THE

AMERICAN JOURNAL OF PHARMACY,

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

JOSEPH CARSON, M.D.
Professor of Materia Medica in the Philadelphia College of Pharmacy,

AND

ROBERT BRIDGES, M.D.
Professor of Chemistry in the Philadelphia College of Pharmacy.

NEW SERIES, VOL. VIII.

PHILADELPHIA:
MERRIHEW AND THOMPSON, PRINTERS.
No. 7 Carter's Alley.
.....
1843.

CONTENTS.

No. I.

MISCELLANY.

No. II.

MISCELLANY.

No. III.

MISCELLANY.

No. IV.

MISCELLANY.

THE
AMERICAN JOURNAL
OF
PHARMACY.

APRIL, 1842.

ART. I—INTRODUCTORY LECTURE DELIVERED AT THE COLLEGE OF PHARMACY, NOVEMBER 4, 1841. By William R. Fisher, M. D., Professor of General and Pharmaceutic Chemistry.

Gentlemen,—The relative positions which we occupy on the present occasion,—yourselves as seekers after knowledge, and he who addresses you as placed here to impart it,—demand a cautious and deliberate consideration; and invite on the part of either, a respectful esteem and sincere confidence from each toward the other. It is an occasion possessing high interest for both parties. It is a period towards which you have looked for some time as pregnant with certain benefits; as abounding with valuable information; as the attainment of such a position in the course of your studies, as promises, with a faithful attention and assiduous industry, to yield an earnest of your future usefulness and prosperity. To some of you the termination of the present course bears prospects of the successful conclusion of your studies, and the commencement of an honorable career as proficients in your profession; while others there are who now enter, for the first time, these walls, in search of those truths of which the more advanced are already partly in possession. Eager for the achievement and zealous in the pursuit, the occasion possesses no less interest for the less than for the more advanced student; though feelings and motives of a somewhat different character are experienced by both. In both, however, the feelings are generous and commendable; the motives praiseworthy and noble; your ambition such as becomes you; and your condition full of interest and sympathy. Confiding in the wisdom and experience of those to whom the duty of providing you instructors is committed, you assemble at their call to listen to the accents, and follow the counsels; to regard the advice and drink in the instruction of one almost an entire stranger, whose opportunities for presenting any evidence of his claims to such confidence have been few; and whose whole title to your attention, as yet, rests upon your regard for the opinions of your elders. If such be your feelings and position, and a candid self-examination is appealed to for the accuracy of the portraiture, are we not justified in regarding the occasion as filled with interest for you in its hopes and prospects, its trusts and responsibilities? But, serious as are your reflections, and anxious as your hopes, no less are those which press upon the future conductor of your journey—upon him to whom so much of your welfare is committed. But a few short years have elapsed since he occupied the very ground which you now occupy, and listened to those principles, which it has now become his duty to teach. The partiality of those from whom he receives his commission has elevated him to this responsible station, and invested him with a power fraught with evil or good, as he may employ it. The highest confidence has been placed in his attainments and character; and the reputation of the College, to say nothing of his own reputation, is placed at stake, to be almost irretrievably blasted should he fail to discharge, as in duty bound, the obligations which he is under to it, to its representatives, and to you. Coming, then, before you for the first time in his new obligations to you and the College, deeply impressed with the value of the trust which has been put in him, subjected to the scrutiny and comparison which invariably attend the inauguration of a new teacher, and entertaining no exalted estimate of his his attainments, can he be otherwise than sensibly affected by the peculiarity of his position, and the arrival of that period which is to witness his induction into this chair as the Professor of Chemistry in the Philadelphia College of Pharmacy—a chair to which he succeeds under circumstances peculiarly trying to one almost a novice? He is about to be placed in direct apposition with predecessors eminent for their attainments; distinguished for their intellectual endowments. Comparisons are to be instituted between their professional abilities and his own; and the experience of many years will be brought into competition with the brief practice of a beginner.

A successor is now about to take the place which has been occupied by those who have been called away to vaster fields of labor; whose merits and established character have been rewarded by those distinctions and preferments which their services most justly have deserved, and who are now classed among the worthies of our land, in the front rank of professional eminence. Names, whose invariable association recall to our recollection the valued services which they have rendered to Pharmacy, and especially to this school, decorate the chair into which an untried occupant is this day about to take his seat.* Possessing the least sensibility, should he not hesitate at the threshold, ponder deeply the responsibility, and make the first entrance with sincere diffidence as to the result? Can such an occasion be then destitute of interest, or regarded as a mere ordinary assemblage for a public discourse? Sensible of all these momentous responsibilities, and the relation in which he stands to the College, to you, and those who have preceded him; feeling that on all accounts he is bound to see that no retrograde movement shall ensue in any matter committed to his charge, the new incumbent assumes the chair with his best exertions pledged to prosecute the undertaking with which he has been entrusted by the partiality of the officers of the College. His own early professional character, identified in some measure with that of the College as one of her alumni; his future professional rank depending upon the fidelity and ability with which he shall discharge his duty to you; his personal relation with, and the high estimation in which he holds the reputation of his predecessors, all concur to stimulate his

---

*Professor Wood, University of Pennsylvania; Professor Bache, Jefferson Medical College.

every effort to maintain the character and advance the interests of every class committed to his charge.

The length to which these personal remarks have been extended, by an anxious desire to expose the unaffected diffidence with which the assumption of this chair is attended, has, in some measure, directed your attention from an exposition of the plan of the course intended to be pursued. Without any assumption of originality in method or arrangement, it may fairly be allowed to every teacher of Chemistry to arrange his subjects in a manner peculiar to himself, according to his best judgment; and this, too, without any imputation against the propriety of the arrangement of others. There are, perhaps, no two minds in which the great system is seen in precisely the same point of view; and hence follows the difference in the mode in which its outline would be presented by each to others. Equally differing are the values which various teachers would place upon the same portions of the science; and hence it is that equal prominence is not given by all to the same subjects. Of the propriety and estimate which is to be placed upon each arrangement, and the confidence to which the selection of prominent topics is entitled, the results must determine. The time allotted for developing the truths of chemical science is by far too brief to enable the lecturer, concise and perspicuous as he may be, to introduce to the notice and attentive regard of his class all that is embraced within these terms. He is, therefore, compelled to make such a selection of topics as the period assigned will embrace, and to which a proper degree of attention may be paid. Although in certain respects all must agree, in regard to what may be deemed fundamental principles, which must, by all means, be included in any arrangement, yet, in descriptive Chemistry, some latitude is allowed for the exercise of individual judgment; and, hence it is, that teachers will differ in regard to the selection of topics toward which the mind of the student is to be directed, and upon which the attention is invited to dwell. Various motives must exist, in directing the judgment of the professor to the one hand or the other, as he enters upon the vast field from which his harvest is to be gathered; and he may, perhaps, himself be insensible to the exact amount of influence which each may exert. But, be the value of other motives what they may, to none should be awarded so much deference and influence as a steady regard to the purpose to which the information, when acquired, is destined to be applied. When the length of the course will admit, too full and comprehensive an arrangement cannot be made; but limited as we are here in all the institutions in which the science is taught, it is impossible to include every thing which the science of Chemistry embraces.

