) See Inflammation.
Hyperæsthesia (conia, 706.)
Hyperemesis (acid. tannic. 42.)
Hypertrophy (barii iodidum, 132; compressio, 237; ferr. bromid. 338; ferr. iodid. 356.)
Of the coats of the stomach (sulph. carburet. 671.)
Of the heart (bromidum, 144; digitalina, 292; iberis amara, 716; iodin. 470; potass. bromid. 586; potass. iodid. 599, 600.)
Of the mammæ (iodinum, 456.)
Of the spleen (iodin. 455; quiniæ sulph. 605.)
Of the thymus (iodin. 456.)
Of the uterus (ergota, 325.)
With dropsy (iberis, 716.)
Hypochondriasis (auri præparat. 116; chlorin. 187; quiniæ sulphas, 625; strychnia, 659; veratriæ, 683.)
Hysteralgia (euphorb. ol. 334.)
Hysteria (æther sulphuric. 70; cimicifuga, 213; creasoton, 278; ergota, 324; ferri valerianas, 381; fuligo, 387; granatum, 407; indigum, 434; lactucarium, 498; strychnia, 659; sumbul, 730; veratria, 683; zinci ferrohydrocyanas, 695.)
Hysteric croup (creasoton, 278.)
Fainting (sulphuris carburetum, 672.)
Convulsions (electro-magnetism, 298: indigum, 433.)
Hysterics (ammoniated counter-irritants, 250.)
Ichthyosis (glycerina, 401.)
Impetigo (acid. hydrocyan. 33, 36; arsen. iodid. 107; creasoton, 280; hydrarg. et arsen. iodid. 430; juglans regia, 494; oleum cadinum, 722; ol. jecin. aselli, 556.)
Impotence (cubebæ, 284; diosma, 295: iodinum, 481; nux vomica, 541.)
Incontinence of urine (diosma, 295; ergota, 326; galvanismus, 392; iodin. 468; nux vomica, 539, 541; potassæ nitras, 726.)
Indigestion. See Dyspepsia.
Indurations of the abdomen (arnica, 104.)
Glandular, chronic (carbo animalis, 174; electro-punctura, 307; fuligo, 385; hydrarg. deuto-iodid. 424.)
Of the liver (iodinum, 455.)
Of the mammæ (calendula, 151.)
Of the pancreas (carbo animalis, 175; iodin. 456.)
Of the spleen (iodinum, 455.)
Of the stomach (calendula, 151.)
Of the testes (iodinum, 456.)
Chronic (calendula, 151.)
Of the mammæ (carbo animalis, 175.)
Inflammation (acid. hydrocyan. 31; aconitia, 48; compression of arteries, 238; conia, 707.)
Of the absorbents (iodinum, 482.)
Of the air passages (iodinum, 485.)
Of the bursæ (iodinum, 485.)
Of the bronchia. See Bronchitis.
Chronic (acid. hydrocyan. 31; barii iodidum, 132; iodic acid, 491; ol. croton. 564.)

Inflammation, chronic, of the Eustachian tube (injections into the Eustachian tube, 436.)
Of the lungs and stomach (ol. jecor. aselli, 554.)
Of the cornea (collodion, 236.)
Of the mouth and fauces (chlorin. aq. 196.)
External (compressio, 238.)
Of the heart. See Carditis.
Internal (acid. hydrocyan. 31.)
Of the joints (iodinum, 482.)
Of the liver (chlorin. aq. 194.)
Of the lungs (ammoniated counter-irritants, 250.) See Pneumonia.
Of the mamma (iodinum, 482.)
Of the pleura (ammoniated counter-irritants, 250.)
Scrofulous (iodinum, 488.)
Synovial (compressio, 238.)
Thoracic (acid. hydrocyan. 31.)
Of the trachea (ammoniated counter-irritants, 250.)
Of the vagina (collodion, 235.)
Inflammatory diseases (colchicum, 226; compressio, 238; cort. adstring. Brazil. 253; morphia, 520; ol. sinapis, 561; potass. nitras, 725.)
Insanity (æther sulphuric. 69; chloroform, 203; quiniæ sulphas, 625.)
Integuments, lesions of the (creasoton, 266.)
Intermittent (adansonia digitata, 703; æther, 70; argent. limat. 101; bebeeria, 135; cetrarina, 178; chlorin. aq. 193; chloroform, 199; cinchonia, 217; conia, 707; cubeba, 283; ferr. subcarb. 378; ferrocyanur. 347; gentiana chirayita, 399; hippocastanum, 410; indigum, 432; iodin. 465; matias, 505; narcotina, 537; phloridzina, 572; piperina, 574; quinia, 601; quiniæ arsenias, 606; quiniæ arsenis, 607; quinia, iodide of iodhydrate of, 611; quiniæ lactas, 612; quiniæ murias, 613; quiniæ sulphas, 617, 623, 629; quiniæ valerianas, 634; quiniæ et cinchon. tannas, 636; quiniæ sulphas impurus, 636; resina chinæ præpar. 636; salicina, 638; sanicula marilandica, 726; soda chlorin. 644; strychnia, 661.)
Intertrigo of children (collodion, 234; creasoton, 266.)
Intestines, atony of the (ferri ferrocyanur. 347.)
Ulceration of the (monesia, 514.)
Iodina, 451.
Iodine disease, 451.
Iodine, stain from (potassii cyanuretum, 591.)
Iodism, 451.
Iodkrankheit, 451.
Iodosis, 451.
Iralgia (quiniæ sulphas, 629.)
Iris, adhesion of to the lens (artemisia, 115.)
Iron, sparks of, removed from the eye (iodinum, 485.)
Irritable habits (ferri subcarbonas, 379.)
Ischias (oleum sinapis, 561; veratria, 682.)
Ischuria (apis mellifica, 704; colchicum, 229; sumbul, 730.)
Issues, formation of (zinci chlorid. 690.)
Isthmitis, atonic (chloroform, 198; ferri et aluminæ sulphas, 712.)
Itch (calx chlorin. 157, 163; chlorin. aq. 194, 195; creasoton, 271; fuligo, 385; iodinum, 469; manganesii sulphas, 719; sapo mollis, 641; oleum cadinum, 721; zinci chlorid. 692.)
Inveterate (hydrarg. iodid. rubr. 422; ol. jecor. aselli, 555.)
Itching (aqua amygdalarum concentrata, 81.)
Jaundice (fel bovinum, 709.)
With liver disease (iodinum, 456.)