Therefore it is, that a necessity for a selection of topics exists, and that we are compelled to divide and classify our science, as its disciples we are in pursuit of its truths, for one purpose or another. Hence it is, that we have "Chemistry applied to the Arts," "Agricultural Chemistry," "Organic Chemistry," "Pharmaceutic Chemistry," and we doubtless soon shall have "Physiological Chemistry," to judge from the valuable contributions to the science of life which have of late years resulted from industrious chemical research.

It is within one of these departments that our selections are confined; for, by the establishment of this chair, its duties are especially directed to Pharmaceutic Chemistry. General and Pharmaceutic Chemistry is the title by which the professorship is designated, indicating a wise provision on the part of its founders that the peculiar interests of those attending upon its lectures shall be constantly regarded. Thus, far, then, the judgment of the Professor is guided in his selections and arrangements; but there is yet need for the exercise of his discretion in calling from the extended field of Pharmaceutic Chemistry, subjects possessing the most value for the student of Pharmacy. Herein may be expected that difference of opinion to which reference has already been made, and wherein consists the contrast between different teachers, all exercising their best judgment, guided by the best lights within their reach. It is for the results depending upon this exercise of judgment, that they are answerable to the public, and by which they will be judged by those who have opportunity and ability to reflect upon and examine their selection.

It will not be deemed a mere aspiring to originality and peculiarity, then, if the present course should differ in some respects from those which have preceded it; nor can it be hoped that much, if any, room be afforded for improvement upon former methods. The servile imitation of a contemporary, I feel assured, would not be expected or approved by any candid mind, and a sketch of the course with which it is designed that our time, during the approaching season, shall be occupied, is therefore submitted, with diffidence and deference, for the opinions of those who are competent and disposed to examine it. It is the result of cool and anxious reflection, aided by no trifling experience in the duties, wants, and resources of the apothecary, and a determination, so far as ability allows, to assist these duties, supply these wants, and develope these resources; presenting to the young student of Pharmaceutic Chemistry as complete and comprehensive a view of that branch of General Chemistry as the experience, resources or industry of his teacher can supply. If, upon comparison with other systems, it should be found that they coincide in many respects, the coincidence of independent judgments should be regarded as confirming the correctness of each; if, on the other hand, some difference of method be found to exist, it is to be hoped that it has arisen after a conscientious examination of the subject; is capable of being sustained by sound argument, or of reconciliation after further reflection. The assertion is reiterated in all honesty, that nothing has been introduced, withheld, or altered for the mere sake of novelty. That it will meet universal approbation cannot be looked for; that further experience will suggest modifications may most surely be anticipated; that every effort shall be made to render it perfect, is here solemnly pledged.

By the title of the chair already announced, you are led to expect a course of lectures on General and Pharmaceutic Chemistry; and it is to a cursory sketch of the plan to be pursued that your attention is now invited. General Chemistry may be defined to be the whole science embracing every principle, and every detail which may be connected with the chemical properties of matter, organic or inorganic; the relations of its ultimate elements; the mutual action or reaction of them, the effect of their new combinations; and the study of the laws according to which the imponderable agents manifest their influence and exert their power.

This definition gives an increased sphere to the operations, and a vast limit to the extent of General Chemistry; so great, indeed, as almost entirely to preclude its accurate and complete grasp by any one mind. Its division or classification, therefore, has been found necessary; and the various departments into which it has been divided (already announced) have enlisted in their support and prosecution, votaries who pursue the objects of the particular branch to which taste or professional duties may have assigned them. In the latter condition do I find you now before me, who, to fulfil the requisites demanded by a thorough knowledge of your profession, and imposed upon those who aspire to the honors of this College, present yourselves to acquire the elements of Pharmaceutic Chemistry. A daughter of the general science, devoted expressly to the preparation of medicines, as exclusively as her sisters are occupied with the arts, with agriculture, and organic structure. In the study of each of these, a knowledge of the elements of General Chemistry is essential, and he who would teach either must commence his instruction with the study of these, if he hope to make the particular division at all intelligible. These are the fundamental principles upon which all chemical science is based, and an intimate acquaintance with them, therefore, is imperiously demanded. Without them your Pharmaceutic Chemistry would have none of the characteristics of a science, but would be mere empiricism; a catalogue of crude, unarranged facts; ill assorted, unclassified experience. Therefore it is, that you are required to have a knowledge of General Chemistry, its constituents, its laws, its objects.

The principles of General Chemistry, proposed to be taught here, are precisely the same as those usually introduced into a course of lectures on that subject. They embrace some matters which are also included in lectures on Natural Philosophy, indeed, which may be said to hold an equal relation between these two portions of Natural Science; such are the doctrines of Specific Gravity, the laws of Caloric, Light and Electricity, in its different modes of manifestation, and a very brief sketch of the general properties of matter. These all form necessarily a portion of the course, although no more space is assigned to them than can possibly be spared. Of those doctrines, which are purely chemical, we have affinity in its varied phases; the doctrines of equivalent proportions; atomic theory; system and principles of nomenclature; and the use of chemical symbols, becoming daily of greater importance from its almost universal employment. So far the subject matter of the course may be considered as General Chemistry, and will be limited as much as is consistent with justice to its importance and to the shortness of the time allotted us. And, although this portion of our subject will be necessarily much restricted, it is hoped that enough of detail will be practicable to render it sufficiently plain, and impress it distinctly on your minds. The character and relations of the electro-magnetic elements, as well as of those of simple combustibles, occupy necessarily prominent grounds, and after these the metals present important matter for study. Some insight into organic structure is alsoneeded, and in all these especial attention will be paid to those substances, which are most intimately connected with Pharmacy.

In regard to these, we have to consider the properties of those elements and their compounds, which are employed in medicine, or occupy space in the apothecary shop assigned them by long usage. We are to understand the chemical characters of the compounds, and the manipulations requisite for their production; we are to become familiar with the employment of re-agents, which will put into your possession means of detecting and exposing the fraud of the adulterator, or accidental impunity of the unskilful manipulator; we are to study, as of equal importance in the education of a pharmaceutist, the character of substances regarded poisonous, and the means requisite to counteract their efforts; and in organic bodies there are certain proximate principles whose properties and relations are intimately connected with Pharmacy. From this sketch, slight as it is, it will be apparent that your attention will be limited to a consideration of those bodies simply, which, in some form, are connected with your particular profession. None but such can be described or discussed, however interesting the relation of others may be. The time allowed for the former class is even too brief to do them full justice, and will scarcely permit any especial devotion of it to processes and manipulations strictly pharmaceutical and worthy particular study. All that can be introduced on these topics must attach incidentally to the bodies which are liable to be the subjects of them. To show the importance of these processes, and the need for instruction in regard to them, it is only necessary to enumerate distillation, the preparation of extracts, plasters, separation of proximate vegetable principles, and some of the manipulations employed in ordinary analysis. This is what, upon careful reflection, has been considered Pharmaceutic Chemistry: the examination and description of the chemical properties and relations of all substances employed in medicine; the study and application of such chemical operations as are used in the production of compounds, or needed for the separation of proximate principles. The construction which has been put upon the term Pharmaceutic Chemistry, and the plan of education here been based upon that construction, is thought to be entirely within the meaning and design of the founders of the College and the wants of the student. It is believed that no undue importance has been given to any portion of the subject, as just announced; nor has any matter of high interest been either suppressed altogether, or consigned to a subordinate position.

It seems scarcely necessary to state, in particular detail, the exact mode in which the principles here laid down will be carried out. Suffice it to say, that every effort and means of illustration, at all attainable, will be employed; and the chemical operations witnessed in the daily duties of the shop will be referred to for demonstration. Personal experience and the records of our Journal, have shown the frequency of adulteration and debasement of chemical compounds used in medicine, and these it will be considered as the especial duty of this chair to expose. The value and dependance to be placed upon an exact knowledge of the specific gravity of liquid products, and the modes by which this information may be obtained, should also be taught and enforced. Thus, in general terms, is sketched out the plan of our course, so far as regards the distribution of scientific matter which is to constitute it, but it will not be deemed irrelevant, or considered unjustifiable, should such moral reflections be associated with the professional topics, as may thus be introduced, with advantage to the student. In accordance with this view, whatever opportunities may offer for sustaining the character and position which the Profession of Pharmacy should hold, will be promptly seized, and the effort be made to impress on the mind of the student the responsible and reputable rank which he is to hold in society, how much depends upon his probity, self-respect, conscientiousness and knowledge of his profession; and that now, in the morn of his life, are those seeds to be sown, those principles to be acquired, those habits fixed, which are to constitute his character in life, upon which his professional success depends. True it is, that ignorance and cunning may thrive for a time, and prevail over modest skill and intelligence; some adventitious circumstances may enable bold pretenders to attract public confidence, at the expense of diffident merit; ultimately, however, the real sterling professor of solid knowledge will secure the palm, and the daring pretender be thrown back in the race, his mask stripped from his features, and the emptiness of his professions exposed. But the success and eminence here promised are not to be the reward of indolence, nor the consequence of even faithful attendance upon a single course of lectures. Long, ardent, and well directed study must create the foundation upon which that character is to be built, destined to become the parent of usefulness and respectability in after life. Careful habits, strict system, respectful obedience, a deep sense of responsibility, and a determined purpose to regard your employer's interests as your own, are necessary to build up that name for accuracy, fidelity, and confidential trust which is equally required with a scientific reputation for your advancement. These, of course, are but the earthly means, which, blessed by the approbation of Heaven, will insure your success. That approval you are all apprised how to secure, and it is deemed no intrusion upon the duties of the sacred desk, and with no kind of irreverence is it spoken, that lasting prosperity cannot be expected, nor a sense of an approving conscience be enjoyed, unless recourse be had to that great source of excellence, the Giver of all good gifts, sought in the manner which he has directed. It is not my purpose, by the foregoing remarks, to forestall, anticipate, or interfere with the private counsel and personal advice which you may receive from those with whom yon are immediately connected, and to whom your direct responsibilities are due; nor will it be deemed an interference with their province thus to allude to subjects so much of a personal character. But, conceiving that, for a time, you have become pupils of the College, and that its appointed officers are those through whom alone its intercourse with you is sustained, and its interests and sympathies for your welfare expressed, it has been thought an especial duty thus to bring before you a sketch of the duties and qualifications which are required at your hands by your Alma Mater, the bountiful mother by whom so much of your intellectual nourishment is provided; she is interested in your welfare, concerned in the character which you may form. You are to reflect your excellence upon her; you are to carry her name wherever your own lot may be cast; you are to take part in the councils, and supply, eventually, the places of those who now oversee and direct her course. Can she then be indifferent to your forming characters, or withhold advice which she knows that those of your age and in your circumstances require? You are yet in her care, and by accepting you as her pupils, she has rendered herself responsible for your attainments. She, therefore, avails herself of the charge which she holds, to point out what the public will require of you, and to say that the award of her diploma does not depend solely upon a proficiency in study, but that good moral standing, sound principles of action, and inflexible honesty of purpose, are equally demanded of those who seek, at her hands, the evidence of merit and confidence. You must recollect that, ere many years elapse, into your charge will be committed the destinies of the College, the education of the rising generation, and the cherished reputation which Philadelphia Pharmacy is acquiring.

The invitation which has been extended to us to participate in the proceedings of the next convention for the revision of the National Pharmacopœa, renders still more imperative upon us the duty of qualifying our students, so that they may be competent to partake of those deliberations, and aid in that research which is to provide a code for the conduct of the entire profession. In the duty of revision recently performed by the College, at the request of the Medical Convention, great and valued services were rendered by her graduates, who, at the period, corresponding to the present, as regards the future revision, occupied a ground no more in advance than you do now. Yet were they chosen to aid in the work, and so may some of you be, if you listen to the counsels here addressed to you, and respect the advice which you receive at our hands. A no more honorable motive to exertion, or more commendable ambition can well be excited, than that which is thus held out of the opportunity for a seat in that council which is to legislate for the whole nation. You may all aim at this distinction, and herein you have a stimulus to which, with the exception of the class assembled during the last term, none of your predecessors were subjected.