Joints, inflamed (iodinum, 482.)
Anomalous pains of the (iodinum, 482.)
Chronic inflammation and Enlargement of the (iodinum, 482.)
False (iodinum, 476.)
Rheumatic (iodin. 476; morphia, 521.)
Swelled (ammoniated counter-irritants, 250; chimaphila, 181; calx chlorin. 157, 164; iodinum, 458; veratria, 685.)
Keratitis (collodion, 236.)
Kidneys, diseases of the (diosma, 295.)
Bright's disease of the (acid. gallic. 22.)

Kriebelkrankheit, 317.
Labia pudendi, infiltration of (creasotum, 267.)
Offensive affections of (creasoton, 267.)
Labour, premature, inducing (ergota, 322, 329.)
Tedious (cannabis indica, 172; electro-magnetism, 299.)
Languor (acid. tannic. 41.)
Laryngismus stridulus (æther, 70.)
Larynx, chronic engorgements of the (iodinum, 463.)
Nervous affections of the (conia, 707.)
Spasmodic affections of the (veratria, 684.)
Leech-bites, hemorrhage from (creasoton, 263; matico, 508.)
Lepra (arsen. iodid. 107; auri præparat. 119; carbon. sesqui-iodid. 177; chlorin. 187; ferri arsenias, 337; glycerina, 401; hura Brasiliensis, 715; hyd. et arsen. iodid. 430; iodidum ammonii, 490; naphthalin, 721; sulphur. iodid. 674.)
Leucophlegmatia after intermittent (ferri ferrocyanuretum, 347.)
Leucorrhœa (acidum gallicum, 22; acid.tannicum,41; argent. oxyd. 100; chlorin. aq. 194; colchicum, 229; cort. adstring. Brazil. 253; creasoton, 269; ferri et alumin. sulph. 712; gentiana chirayita, 400; cubebæ, 283; ergota, 323, 330; ferr. iodid. 355, 358; iodinum, 471; juglans regia, 494; liq. ferr. persesquinit. 363; matico, 509; monesia, 514; platin. 576; potassii iodhydrargyras, 594; potassii iodidum, 599; salicina, 640.)
Lichen (ferri arsenias, 337; glycerin. 402; potassii cyanuretum, 592.)
Leproides (ferr. carbur. 340.)
Urticatus (hydrarg. et arsenic. iodid. 431.)
Lipomatous cysts (electro-punctura, 307.)
Lips, chapped (glycerin. 402.)
Lithuria (acidum benzoicum, 18; ammon. phosphas, 78; leucolein, 717; lithiæ carbonas, 717; sodæ phosphas, 728.)
Liver, affections of the (potassæ chloras, 583; berberina, 137; chlorin. 187; iodin. 456.)
Enlarged (iodinum, 456.)
Induration of the (hydrarg. deutoiodid. 424; iodinum, 455, 463.)
Inflammation of the (chlorin. aq. 194.)
Obstruction of the (hydrarg. iodid. 419.)
Tubercles of the (iodinum, 463.)
Lumbago (acupunct. 57; ammoniated counter-irritants, 250, 251; chloroform, 199; emetia, 311; iodin. 475; veratria, 683.)
Lungs, affections of the (cimicifuga, 213; chlorinum, 184.)
Gangrene of the (chlorin. 185.)
And stomach, chronic inflammation of the (ol. jecor. aselli, 554.)
Mucous affections of the (creasotum, 275.)
Ulceration of the (chlorinum, 184; creasotum, 274.)
Lupus (auri chlorid. 121; collodion, 234; ferri arsenias, 337; ferri protocarb. 376; hydrarg. et arsen. iodid. 430; hydrarg. deutoiodid. 425; hydrarg. deuto-nitras, 428; hydrarg. et quiniæ protochlorid. 715; iodin. 469, 483; oleum cadinum, 722; ol. jecoris aselli, 555; zinci chlorid. 690.)
Non exedens (collodion, 234; sulphur. iodid. 674.)
Of the ala nasi (ferr. carb. præc. 377.)
Of the nose (creasoton, 268.)
Luxations (diosma, 295.)
Lymphatic glands, indurated (sulphuris carburetum, 671.)
Lymphatism (ferr. iodid. 355.)
Malignant disease (ferri citras, 343.)
Mammary tumour, chronic (iodinum, 456; potassii iodidum, 602; veratria, 685.)
Mammæ, hypertrophied (iodinum, 456; potassii iodidum, 602.)
Indurated (carbo animalis, 176; iodinum, 456.)
Inflamed (iodinum, 482.)
Painful tumours of the (potass. iodid. 602.)
Mania (cannabis indica, 171.)
Hydrophobic (chloroform, 203.)

Mastitis (collodion, 235; iodinum, 482.)
Measles (chlorin. aq. 193; iodin. 467.)
Melæna (matico, 509.)
Melicerous cysts (electro-punctura, 307.)
Membranes, false (acid. tannic. 41.)
Meningitis, tubercular (iodin. 464.)
Menorrhagia (acidum gallicum, 21; argent. oxid. 100; cannabis indica, 171; cort. adstring. Brazil. 253; electro-magnetism, 299; ferr. cyanur. 347; matico, 509; monesia, 514.)
Mental affections (auri præparat. 116; ol. tiglii, 505.)
Mesenteric glands. See Glands, mesenteric.
Metritis (acid. hydrocyan. 31.)
Metrorrhagia (cort. adstring. Brazil, 253; monesia, 514.) See Hemorrhage, uterine.
Miasmata, destroying (calx chlorin. 157.)
Milzbrandkarbunkel (chlorin. aq. 192; zinci chlorid. 689.)
Mortification, mildew, 316.
Mouth, inflammation of the, chronic (chlorin. aq. 196.)
Offensive conditions of the (calx chlorin. 157.)
Ulcers in the (calx chlorinata, 162.)
Mucous membranes, irritability and tenderness of the (liquor ferri persesquinitrat. 363.)
Inordinate secretion from (chimaphila, 180; ol. sinapis, 561.)
Mutism, paralytic (electro-punctur. 307.)
Mydriasis (ergota, 325.)
Nævi (collodion, 235; creasotum, 273; ol. tiglii, 565; zinci chlorid. 689.)
Necrosis (iodinum, 458; zinci chlorid. 689.)
Nephralgia (chimaphila, 180; chloroform, 203.)
Nephritis (acid. hydrocyan. 31.)
Nervous coughs (tanninum, 41.)