The advantages and valued benefits which the College is enabled to provide those who regard her precepts, and make her instructions the rule of action for their professional lives, great as they have always been, are now much enhanced by the prospect for distinction already alluded to, and by the anticipation of preferment to her own vacant chairs. A hope legitimately indulged by her pupils. It may be the lot of some one of you to fill this very place from which you are now addressed; and should the selection ever be made from among you, the choice will undoubtedly fall upon him who may prove himself most deserving. His deserts being measured by the coincidence which may appear between his own character and the professional and moral attributes already stated. To no class of young men do greater or brighter prospects open than to yourselves. Your anticipations of a successful professional life are heightened by the preferments already pointed out. Nor are they limited to them; the wide field of employment, as professional teachers, is opened in all its extent to you, as well as to others, whenever you prove your abilities to discharge such duties. We have all seen, in the past history of our own College, that desert has met its reward ; and in the promotion which some of her professors* have realized, that through her porches and forum lies one road to eminence and distinction. This way lies open to you as well as others, provided the prerequisites of character, knowledge, and faithful devotion to duty be adopted as your motto, and ever cherished as the objects of your search and incentives to your exertion.

These encouraging prospects which have been shown to gild the terminus of the journey upon which you are now advancing, may with confidence be regarded as the rewards of time well employed now; but recollect, that their acquisition depends upon evidence of merit; and with the same certainty that merit will be appreciated, may you anticipate ignoble disregard and insignificance, if that evidence be wanting. It is greatly to be feared that numbers have left these scenes of instruction, and it may be the purpose of some of you to do the same, unfurnished with one important link in the chain of proof. Of the number who are inscribed as pupils since the institution of these lectures, now nearly twenty years, who have availed themselves of the advantages thus provided, how few have presented themselves for examination, and secured for themselves an honorable distinction as

---

* Professors Jackson, Wood, Griffith, and Bache.

graduates of the College? Surely, of the large number who have drank from these fountains of instruction, there must be many capable of proving that their thirst has been slacked, and their labor refreshed by the draught, than our records are able to show. No enduring evidence remains with us, of their attainments, they "come like shadows, so depart,'' satisfied with their own sense of their acquisitions, their own estimate of their capacity to fulfil all the requisitions of their profession. Can it be that the honorable ambition of winning the honors of the College, and the approbation of their preceptors, has been overcome in some, by diffidence, in others by dread, or by some, let us hope but few, who, from a homefelt consciousness of utter incompetency, have shrunk from an examination, certain of disgrace? What injustice do those who withhold themselves from examination do to their own characters, and how depreciate their attainments in the eyes of all their friends, by thus voluntarily leaving College, unprovided with its Diploma, unfurnished with any evidence that their studies have been pursued with advantage? If all who have left these halls, in this destitute condition, had reflected upon the parallel which they had drawn of themselves with the most ignorant and unqualified, they certainly would have felt one sentiment of self-respect, one spark of ambition, one throe would have been excited to shake off their ignoble associates, one effort would have been made to dissolve the degraded connexion. It is a self-debasement which they thus impose, in suffering their dread of a vague, uncertain difficulty, to prevent their entering as candidates for the reward which the College presents to those who prove themselves worthy to receive it. In the public eye, all who leave here without such examination, are classed together as unable, from incompetency, to obtain a diploma, as all those who do submit to examination and secure evidence of their qualifications, are regarded with favor, and esteemed as proficients, by the judgment of the same tribunal. The distinction being more marked and obvious, from the strong contrast in which the two classes are placed by comparison. Let those who have slighted the proffered reward of the College, known to have been in attendance, at the same time with others who have sought and obtained it, take care lest the contrast be attributed to inability, and reflect that those in whom this deficiency is found, may have attached to their names the stigma of rejected. This may appear a harsh judgment, and undoubtedly it is so; but recollect that those by whom it is made are unacquainted with the cause; they judge from apparent results, and however eroneous their decision, it is based upon the voluntary assumption of the condition which is thus liable to misconstruction. Most assuredly from such, the selection of those who are to be installed in Professorships, will never be made, nor are they those in whom public confidence will be placed, or on whom favor and emoluments be bestowed. The time is, I trust, not far distant, when public opinion, at least, if public law or the requirements of the College do not, require that every candidate for confidence as a Pharmaceutist, shall be compelled to prove his attainments and exhibit his diploma, as evidence that his professions may be relied upon. Trusting to the influence of generous emulation, and the regard of youth for the approbation of its seniors, the College has not as yet thought proper to enforce, by special enactment, the possession of a degree, by all who desire to become incorporated with her in membership, nor has she insisted that all who attend her lectures shall be compelled to apply for her diploma. She has trusted to the value of her approbation thus formally expressed, to invite application for it; and relying upon this incitement, has ever held the character of her certificate above suspicion. In no instance that has come to my knowledge, has it been undeservingly awarded ; nor has ever the ambition of presenting a long list of graduates, tempted her to award it to an unworthy applicant. Competition, the motive which might induce in other cases a relaxation of requirement, exists not with her; and jealous of the character of her recommendation, she holds it only within the reach of the deserving. If such be the value of her diploma, and such be the disadvantages of wanting it ; if its attainment be placed within reach of all but those who are negligent and ignorant; if the College affectionately invite all who come to her for instruction, to apply for it, and withholds all means of compelling the application, why is it that so many have denied themselves the possession ? Disposing, in a word, of those who feel satisfied of their inability and total absence of claim, of those who, conscious of neglected opportunity, and misspent time, who, sensible that their application for a diploma would justly be in vain, let us for a moment examine a case which has elsewhere been supposed, as actuating the conduct of another class—diffidence, or apprehension that the requirements are too severe, and that the diploma is beyond their reach. There is, perhaps, no more commendable trait in the character of the young, than a modest regard of their attainments, and none which more surely attracts the favor and wins the regard of their seniors. As the poet expresses it:

" Humility is the softening shadow before the stature of excellence
And lieth lowly on the ground, beloved and lovely as the violet.
Humility is the fair-haired maid, that calleth worth her brother;
The gentle, silent nurse, that fostereth infant virtues ;
Her countenance is needful unto all, who would prosper in either world;
And the mild light of her sweet face is mirrored in the eyes of her companions,
And straightway stand they accepted, children of penitence and love ;
As when the blind man is nigh unto a rose, its sweetnees heraldeth its beauty,
So when thou savorest humility, be sure thou art nigh unto merit."

Excellent, then, as such a sense of diffidence is, it is doing injustice to those in whom the duty of examining the candidate is reposed, to dread the examination, from a fear that more will be required than opportunity and means have been afforded to acquire. Such dread is entirely unjust, and is based upon imaginary difficulties, which the experience of every graduate who has passed the ordeal, has proved to have no existence. These difficulties are altogether fabled ; chimeras of fancy, having no reason for their foundation ; and indulged almost invariably by none but those who have an exquisite sensibility for commendation, who look for praise for a mere act of duty, and dread lest the discharge of that duty might be esteemed as sufficiently paid by its accomplishment. And who are they upon whom this insinuation of injustice is cast ! Are they strangers, having no sympathies for the feelings and interests of the candidate ? Are they cotemporaries, jealous of his success, or anxious to defeat him ? Are they those who, ignorant themselves of their profession, are incapable of appreciating the knowledge of it in others ? Far be it from any one of those who has suffered his dread to keep him away from the tribunal, to answer these interrogatories in the affirmative. The facts are too glaringly opposed to such assertions, not to appal the stoutest hardihood which would hazard them. Instead of strangers, destitute of sympathy, they have had those who had known and anxiously watched their progress in knowledge ; instead of jealous cotemporaries, they have had generous seniors, most desirous of the success of the candidate ; instead of ignorant judges, incapable of discovering merit, they have had the knowledge and experience of their professors, aided by members of the College, specially selected for their fitness. Away then, with the dread of difficulty, and relying upon industrious application to study and observation, let no such excuse ever be offered for the neglect in future.

> " Our doubts are traitors
> And make us lose the good we oft might win,
> By fearing to attempt."

Let the remarks here suggested, while they pay all possible deference to real diffidence, serve to banish this dread of too severe an examination, and expose the fact that such excuses are mostly had recourse to by him, who would brave the charge of ignorance, risk the stigma of incompetent, hazard the title of rejected !!!

Let me beseech you, who now are about to constitute the class, who will be placed in the position of those of whom we have spoken; who must have the choice of accepting or refusing the offers of the College to guarantee your attainments; let me beg you to determine this day not to reject the offer. Let this day witness the establishment of a new era in the history of the College, which is to be characterised by the resolution of each one of you to become a candidate for the degree, when you shall have fulfilled the conditions which entitle you to apply for it. If such a resolution be adopted by each of you for himself, with a steady purpose to adhere to it, the stimulus thus given to exertion will put into your power the means which will enable you to reach the destined goal. How great is the value which should be placed upon the diploma by those who do obtain it, has been somewhat exhibited by the strong terms in which a want of it has been represented. It cannot, therefore, be needed, that an extended argument should be spread before you to display all the advantages, and set forth all the benefits which may be expected to be derived from its possession. The necessity for a diploma in the hands of him who would seek further preferment, who would soar to the highest regions of professional rank, has been shown to be indispensable; and that the gratification of an honorable ambition in securing this means of elevation is not of doubtful morality, is evidenced by the establishment of it by universal consent, and by those who have been appointed to conduct your education and promote your welfare. But, independently of this view in which we have regarded it, and which may be thought as far beyond the reach to which any of you aspire, consider the value of a diploma to one who seeks, in the quiet of private life, the discharge of the ordinary duties of his profession. Regarded merely as a testimony of the approbation of your instructors, and the evidence to yourselves that your studies have been pursued with advantage, resulting in solid attainment, an evidence, by no means so easily and certainly obtained as by an examination by others, its possession is eminently deserving of your efforts. This, perhaps, is one great incitement with some, and justly so. To him who is diffident of his abilities, and doubtful of his preparation for rendering justice to those who may confide in his skill, assuredly it must be a great satisfaction and ground of confidence, that by the assurance of persons qualified to determine, he has, upon an exhibition of his claims, been found so prepared and duly entitled to support. The only evidence, short of a diploma, which can establish the same facts, are long practice, and the invariable employment by those who are willing to hazard your skill thus unsupported by evidence. The disadvantages of submitting to such an ordeal present great obstacles to your early success, if, indeed, any can be found willing to trust you at all, while they may so readily procure the services of others known to be competent. Relying upon this means of establishing your character, you may toil for years, waiting the result which a graduate already possesses in the exhibition of his diploma. Here is positive, certain, respectable testimony of persons, known to the public to be capable of judging, who, by affixing their signatures to your diploma, stake their reputation for your competency, and guarantee your claims to the support and patronage of the public. The contrast thus afforded of these two opposite conditions, self-selected by the respective parties, should alone determine your choice, and induce you to adopt the resolution already submitted to you, not to entrust your qualifications for the world to adjudge them, while you may have the verdict of a competent tribunal, enabling you to reap a harvest at once, which otherwise years may be required to produce. It cannot be supposed that immediate confidence will be placed in the ungraduated, or that opportunity will be immediately afforded them to satisfy the public, while there are those presenting themselves who have already, by their graduation, evinced their claims to regard, and established their professional character. But enough said. You feel the appeal which has been made to you, and acknowledge that the sanction of the College to your deserts is not a worthless achievement.

A few words are here addressed to those, if any such be present, who, desiring merely a general insight into chemistry, have no particular employment of the knowledge in view, other than the great delights which flow from the possession of truth, and especially those truths, which reveal so much of the power, wisdom, and glory of the Creator,—he who possesses not the knowledge of the infinite relations of elementary matter, which chemistry alone teaches, can never understand and enjoy the pleasure derived from an acquaintance with the order, harmony, and invariable laws with which matter of all kinds has been endowed by the Almighty. To such it may be necessary to explain, that the professional character of the course opposes no obstacle to the study of general chemistry to an extent quite commensurate with the wants of a general student. Every principle required for a finished education is required for the peculiar wants of a professional student, and therefore no sacrifice of the requisites of a general is made to the demands of a special course of study. It will be an effort constantly exerted to render the lectures delivered from this desk, entertaining and instructive to all who may feel disposed to attend, whether student or amateur; an attempt which it would not be worth while to enlarge upon here. Let an attendance upon the course decide the claim which it may possess to those epithets.

And now, young gentlemen, who are about to embark with me on an untried voyage, let me invite from you a steady determination to give your best efforts to the purpose for which we are associated; let me ask on your part a decorous, faithful, punctual attendance, and a confidence in the sincerity in which the preceding remarks have been addressed to you; and I pledge you, on my part, a constant regard to the objects which have brought us together; and an anxious hope that our destined haven may be reached, the good ship laden with a precious freight, and a decided determination to spare no means which a conscientious discharge of duty may intimate as necessary to your improvement and permanent good. One means is afforded us which we must all respect, 'the advice and example of those more experienced than ourselves; a regard for the attainments of those who have gone before us. Brilliant as are the prospects held out to you; gratifying as are the sentiments with which you look forward to the completion of your studies; pleasant as are the paths by which your progress is to be made, be not disappointed that you find some checks to your advance, obstacles to be surmounted, difficulties to be overcome. Industry, perseverance, and contentment, will be your aids in adverse circumstances, and, triumphing over every impediment, bring you to the attainment of your goal. But, I refrain from further comment upon your prospects, or further incitement to duty; at your age, with your means of success, and your sense of the necessity of exertion, such remarks are unneeded. Let me close my address with the statement, that it has come from one who has experienced all that he describes as pertaining to your situation, and having since realized some of the benefits which are promised to follow exertion, he invokes your confidence in the advice which he offers, your reliance on his assurance that EFFORT WILL MEET SUCCESS.