Diseases (acidum hydrocyanicum, 32; ammoniated counter-irritants, 251; auri præparat. 116; cort. adstring. Brazil. 253; creasoton, 277; electro-punctur. 307; ferr. carb. præc. 377; ferr. cyanur. 347; fuligo, 387; galvanism, 395; iodinum, 467; magnes. 499; morphia, 522; morphiæ acetas, 524; ol. sinapis, 561; quiniæ sulphas, 632; sumbul, 730; veratria, 682; zinci ferrohydrocyanas, 695.)
Chronic (acid. hydrocyan. 32; liq. argent. muriat. ammoniat. 96.)
Excitement (lactucarium, 497.)
Neuralgia (acid. hydrocyan. 32, 33; aconitia, 49, 51; acupunctura, 56; æther sulphuric. 70; ammoniated counter-irritants, 252; atropia, 115; chloroform, 199, 203; bebeeria, 135; bismuthi valerianas, 704; cannabis indica, 169; compression of arteries, 242; conia, 706; contra-irritatio, 249; creasoton, 277; delphinia, 289; electro-magnet. 296, 298; electro-punct. 303; ferr. carb. præc. 376; ferr. ferrocyanur. 347; galvanism, 392; glycerin, 402; iodin. 467; magnes. 499; morphia, 521; morphiæ acetas, 524; morphiæ bimeconas, 530; moxa, 534; nux vomica, 542; ol. sinapis, 561; ol. tiglii, 564; potass. cyanur. 590; quiniæ arsenis, 607; strychnia, 659; veratria, 682, 686; zinci ferrohydrocyanur. 696.)
Of the abdomen (codeia, 222.)
Of the arm (strychnia, 659.)
Of the chest (galvanism, 394.)
Faciei (acid. hydrocyan. 33; artemisia, 111; codeia, 222; compression of the arteries, 242; conia, 707; creasotum, 277; ferri ferrocyanur. 347; morphia, 522; nux vomica, 542; potassæ chloras. 583; potassii cyanuretum, 590, 592.) See Tic Douloureux.
Frontal (galvanism, 398; morphia, 522.)
Of the head (cannabis indica, 171.)
Of the heart (aconitia, 50; magnes. 499.)
Of the nervus pudendus superior, (compression of the arteries, 242.)
Obstinate (zinci valerianas, 700.)

Neuralgia of the orbitar nerves (compression of the arteries, 242.)
Pulmonary (magnes. 499.)
Rheumatic (electro-magnetismus, iv.)
Sciatic (morphia, 523; potassii cyanuret. 590.)
Neuralgic tumours (plumbi chlorid. 723.)
Neuropathic diseases (iodinum, 467.)
Neuroses (æther sulphuric. 68; chloroform, 202; electro-magnetism, 297; granatum, 407; ol. tiglii, 564; iodide of zinc and strychnia, 666; zinci chlorid. 690.)
Nipples, excoriated (acid. acet. empyr. 13; acid. tannic. 42; calx chlorin. 156; collodion, 234; creasoton, 266; glycerin, 402; plumbi tannas, 581.)
Nodes, gouty (sulphur. carb. 672.)
Noli me tangere (iodinum, 483; zinci chloridum, 690.)
Noma (chlorin. aq. 194.)
Obstetrics (æther, 70; chloroform, 205.)
Odontalgia (chloroform, 199; ammoniated counter-irritants, 250; conia, 707; ol. sinapis, 561.) See Toothach.
Rheumatic (sulphuris carburetum, 672; ol. croton. 564.)
Odour, offensive (calx chlorin. 157.)
Œdema (creasoton, 272.)
Of the feet (acupunct. 56.)
Meningum (iodin. 465.)
Œsophagus, stricture of the (iodinum, 476; sulphuris carburetum, 671.)
Offensive evacuations, (calx chlorin. 154.)
Oligæmia (ferri iodidum, 356.)
Ophthalmia (acid. hydrocyan. 34; acupunct. 56, 57; æther, 70; argent. oxid. 100; creasoton, 272; ferri et aluminæ sulphas, 712; iodin. 468.)
Catarrhal (calx chlorin. 158, 163; lactucarium, 497.)
Chronic (cadmii sulphas, 705; calx chlorin. 158; iodinum 485; matico, 516; oleum cadinum, 721.)
Egyptian (acid. tannic. 42.)
Ophthalmia, neonatorum (calx chlorin. 158.)
Purulent (calx chlorin. 158; monesia, 515.)
Rheumatic (zinci ferrohydrocyan. 696.)
Scrofulous (auri præparat. 118; auri chlorid. 121; calx chlorin. 163; hydrarg. et arsen. iodid. 431; iodin. 458; oleum jecoris aselli, 553; potass. iodid. 602, 603; quiniæ sulphas, 631; zinci iodid. 698.)
Strumous (bebeeria, 135; creasoton, 272; fuligo, 386; hydrarg. et arsenic. iodid. 431; iodin. 485; juglans, 494; matias, 505; ol. cadinum, 721; potassii iodid. 601; ol. jecor. aselli, 553.)
Tarsi (acid. acet. empyr. 15; creasoton, 272; hydrarg. deutoiodid. 424; zinci ferrohydrocyanas, 696; zinci iodidum, 698.)
Orchitis (chloroform, 199; compressio, 238; iodinum, 485.)
Os uteri, ulcerations of the (collodion, 235; creasotum, 268; iodinum, 489.)
Osteocopi, syphilitic (hydrarg. et arsenic. iodid. 432; iodin. 474; strychnia, 660; strychniæ acetas, 665; zinci ferrocyanur. 696.)
Otalgia (conia, 706; ol. sinapis, 561; ol. tiglii, 564.)
Otorrhœa (cadmii sulphas, 705; creasoton, 265, 273; cubebæ, 283; juglans, 494; oleum cadinum, 721; potassii bromid. 586.)
Otorrhœa, fetid (zinci chlorid. 693.)
Ovaries, degenerated (iodin. 470.)
Dropsy of the (iodin. 470.)
Indurated (iodin. 470.)
Inflammation of the (hydrarg. cyanur. 416.)
Ozæna (calx chlorin. 164; carbo animalis, 175; iodinum, 472.)
Pain, anomalous, of hip and thigh (morphiæ bimeconas, 530.)
Nervous and muscular (ammoniated counter-irritants, 249; moxa, 535.)
Nocturnal, in the bones (hydrarg. et arsen. iodid. 432; iodinum, 474; zinci ferro-hydrocyanas, 696.)

Pain, rheumatic (cainca, 149; diosma, 295.)