ART. II.—OBSERVATIONS ON ZAMIA INTEGRIFOLIA—THE PLANT WHICH AFFORDS FLORIDA ARROW ROOT. By Joseph Carson, M. D.

Read at the Pharmaceutical Meeting of the College of Pharmacy, Feb. 14, 1842.

The source of "Florida Arrow Root" appears not to be commonly known to Pharmaceutists, the generality of whom have attributed it to the same plant that affords the Bermuda article, the *Maranta arundinacea.* The supposition that both these varieties of the drug were obtained from the plant mentioned can readily be explained. It is well understood that the *Maranta arundinacea* is found in other localities besides the island of Bermuda, in which it either grows spontaneously or is cultivated; thus it is common in Cuba, Jamaica, and other West India Islands; the close proximity of these localities to the coast of Florida, therefore, naturally induced the belief that it also existed in this *juxta tropical* portion of our country, independently of the vague reference by authors to such a location. The existence of it in Florida, whether correctly asserted or otherwise, has nothing to do with the origin and derivation of the article designated as Florida Arrow Root, as it is now ascertained to be obtained from an entirely distinct vegetable, possessing wholly different characteristics.

Florida Arrow Root has been brought so frequently into our market, as to have become known to most of our druggists, and yet in no authority do we find an allusion to a difference of source, nor has any suggestion been thrown out with respect to its true origin. In drawing up the present communication, which has been attempted with the desire of filling a chasm existing in our Pharmacological knowledge, it should be stated that I am indebted for many of the facts contained in it to officers of our army, who, at different times, have served in Florida, (particularly Dr. Abadie,) who have not only communicated to me information, but have also supplied me with specimens. To these gentlemen was the feculent substance not only familiar, as it afforded them an article of food, but also the plant from which it was procured.

The plant from which Florida Arrow Root is derived is the *Zamia integrifolia* of botanists; a plant which for a long time has been known and described. Under the name of *Zamia pumila,* we find it noticed in the "Species Plantarum," of Linnæus; in the "Species Plantarum," by Willdenow, however, it is described by the title of *Z. integrifolia,* with the citation of *Z. pumila* as a synonym. Willdenow refers to the HORTUS KEWENSIS of *Aiton,* who appears to have drawn up his account of it from living specimens, as it was introduced by John Ellis, Esq., in 1768, and cultivated in the hot houses of England. In *Curtis' Botanical Magazine* for 1816, there is given a description and figure of the plant; the female alone is there represented. In the same work is also presented the figure of another species, the *Z. media,* which would apppear to be hardly worthy of any other distinction than as a variety. The representation of the plant, however, had previously appeared in the *"Icones"* of Jaquin.

From ENDLICHER'S " *Genera plantarum,*" which is now regarded of the highest authority, we have obtained the following *generic description.*

" 706. ZAMIA, Lin. *Flores masculi:* Antheræ apertæ, in strobilos terminales, pedunculatos collectæ, undique rachi communi insertæ, singulæ ovoideæ, basi in stipitem attenuatæ, apice incrassato peltiformi, sub-bilobæ, lobis-subtus polliniferis. *Flores feminei* ; *Carpidia* plurima, monophylla, aperta, in strobilos terminales pedunculatos collecta, rachi communi undique inserta, singula basi in stipitem attenuata, apice in peltam hexagonam dilatata, pelta subtus utrinque *ovulo* unico, inverso, fœta. *Fructus* e carpidiis subdiscretis. *Semina* ovoideo-subglobosa, testa ossea, epidermide tenuiter carnosa cincta. *Embryo* inversus, in axi albuminis carnosi, radicula respectu racheos communis centripeta."

706. Zamia L. *Male flowers:* Anthers open, collected in pedunculated terminal strobiles, inserted all round a common rachis. Each one ovoid, attenuated at base into a stipe (stalk) with an apex uniformly peltiform, subbilobate, lobes polleniferous beneath. *Female flowers:* carpels numerous, one-leafed, open, collected in pedunculated terminal strobiles, inserted all round a common rachis, each at base attenuated to the form of a stalk, dilated at the free extremity, which is hexagonal and peltiform, face beneath bearing a single inverted ovule. *Fruit* sub-discrete. *Seeds* ovoid sub-globose, testa bony, enveloped in a thin fleshy epidermis. *Embryo* inverted, in the axis of the fleshy albumen, radicle centripetal with respect to the common rachis.

1. *Specific description. Zamia integrifolia.*—Frondibus pinnatis, foliolis lanceolatis, rotundato obtusis, basi attenuatis, exteriore ad apicem serrulatis, stipite glabro subtetragono. Willd.

Specific description. Zamia integrifolia.—Fronds pinnate, folioles lanceolate, rotundo obtuse, attenuated at base, serrulate at the apex, stipe smooth, subtetragonal. Willd. *Sp. Plant.*

The *dwarf zamia* has a root in the form of a somewhat spherical coated tube, rough and dark colored externally; the crown of the root, which is usually above ground, is sometimes as thick as a man's arm, dividing below into several stout branches and fibres. The *leaves* arise immediately from the root in a cluster, and are from a foot to two feet or more in length; pinnate in form. The *leaflets* are from ten to twenty pair, opposite or alternate, sessile, each two and a half or three inches long, and varying in breadth from a quarter to three-fourths of an inch, entire, rather shining, strongly striated on both sides with parallel ribs, the extremity rounded obtuse, slightly serrated at the apex; the common stalk smooth, somewhat quadrangular. The *cones* arise from among the leaves, on stalks several inches in length, the *male* are three inches long, an inch wide, of a reddish-brown color, the *female* thicker and larger. The *fruit* is three or more inches long, elliptical, pointed, downy, the scales finally separate widely, each is peltate and angular, remaining after the drupe has fallen. The *drupe* is elliptical, about half an inch in length, with a small quantity of sweet orange-colored pulp, and a large rather-pointed nut.

The Z. *media* differs from the present species in having more numerous, longer, and narrower leaflets, which are perfectly entire, or nearly destitute of the servatures at the extremity; the foot-stalk is not as smooth, and the female cone is obtuse and not pointed. It has been called media because it appears to be intermediate between Z. *angustifolia* and Z. *integrifolia.*

The natural family to which Zamia belongs is *Cycadaceæ.*[*] The dwarf Zamia, by all the authorities we have consulted, is referred to East Florida, and by a few to the West Indies. Willdenow refers it to St. Domingo. Pursh informs us that it is "only found in Florida," and that he had made every inquiry to find it in Georgia, but without success. Mr. Bartram, in his travels, states that "it grows in the open pine forests, in tufts or clumps." It appears also that the *Zamia media* is found in similar localities, from the references attached to the specimens in the Herbarium of the Academy of Natural Sciences.