Severe (acid. hydrocyan. 33, 34.)
Pains, After (ergota, 332; sulphuris carburetum, 671.)
Erratic (iodinum, 468.)
Palpitations (acidum hydrocyanicum, 32; bismuthi valerianas, 704; creasotum, 278; emetia, 307; magnes. 499; veratria, 685.)
Palsy, see Paralysis.
Pancreas, induration of the (carbo animalis, 175; iodin. 471.)
Pannus, cellular (ol. jecoris aselli, 553.)
Vascular (ol. jecoris aselli, 553.)
Paralysis (acupunct. 57; arnica, 103; brucia, 146; delphinia, 289; galvanism, 392; electro-punct. 303, 307; hæmospasia, 712; iodinum, 467; nux vomica, 539; ol. sinapis, 561; ol. tiglii, 564; sumbul, 730; paullinia, 570; strychnia, 657; veratria, 683; zinci chlorid. 690; zinci ferro-hydrocyanas, 695.)
Of the bladder (diosma, 295; ergota, 326; strychnia, 658.)
Of the rectum (nux vomica, 541.)
Of the upper eyelid (ol. tiglii, 565; strychnia, 657.)
Of the rectum (strychnia, 658.)
Of the tongue (electro-puncture, 304.)
Of the facial nerve (electro-magnetismus, iv.; strychnia, 658.)
Of the portio dura (ammoniated counter-irritants, 252.)
Lead (brucia, 146.)
Partial (electro-magnetism. iv., 296; nux vomica, 541; strychnia, 658; veratria, 683.)
Rheumatic (electro-magnetism. 296.)
Of the forearm (electro-magnetism. iv.)
Succeeding to apoplexy (brucia, 146; nux vomica, 540.)
Paralytic debility (ammoniated counter-irritants, 250.)
Paraplegia (ergota, 325; galvanism, 394; strychnia, 657; strychniæ iodas, 665.)
Parasites (oleum cadinum, 722.)
Paroxysmal diseases (ergota, 325.)
Parturient efforts, defective (cannabis indica, 172; cimicifuga, 214; ergota, 312.)
Pelvic tumours, painful (chloroform, 199.)
Pericarditis (ammoniated counter-irritants, 250.)
Periodical diseases (ergota, 325; quiniæ ferrocyanas, 609; quiniæ sulphas, 620.)
Periostitis (iodinum, 458.)
Periosteum, diseased (iodin. 474.)
Peritonitis from constipation (mannita, 504.)
Phagedæna (chloroform, 198; creasotum, 280; iodinum, 473; zinci chloridum, 689.)
Of the cheek (potassæ chloras, 583.)
Phagedænic tuberculous diseases (arsenic. iodid. 107.)
Phimosis (lupulina, 718.)
Phlebitis (compressio, 238.)
Phlegmasia (compressio, 238; hæmostasis, 714.)
Phlegmon iodinum, 481.)
Phosphatic depositions (acid. lactis, 38.)
Photophobia (conia, 707.)
Phthisis (acid. hydrocyan. 31, 34; acid. acet. empyr. 15; acid. tannic. 41; æther, 71; aq. picea, 89; argilla, 101; calx chlorin. 154; chlorin, 184; chondrus, 211; cimicifuga, 214; creasoton, 273; ferri iodidum, 355; fucus crispus, 211; galeopsis, 390; hæmospasis, 713; iodic acid, 491; lactucarium, 498; iodinum, 459, 462; matias, 505; monesia, 513; ol. tiglii, 564; ol. jecor. aselli, 550, 554; paullinia, 570; potassæ chloras, 583; sumbul, 730; spiritus pyro-aceticus, 647.)
Cough of (codeia, 222.)
Mucosa (galeopsis, 390; iodinum, 462.)
Pituitosa (chimaphila, 180.)
Sweats of (acid. gallic. 22; boletus laricis, 138; acid. tannic. 42; argenti. oxid. 100; galeopsis, 390; iodin. 461.)
Threatened (galeopsis, 390.)
Pica (caincæ radix, 149.)
Pile, bleeding (acidum nitricum, 702.)

Pimples (ammoniated counter-irritants, 250.)
Pitting from smallpox (calx chlorin. 156; collodion, 236; iodin. 466.)
Pityriasis (glycerina, 401; hydrarg. et arsen. iodid. 431; zinci chlorid. 689.)
Placenta prævia (æther sulphuricus, 72.)
Retention of the (ergota, 322.)
Plague (chlorin. aq. 194.)
Prevention of (chlorin. aq. 194.)
Pleuritis, see Inflammation of the Pleura.
Pleurodyne (acupunct. 57.)
Pneumonia (iodine, 462; mannita, 504.)
Chronic (hydrarg. cyanuret. 416.)
Convalescence from (mannit. 504.)
Purulent, infiltration after (moxa, 534.)
Poisoning, by arsenic (ferri oxyd. hydrat. 367.)
By arseniate of copper (ferri oxidum hydratum, 371.)
By hydrocyanic acid (chlorin. aq. 194.)
By opium (electro-magnetism, 302.)
Polypi, cartilaginous (carbo animalis, 174.)
Mucous (carbo animalis, 174.)
Uterine (ergota, 323.)
Porrigo (acid. acet. empyr. 14; carbon. sesqui-iodid. 177; fuligo, 387; iodin. 468; juglans, 494; sulphur. iodid. 674; ol. jecor. aselli, 555; hydrargyri deutonitras, 428; hydrarg. et arsen. iodid. 431; oleum cadinum, 721.) See Tinea.
Decalvans (sulphur. iodid. 674.)
Favosa (creasoton, 272; hydrarg. bromid. 413; iodinum, 468; potassii bromid. 587.)
Scrofulous (auri præparat. 118; monesia, 513.) See Tinea.
Profluvia (aqua Binelli, 84.)
Prolapsus ani (acid. tannic. 41; nux vomica, 541.)
Uteri (electro-magnetism, 302.)
Vaginæ (creasoton, 272.)
Prosopalgia (ol. sinapis, 561; potassæ chloras, 583; veratria, 682; zinci chlorid. 690.)
Prostate, disease of the (diosma, 295.)
Enlargement of the (carbo animalis, 176; iodinum, 456, 474.)
Prostatic discharges (cubeba, 284.)
Prurigo (colchicum, 229; glycerin, 402; zinci chlorid. 692.)
Senilis (aq. amygd. concentrata, 81.)
Pruritus (glycerin, 402; zinci chlorid. 692.)
Pudendi muliebris (calx chlorin, 158.)
Vulvæ (fuligo, 385; potassii cyanuret. 591.)
Psora, see Itch.
Psoriasis (chlorin, 187; creasoton, 271; ferri arsenias, 337; hydrarg. iodid. 419; glycerina, 401; hydrarg. et arsen. iodid. 430; iodidum ammonii, 490; naphthalin, 720; sulphur. iodid. 675.)
Palmaris (fuligokali, 389.)
Pulmonary complaints, chronic (iodinum, 460.)
Pupil, dilatation of the, caused by belladonna (ergota, 325.)
Pustular eruptions (creasoton, 272; iodinum, 474.)
Pustule maligne (zinci chlorid. 689.)
Putrefaction, checking (calx chlorin, 160.)
Putrescency, tendency to (quiniæ et cinchoniæ tannas, 636.)
Pyrosis (argenti oxidum, 99; nux vomica, 542.)
Ranula (iodinum, 483.)
Rectum, catarrh of the (cort. adstring. Brazil. 253.)
Paralyzed (nux vomica, 541.)
Ulcerated (moxa, 534.)
Varicose condition of the (matico, 510.)
Remittent fever (bebeeria, 135; ferr. cyanur. 347; quiniæ sulphas, 621; quiniæ valerianas, 634.)
Retention of urine (ergota, 326.)
Rhagades (ol. jecor. aselli, 556.)
Rheumatic gout (colchicum, 228.)
Rheumatic effusions (electro-magnetismus, iv.)
Pains (cainca, 149; emetia, 311; hydrarg. deuto-iodid. 424.)
Swellings of the joints (iodinum, 476, 485; potassii iodidum, 598; sulphuris carburetum, 671.)

Rheumatism (aconitia, 49; acupunct. 56; ammoniæ phosphas, 77; ammoniated counter-irritants, 250; anthrakokali, 80; ballota lanata, 131; caincæ radix, 149; cannabis indica, 170; chlorin. 187; cimicifuga, 213; colchicum, 226; compressio, 238; compression of arteries, 242; creasoton, 275; delphin. 289; electro-magnetism, 296, 300; electro-punct. 303; ergota, 325; fuligo, 387; galvanism, 392; glycerin, 402; iodinum, 475; magnes. 499; morphiæ acetas, 524; moxa, 534; ol. tiglii, 564; ol. jecinor. aselli, 549; ol. sinapis, 561; ol. tiglii, 565; platinum, 576; potassæ chloras, 583; potass. nitras, 725; potass. cyanur. 590; quiniæ sulphas, 624; sp. pyro-aceticus, 648; succus limonis, 728; sulphuris carburetum, 670; veratria, 683, 685.)
Atonic (creasotum, 278.)
Chronic (aconitia, 51; ammoniæ phosphas, 77, 78; anthrakokali, 80; chimaphila, 180; colchicum, 231; cubebæ, 283; diosma, 294; electro-punctura, 307; fuligo, 385; iodin. 475; morphia, 521; ol. sinapis, 561; potassii cyanuretum, 590; veratria, 683; spiritus pyro-aceticus, 648.)
Rickets (ferr. iodid. 354; fuligo, 385; ol. jecor. aselli, 549, 553.)
Ringworm (ammoniated counter-irritants, 250.)
Roseola (chlorin. aq. 193.)
Rubeolæ (chlorin. aq. 193.)
Rupia (iodinum, 474; hydrargyri et arsenic. iodid. 431.)
Scalp, dryness of the (glycerin, 402.)
St. Vitus's dance (ammoniated counter-irritants, 250; liq. argent. muriat. ammon. 96; artemisia, 111; indigum, 434; nux vomica, 542; zinci chlorid. 690.) See Chorea.
Salivation, mercurial (acid. acet. empyr. 15; calx chlorin. 157.)
Mercurial (creasotum, 265; iodinum, 476; potassæ chloras, 584.)
Profuse (auri præparat. 116; ferri et aluminæ sulphas, 712.)
Sarcomatous tumour of the knee (bromin. 144.)
Scabies (acid. acet. empyr. 15; chlorin. 187.)
Scalds (iodinum, 484.) See Itch.
Scarlatina (acid. acet. empyr. 15; calx chlorin. 157; chlorin. aq. 192, 195; colchicum, 229; iodin. 467; potassæ chloras, 584.)
Sciatica (acupunct. 57; cannabis indica, 170; ammoniated counter-irritants, 252; codeia, 222; iodin. 475; electro-magnetism, 296; morphia, 521; potass. cyanur. 590.)
Gouty (acid. hydrocyan. 33.)
Rheumatic (acid. hydrocyan. 33.)
Scirrhus (auri præpar. 119; calendula, 151; ferr. iodid. 354; iodinum, 470; platinum, 576; potass. iodid. 598.)
Of the lips (carbo animalis, 174.)
Of the mammæ (calendula, 151; carbo animalis, 275; ferri iodid. 354; iodin. 470.)
Of the prostate (carbo animalis, 175.)
Of the pylorus (acid. hydrocyan. 33; auri præparat. 119; iodin. 471; zinci ferrohydrocyanur. 696.)
Of the stomach (artemisia, 111; iodin. 471; platinum, 576.)
Of the tongue (auri præparat. 119.)
Of the uterus (acid. hydrocyan. 33; auri præpar. 119; iodin. 470.)
Scorbutus (acid. acet. empyr. 15; iodin. 476; monesia, 514; ol. cadinum, 721.)
Scrofula (acid. pyrolign. 15; anthrakokali, 80; auri cyanur. 125; auri præpar. 118; barii iodidum, 132; brominum, 144; carbo animalis, 175; chimaphila, 181; chlorin. 187; chondrus, 211; ferr. bromid. 338; ferr. cyanur. 347; ferr. iodid. 355; fucus crispus, 211; hydrarg. iodid. 419; hydrarg. iodid. rubr. 422; iodinum, 457; iodic acid, 491; oleum cadinum, 721; juglans regia, 494; monesia, 515; ol. jecoris aselli, 549; potassii bromid. 586; potass. iodid. 600.)

Scrofulous affections (acid. acet. empyr. 15; auri et sodii chlorid. 124; carbon. sesquiiodid. 177; ferri iodid. 354; juglans, 493; soda chlorin. 645; sodæ hyposulphis, 727.
Caries (creasotum, 280.)
Diathesis (carbo animalis, 174.)
Discharges from the nose and ear (iodinum, 178.)