The root of this plant contains large quantities of feculent substance, a fact which is overlooked by all the authorities above quoted; Mr. Nuttall, however, remarks that the farina is wholesome and nutricious, and that the root is one of those called by the aborigines *Tuckahoe* or *bread.* The specimens in our possession present masses of almost pure feculæ, dense, weighty, and of a pure white color, tasteless and

---

[*] The different species of Zamia were originally supposed to be ferns, from the resemblance of the leaves to this tribe; a mistake which is sometimes made by common observers at the present time. To a certain extent there is an affinity to *Palms*, but the resemblance is not carried out beyond the pinnate leaves and large cylindrical stems. Palms are monocotyledonous, while the Cycadaceæ are dicotyledonous, and there are other points which evince dissimilarity.

inodorous. By the Seminole Indians the tubers are extensively consumed as an article of food, prepared by roasting, a purpose to which they are also put by the white inhabitants and the army of Florida. They afford a substitute for potatoes. From the dense hard substance, when dried, the Indians are also in the habit of constructing the bowls of their pipes, which are lined with tin or a metallic substance. There are two varieties of the root—the white, and another having a reddish hue internally; the latter is mostly used for the construction of pipes.

Coonti is the name by which this root is known in Florida and the Southern States; a name which is also applied to the prepared farina, and under this title it is taken into the markets of the South; with the view to such disposition, it is prepared by the descendants of the Spanish settlers in the neighborhood of St. Augustine. The mode of preparation is the same as that of common arrow root.

Compared with the Bermuda arrow root, the Florida article has more of a mealy appearance and feel, and is of a duller white color, with less of the crystalline lustrous hue. When carefully prepared, it is, however, pure white, but is apt to be lumpy like that obtained from the tapioca root. When examined with the microscope the form is that of "a half, a fourth, or third of a solid sphere," conforming to the account which has been given by Raspail of the form of the granule of the *Maranta aurundinacea.* *(See this Journal,* vol. v. *New Series,* pp. 23.*)* Now, as we have determined by observation that the form of the granules of Bermuda arrow root is round, the conclusion is inevitable that Raspail mistook the source of the article that he examined, and that it must have been the identical article under consideration. I am indebted to Dr. Goddard for first directing my attention to this fact.

ART. III.—REMARKS ON SYRUP OF WILD CHERRY BARK, AND ON SYRUP OF VALERIAN.

By W. Procter, Jr. and J. C. Turnpenny.

Read at the Pharmaceutical Meeting of the College, Feb. 14th, 1842.

The bark of the *Prunus Virginiana*, as an article of our Materia Medica, is daily becoming more in use, and its admitted value as a remedial agent, renders any suggestions having a pharmaceutical bearing upon it, of some importance. The existence of amygdalin in this bark, and also of a substance which reacts with it like emulsin in the bitter almond, so as to generate a volatile oil and hydrocyanic acid, has been elsewhere shown ;* hence, in all the aqueous preparations of the bark, hydrocyanic and volatile oil are present, and the wisdom of employing cold water as a menstruum, as directed by the U. S. Pharmacopœia, is apparent.

The long time required to make the infusion by maceration in the ordinary way, gives additional advantage to a preparation which, while it possesses all the virtues of the other, as being made without heat, contains them in a more concentrated form, and is capable of preservation for a long time.

With these preliminary remarks, we will state that the following formula yields a preparation of good quality, containing all the activity that the quantity of menstruum appears capable of extracting.

Take of Wild Chery bark, in powder,	℥iv.
Water,	℥xii.
Sugar, in coarse powder,	℥xxiv.

Macerate the bark in the water for forty eight hours ; put the mixture into a displacement apparatus ; return the fluid that passes several times, until it becomes transparent, and then add sufficient water to displace twelve fluid ounces of in-

---

* American Journal of Pharmacy, Vol. x. page 197.

fusion. Place the sugar in a displacement funnel, and pass and repass the infusion through it, until it is all dissolved. Lastly, preserve in well stopped bottles.

Syrup of Valerian, 1st.

Take of Valerian, in powder,	℥j
Water,	℥iij.
Sugar, in coarse powder,	℥vj.

Macerate the Valerian in the water for forty-eight hours, and displace so as to obtain three fluid ounces of infusion; then, having placed the sugar in a displacement funnel, treat it with the infusion until it is all dissolved.

2d.

Take of Valerian, in powder,	℥j.
Water,	℥ijss.
Alcohol,	℥j.
Sugar,	℥vj.

Proceed precisely as in the preceding formula.

There are some occasions where the effects of Valerian is wanted, unassociated with that produced by the presence of alcohol. The first formula embraces this idea, and fully answers its object. The second, where alcohol is no objection, forms a more ready means of exhausting the valerian.

We have tried the formula of Soubeiran, for Syrup of Valerian, but think the above afford superior products, which, at the same time, are more readily and easily obtained. His method consists in macerating the Valerian in the water for ten hours, and drawing off one-third by distillation. The residue in the retort is strained and filtered, the proper quantity of sugar added to it, and dissolved by means of heat, and finally, after it has cooled, the distilled water is mixed with it.

ART. IV.—OBSERVATIONS ON HYDRATED PEROXIDE OF IRON, DEMONSTRATIVE OF ITS DECREASE IN POWER, AS AN ANTIDOTE FOR ARSENIOUS ACID, BY AGE, AND SOME HINTS ON THE METHOD OF PREPARING IT. By WILLAM PROCTER, JR.

Read at the Pharmaceutical Meeting of the College, Feb. 28th, 1842.

Few subjects have attracted more attention in the *medico-chemical* world, than that of the antidotal power of the hydrated peroxide of iron, in its relations with arsenious acid; and indeed so many papers have been already written upon it, that nothing but the importance of some of the views now offered, would have induced the writer to have added to the number.

Many months ago, in preparing some tartrate of iron and potassa, not having quite enough of the recently precipitated oxide of iron, a portion of the hydrated oxide, which had been prepared nearly a year before as an antidote, and kept under water, was resorted to, but it was observed that the latter was dissolved very slowly by the tartaric acid, and the great difference in that respect from the recent, was a matter of surprise, and suggested the idea that a like difficulty would occur in a still greater degree, when arsenious acid was employed.