Diseases (barium iodatum, 133.)
Habit (auri et sodii chlorid. 123; ferr. cyanur. 347.)
Inflammation (iodin. 459.)
Swellings (barii iodidum, 133; brominum, 144; calx chlorin. 154; carbo animalis, 175; chlorin. aq. 194; conia, 707; iodid. quiniæ, 611; iodinum, 458, 483; potassii bromidum, 588; plumbi iodid. 580, 586; potassii iodhydrargyras, 594; veratria, 685.)
Of the glands (calx chlorin. 157; iodinum, 102; potassii iodhydrargyras, 594; potassii iodidum, 600; quiniæ hydriodas, 610; veratria, 685.)
Of the joints (calx chlorin. 164.)
Tumefaction of the testicle (potassii bromidum, 586.)
Tumefaction of the upper lip (aur. et sod. chlorid. 123.)
Ulcers (potass. iodid. 601; hyd. et arsen. iodid. 430; juglans regia, 494; monesia, 515; zinci chlorid. 689, 692.)
Scurvy (creasoton, 267.) See Scorbutus.
Sea sickness (creasoton, 276.)
Sebiparous organs, affections of the (collodion, 234.)
Secretion, undue (argenti oxidum, 99.)
Sensibility, unusual, of the abdodomen(zinci ferrohydrocyanas, 696.)
Serous cysts (electro-punctura, 307; iodinum, 478.)
Serpents, bites of (caincæ radix, 149; guaco, 408; iodin. 485.)
Serpigo (potass. iodid. 600.)
Sibbens (hydrarg. et arsen. iodid. 431.)
Skin, irritation of the (glycerin, 402.)
Sleeplessness (lactucarium, 498; magnetism, animal, 499; morphiæ bimeconas, 530.)
Sloughing of cellular membrane (acid. acet. empyreum. 16; iodin. 482.)
Of the female organs (calx chlorinata, 156.)
Gangrenous (monesia, 515.)
Ulcers (calx chlorin. 155.)
Small pox, pitting from (calx chlorin. 156; chlorin. aq. 193; iodin, 466.)
Sore mouth, nurses' (iodin. 476.)
Sore throat (ammoniated counter-irritants, 250; hæmospasia, 713.)
Phagedenic (iodin. 474.)
Mercurial (zinci chlorid. 692; creasotum, 269.)
Ulcerated (chloroform, 198.)
Sores, bed (collodion, 236; plumbi tannas, 581.)
Sloughing, gangrenous (acidum pyrolign. 14; iodinum, 484.)
Syphilitic (hyd. deuto-iodid. 423.)
Spasmodic diseases (acid. hydrocyan. 32; acupunct. 56; cannabis indica, 170; colchicum, 229; conia, 707; indigum, 432; magnes, 499; zinci ferrohydrocyanas, 695.)
Erethism (creasoton, 278.)
Spasms (acupunct. 57; ammoniated counter-irritants, 250; magnes, 499.)
Of the muscles of the face (electro-magnetismus, iv.)
Specks of the cornea (fuligo, 386.)
Spermatorrhœa (compressio, 241; cubeba, 284; ergota, 324; nux vomica, 541; lupulina, 718.)
Sphacelus (acid. acet. empyr. 14.)
Spina bifida (iodinum, 479.)
Ventosa (ol. jecor. aselli, 552.)
Spine, diseases of the (iodinum, 485.)
Spleen, diseases of the (potass. bromid. 587.)
Engorgement of the (quiniæ sulphas, 605, 623.)
Enlarged (ferri subcarb. 378; hydrarg. deuto-iodid. 424; iodin. 456; potassii hydrargyro-iodid. 594.)
Indurated (iodinum, 455.)

Sprains (creasoton, 266; galvanism, 392; glycerin. 402; electro-punctura, 304.
Violent (ammoniated counter-irritants, 250.)
Staubasthma (acid. hydrocyan. 32.)
Steatomatous cysts (electro-punctura, 307.)
Stiffness (glycerina, 402.)
Stings of wasps (iodinum, 485.)
Stomacace (iodinum, 476.)
Stomach, coats of the, hypertrophy of the (sulph. carbur. 671.)
Induration of the (calendula, 151.)
Irritability of the (argenti oxidum, 99; nux vomica, 542; sp. pyroacet. 618.)
Irritation of (codeia, 222.)
Neuropathic disorders of (acid. hydrocyan. 32.)
Scirrhus of the (artemisia, 111; iodin. 471.)
Spasms of the (sumbul, 730.)
Stomatitis (monesia, 515; potassæ chloras, 583.)
Strangulation, internal (strychnia, 661.)
Strangury (apis mellifica, 703.)
Stricture of the Eustachian tube (catheterism for, 437.)
Of the œsophagus (iodin. 476.)
Of the urethra (iodin. 471; lupulina, 718.)
Spasmodic, of the urethra (diosma, 295.)
Strophulus (glycerina, 402.)
Struma varicosa (carbo animalis, 175.)
Strumous habits (chimaphila, 181; ferri citras, 343; ferri subcarbonas, 378.)
In children (ferri ferrocyanuretum, 347.)
Suffocation, sense of, (acid. hydrocyan. 32.)
Suppuration, profuse (creasoton, 265; sumbul, 730.)
Surgical operations (æther sulphuric. 66; chloroform, 204.)
Sweating, profuse (acidum gallicum, 22; acid. tannic. 42; argent. oxyd. 100; boletus laricis, 138; ferri et alumin. sulphas, 712.)
[illegible]rg. et arsen. iodid. 431.)
Synovial cysts (electro-punctura, 307.)
Syphilide, tuberculous (auri chlorid. 121.)
Syphilis (argenti præparat. 94; arg. et ammon. chlorid. 96; arg. oxidum, 99; auri cyanur. 125; auri chlorid. 121; auri præparat. 116; aurum muriat. 121; chlorin. 187; hydrarg. bromid. 412; hydrarg. cyanur. 415; hydrarg. deuto-bromid. 413; hydrarg. deuto-iodid. 423; hydrarg. proto-nitras, 427; hydrarg. et arsen. iodid. 431; iodic acid, 491; manganesii sulphas, 719; platinum, 576; potassæ chloras, 583.)
Consequences of (ferri iodidum, 355.)
Of children (hydrarg. iodid. 419.)
Secondary (ferr. iodid. 354; hydrarg. et arsenic. iodid. 431; iodinum, 472; potassii bromidum, 587.)
Tertiary (iodin. 473, 487; potassii bromidum, 587; potass. iodid. 597.)
With scrofula (potass. iodid. 599; hydrarg. iodid. rubr. 422; sapo mollis, 642.)
Syphilitic affections (potassæ chloras, 583.)
Eruptions (arsen. iodid. 107; ferr. carb. 339; hyd. et arsen. iodid. 430.)
Excoriations (aurum metallicum, 129.)
Excrescences (aurum metallicum, 129; platinum, 576.)
Osteocopi (hydrarg. et arsenic. iodid. 432; strychnia, 660.)
Sore throat (hyd. deuto-iodid. 423.)
Swellings of the bones (potass. iodid. 602.)
Tubercles (iodin. 473.)
Ulcers (auri nitro-murias, 129, creasotum, 269.)
Tabes mesenterica (ferr. iodid. 354.)
Tænia (acid. hydrocyan. 34; brayera anthelmintica, 139; colchicum, 229; creasoton, 277; euphorb. ol. 334; filix mas, 382; granatum, 407; ol. croton. 563.)
Tarsi, inflamed, chronic (creasoton, 272.)

Tartar of the teeth (acidum tannicum, 44; calx chlorin. 157.)
Teeth, affections of the (chloroform, 199.)
Caries of the (calx chlorin. 157; creasotum, 279; monesia, 515; piscidia erythrina, 722.)
Stopping for (collodion, 236.)
Tenesmus (morphia, 523.)
Testes, enlarged (iodinum, 456; potass. iodid. 601.)
Scrofulous swelling of the (potassii bromid. 586.)
Tetanus (acid. hydrocyan. 32; acupuncture, 57; æther sulphuric. 69; ammoniated counter-irritants, 250; cannabis indica, 169, 172; chloroform, 203; colchicum, 229; galvanismus, 395.)
Traumatic (cannabis indica, 169; morphiæ acetas, 525; quiniæ sulphas, 624; strychnia, 659.)
Tetter (iodinum, 468.) See Herpes.
Humid (hydrarg. cyanuret. 416.)
Thoracic inflammation (hydrargyri cyanur. 416.)
Throat diseases (zinci chlorid. 692.)
Relaxation of the (acid. tannic. 41.)
Thymus, hypertrophied (iodin. 456.)
Thyroid gland, swelled (iodinum, 458.)
Tic douloureux (acid. hydrocyan. 33; aconitia, 49; ammoniated counter-irritants, 250; delphinia, 289; galvanism, 394; strychnia, 659; veratria, 682, 687; zinci valerianas, 699.) See Neuralgia.
Tinea (calx chlorin. 158, 164; chlorin. aq. 194, 195; fuligo, 385; iodid. sulph. 674.) See Porrigo.
Tinnitus aurium (electro-magnetism, 299.)
Tone, general, deficient (ferri citras, 343.)
Tongue, induration of the (auri præparat, 119.)
Malignant ulcers of the (iodinum, 483.)
Paralysis of the (electro-puncture, 304.)
Tonsils, enlarged (iodinum, 456, 483; zinci iodid. 108.)
Malignant ulcers of the (iodinum, 485.)
Toothach (acid. hydrocyan. 33; acid. acet. empyr. 14; acid. tannic. 42; acupunct. 57; collodion, 236; creasoton, 273; liq. ferr. persesquinit. 363; magnes. 500; morphia, 522; oleum cadinum, 721; piscidia erythrina, 722; zinci chlorid. 692.)
Rheumatic (creasoton, 273; ergota, 325; sulph. carbur. 673.)
Tophi, gouty (acidum benzoicum, 18; iodinum, 475.)
Tormina (artemisia, 111.)
Torpor in children (ferri ferrocyanur. 347.)
Tremors (magnes. 499; strychnia, 658.)
From mercury (electro-punct. 303.)
Trichiasis (collodion, 236.)
Trismus (acupuncture, 57; ammoniated counter-irritants, 250.)
Tubercles (iodinum, 450; ol. jecor. aselli, 554.)
Of the lungs (chlorin. 184; conia, 707; iodinum, 459.)
Mesenteric (iodinum, 459.)
Softening of (moxa, 534.)
Syphilitic (iodin. 473.)
Tuberculous eruptions (brominum, 144.)
Tumefactions, indolent (electropunctura, 307.)
Tumours of the bones (auri præparat. 119.)
Erectile (ol. tiglii, 565.)
Hemorrhoidal (acid. tannic. 41.)
Indolent (plumbi iodid. 580.)
Of the mammæ (ol. jecor. aselli, 556.)
Scrofulous (iodid. quiniæ, 610; iodinum, 483; veratria, 685.)
Vascular (acid. nitric. 702.)
Typhoid fever (aq. chlor. 192; iodinum, 465; quiniæ sulph. 622.)
Typhus (calx chlorin. 154; chloroform, 203; codeia, 223; chlorin. aq. 193; iodin. 465; potassæ chloras, 583; quiniæ et cinchoniæ tannas, 635; sodæ chloridum, 644; sumbul, 730.)
Abdominalis (chlorin. aq. 193.)
Bilious (calx chlorin. 154.)
Convalescence from (sumbul, 730.)
Ulceration of the mouth (calx chlorin. 155.)

Ulceration of the rectum (moxa, 534.)
Ulcerative process (iodinum, 481.)
Ulcers (acid. acet. empyr. 16; calx chlorin. 155; chlorin. aq. 194; collodion, 234; cortex adstringens, 254; creasoton, 266; iodinum, 484; matico, 507; monesia, 515; ol. jecor. aselli, 559; soda chlorin. 645.)
Atonic (creasoton, 266; ferri iodid. 355; iodinum, 481; ol. jecoris aselli, 553; sulph. iodid. 675; zinci chloridum, 688.)
Ulcers, cancerous (acid. tannic. 42; calx chlorin. 155; carbo animalis, 175; creasotum, 266; calendula, 151; chlorin. aq. 195; fel bovinum, 708; ferr. subcarb. 376; hydrarg. deuto-iodid. 423; hydrargyri deuto-nitras, 428; potassii iodid. 601; zinci chlorid. 689.)
Of the face (creasoton, 268; plumbi chlorid. 722; fel bovinum, 709; soda chlorin. 645.)
Carious (creasoton, 266.)
Erosive (zinci chlorid. 689.)
Fistulous (creasoton, 266.)
Flabby (acid. acet. empyr. 14; chlorin. aq. 194; ferri et alumin. sulph. 712.)
Foul (acid. acet. empyr. 16; aluminæ sales, 76; carbon. trichlorid. 706; ferri et alumin. sulph. 712; fuligo, 388; zinci chlorid. 689.)
Fungous (acid. acet. empyr. 14; creasotum, 268.)
Gangrenous (calx chlorin. 154; creasoton, 267.)
Herpetic, &c. (acid. acet. empyr. 14; calx chlorin. 155; creasoton, 268; fuligo, 388.)
Ill-conditioned (ferri ferrocyanur. 348.)
Indolent (creasoton, 266; platin. 577.)
Irritable (argent. oxid. 100; iodin. 484.
Interciliary (ol. jecoris aselli, 553.)
Malignant (conia, 707; creasoton, 267; iodinum, 484; monesia, 515; zinci chlorid. 689.)
Obstinate (creasotum, 266; plumbi iodid. 580.)
Ulcers of the mouth, after salivation (calx chlorin. 162; hydrarg. iodid. rubr. 423; iodin. 481; potassæ chloras, 583; soda chlorinata, 645.)
Offensive (chlorini aqua, 194.)
Old (iodinum, 484.)
Phagedenic (calx chlorin. 155; creasotum, 280; hydrargyri iodidum, 420; monesia, 515; zinci chlorid. 689.)
Psoric (fuligo, 388.)
Putrid (chlorini aqua, 194.)
Sanious (creasoton, 266.)
Scorbutic (creasoton, 267.)
Scrofulo-venereal (hydrargyri iodidum rubrum, 422.)
Scrofulous (brominum, 144; calx chlorin. 155; creasoton, 266; hyd. et arsen. iodid. 430; hydrarg. iodid. 419, 421; hydrarg. iodid. rubr. 423; juglans regia, 494; iodinum, 488; monesia, 515; zinci chlorid, 688.)
Serpiginous (monesia, 515.)
Sinuous (zinci chlorid. 688.)
Sloughing (acid. acet. empyr. 14; chloroform, 199; creasoton, 267; zinci chloridum, 689.)
Sloughing, from lying (plumb. tannas. 581.)
Specific (brominum, 144.)
Superficial (creasotum, 266.)
Syphilitic (argent. præpar. 93; aurum metallicum. 129; brominum, 144; calx chlorin. 155; creasoton, 266, 269; ferr. iodid. 354; fuligo, 388; galvanismus, 396; hydrarg. cyanuret. 416; hydrarg. iodid. 419; hydrarg. iodid. rubr. 423, 426; iodinum, 473; iodide of chloride of mercury, 492; monesia, 515.)
Syphilitic, old (zinci chlorid. 689.)
Torpid, foul, &c. (calx chlorin. 155; ferr. cyanur. 348.)
Varicose (creasoton, 266.)
Ulceration of os uteri (collodion, 235; hydrargyri deuto-nitras, 428; iodin. 471.)
Urethra, diseases of the (diosma, 295.)
Inflamed (iodin. 485.)
Mucous membrane of the, tumefied (carb. anim. 176.)
Urethritis (cubeba, 284; ergota, 331.)

Uric acid calculus (ammoniæ phosphas, 77; sodæ phosphas, 728.)
Diathesis (acidum benzoicum, 18.)
Urinary organs, diseased (cainca, 148; chimaphila, 180.)
Urine, incontinence of (diosma, 295; ergota, 326; iodin. 468; potass. nitras, 726; sumbul, 730.)
Retention of (apis mellifica, 704; ergota, 326; strychnia, 660.)
Urticaria (cort. adstring. Brazil. 253; ferri nitras, 363.)
Uterine contractions, excitant of the, 322, 329.
Irritation, (chloroform, 198.)
Uterus, cancer of the (cortex adstringens, 254; ferr. subcarb. 376.)
Diseases of the (argenti oxidum, 99; hydrarg. et arsen. iodid. 431.)
Engorgement of the (ergota, 330.)
Hard tumours of the (iodidum, 470.)
Hypertrophy of the (ergota, 325; ferri bromidum, 338.)
Induration of the glands of the, (calendula, 151.)
Inertia of the (ergotin, 332, 333.)
Neck of the, fungus of the (aur. nitricomuriat. 127.)
Neuralgia of the (chloroform, 198.)
Pain of the (acid. hydrocyan. 32.)
Spasmodic pains of the (acid. hydrocyan. 32.)
Ulcerated (iodin. 471.)
Uvula, relaxed (ferri et aluminæ sulphas, 712.)
Vagina, discharges of blood from the, 509.)
Inflammation of the (collodion, 235; fuligo, 386; monesia, 514; zinci chlorid. 691.)
Fetid discharges from the (aluminæ sales, 76.)
Vaginitis (cubeba, 284; ergota, 331.)
Varicose condition of the rectum (matico, 510.)
Varicose veins (acupunct. 58; electro-punctura, 307.)
Variola, see Small-pox.
Venereal, see Syphilitic.
Infection, prevention of (chlorin. aq. 194.)
Vomica (chlorinum, 184.)
Vomiting (acid. hydrocyan. 33; aq. picea, 91; argilla, 102; creasoton, 276; strychnia, 650; sumbul, 730.)
Chronic (artemisia, 111; calendula, 151.)
Obstinate (calendula, 151; chloroform, 198.)
Of infancy (argilla, 102.)
Of pregnancy (creasotum, 276; nux vomica, 542.)
Wakefulness (bimeconate of morphia, 530.)
Warts, malignant (iodinum, 485.)
White swelling (chimaphila, 181; iodinum, 458; ol. jecor. aselli, 555; potassii cyanuret. 590; potassii iodidum, 601.)
White tissues, thickening of the (ammoniæ phosphas, 77.)
Whitlow (iodinum, 483.)
Womb, inertia of the (ergotin, 332, 333.)
Worms (caincæ radix, 149; corylus rostrata, 255; ferri et alumin. sulphas, 712; filix mas, 382; granatum, 407; juglans, 494; ol. tiglii, 563; zinci ferrohydrocyanas, 695.)
Wounds (calx chlorin. 156.)
Contused (calx chlorin. 156; diosma, 295; iodinum, 483.)
From dissection (calx chlor. 155; iodinum, 483, 485.)
From gunpowder (calx chlorin. 156.)
Lacerated (iodinum, 483; calx chlorin. 156.)
Painful (acid. hydrocyan. 33.)
Poisoned (argilla, 101.)
Punctured (iodinum, 483.)
Zymotic diseases (chlorinum, 188.)

THE END.

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