Under the impression that, if several specimens of the hydrated peroxide of different ages, which had been kept under water, were subjected to trial, as to their activity in removing arsenic from solution, conclusions might be drawn which would settle the question definitely, a series of experiments were undertaken, and the result of these corroborate the suggestion, that this substance gradually decreases in activity by age, notwithstanding it may be kept under a stratum of water. If this position is fairly established, as it is believed to be by the following observations, then it becomes a matter of some moment, both to the physician and the apothecary, to be acquainted with the fact and to adopt a remedy.

Nine specimens of the hydrated peroxide of iron, all of which had been kept in the moist way under water, and most of them in bottles hermetically sealed, were treated in the following manner, viz.: The percentage of dry oxide which they severally contained having been ascertained, so much of each as was equal to thirty-six grains of the oxide, was placed in a vial, and three grains of arsenious acid, in solution, added, the mixture occasionally shaken, and tested to ascertain if the arsenic had been removed from the solution.

A. A specimen made about four years ago, and appeared to be in a finely divided state. The mixture of this specimen and arsenious acid was tested occasionally with ammoniacal sulphate of copper, and ammoniacal nitrate of silver, for three days, at the expiration of which time, a portion of the filtered liquid was treated by Marsh's apparatus, which gave evidence of the presence of arsenic, although, previous to the addition of the solution, no spot could be obtained.

B. A specimen two years old, in appearance similar to the preceding. This was treated as above, and at the end of three days the solution contained arsenic.

C. A specimen two years old, apparently more dense than the preceding, was found equally, if not more inactive.

D. A specimen which had a thicker consistence than any of the preceding, preserved its gelatinous character to a greater extent, and was about two years old. All the arsenic had been removed from the solution in twenty-four hours.

E. A specimen nine months old, very thick in its consistence, having much less water mixed with it. This was diluted to the proportion of the other specimens, the arsenic added, and the latter was entirely removed from solution in four or five hours.

F. A specimen made at the same time as D, but having less water mixed with it, being so thick that the vessel could be inverted without its changing its position. This, when diluted, removed the arsenic in three hours.

G. A specimen twelve months old, and after twenty-four hours contact with it, the solution yet contained arsenious acid.

H. A specimen, precipitated three months ago, was found to remove the arsenic in ten or fifteen minutes.

I and *J.* Specimens precipitated for the occasion, removed the arsenic in five to eight minutes.

In looking over the above results, and comparing them, the difference in the activity of the specimens is quite apparent, and those which are the least active are on the side of age. But independent of any influence that mere age may have in its deterioration, other circumstances most probably influence the powers of the preparation. It was invariably found, that those specimens which were most diluted, that is to say, which had the largest proportion of water admixed, all other circumstances being equal, were least active; whereas, those which preserved the state of *magma,* having little water mixed with them, were most active. Thus specimen F, made at the same time as D, was much more active. By having much fluid associated with them, the particles of the hydrated oxide, after being kept some time, appear to contract in some way, so as to take up less space in the bottle. It is not probable that this preparation undergoes any change through the agency of the atmospheric oxygen, the iron being already at its maximum of oxidation; hence, the most accurate exclusion of the air, will not prevent its deterioration, and this must be attributed to another cause. Orfila has stated, in a note to the Academy,* that colcothar, which is an anhydrous peroxide of iron, possesses no antidotal power, that is to say, it does not combine with arsenious acid. He says that if two millegrammes (.3 of a troy grain) of arsenious acid be boiled

---

* American Journal of Pharmacy, Vol. xiii. page 331, from Journal de Chim. Med.

for two hours with water in which sixteen grammes (247 grains) of colcothar is suspended, the filtered liquid will still afford arsenic by means of Marsh's apparatus, and hence that 833 times the weight of the acid will not neutralize it.

Is it not probable that the true reason of the deterioration of the preparation will be found in a combination of the oxide and water when recent, which does not exist in that which has been long kept? That the presence of water is a condition of its activity, has been shown by the experiment of Orfila, quoted above. To ascertain, if possible, whether the hydrate long kept (under water) had the same amount of water in its composition as that recently precipitated, four specimens were taken from those previously used, viz. : A, C, E, and I. The two first, four and two years old, the two last nine months old and recent. They were dried at a temperature of from 80° to 90° Fahr., for twelve hours, a given quantity of each was introduced into glass bulbs afterwards balanced, and then subjected to a red heat, until they ceased to lose weight. The loss was in the following proportion.

A,	8.4
C,	7.2
E,	12.
I,	13.

These experiments were repeated with nearly similar results. This statement shows that the recently precipitated oxide contains nearly double the amount of water that is contained in the two first, and more than is in the third. Whether the *proportion* of water combined with the oxide is a condition of its activity or not, the above statement, taking either view of the subject, is a curious coincidence; the proportion of water being very nearly that of their activity, as seen by reference to the previous experiment.

Orfila further says in the paper before alluded to, "I have proven by numerous experiments, that if the hydrated peroxide, instead of being in the state of *magma*, be used dry, that is to say hydrated but not moist, and at a temperature of 36° to 40° centigrade, 16 grammes will neutralize about six decigrammes (9.26 grs. troy) of arsenious acid. At least the aqueous liquid, resting over 16 grammes of the hydrated oxide, which had previously contained 6 decigrammes of arsenious acid for some hours, did not become yellow on the addition of a solution of hydro-sulphuric acid, to which a few drops of hydro-chloric acid had been added."

From these remarks it is evident that the dry oxide is not so active as that recently precipitated, as less than half the quantity of the latter removed the same proportion of arsenious acid from solution in about five minutes; indeed, it must be evident, that in a case where such feeble affinity is exerted, so great a change in the state of aggregation of a substance like hydrated oxide of iron as is produced by drying it, and afterwards triturating it to powder, would materially interfere with combination. To test the matter, however, the following experiments were made, viz.

Sixty grains of recently precipitated oxide, dried at a temperature of from 80 to 90° Fahr., was mixed with water and 3 grains of arsenious acid in solution added, and the mixture occasionally shaken. In half an hour the arsenic was removed.

Sixty grains of a dry hydrate, six weeks old, had not removed, in seven hours, three grains of arsenic; but 120 grains of the same oxide separated the same quantity in about four hours. Sixty grains of a specimen of hydrated oxide made a year or more, had not removed the same quantity of arsenic when examined in twenty-four hours;—120 grains of the same oxide removed the arsenic in about ten hours.

From these observations it is clear that *quantity* may, to a certain extent, make up for *quality*. They also render it probable that if a larger proportion of the specimens *A. B.* and *C.* in the first series of experiments had been employed, that they would have removed the arsenic sooner, but this does not do away with the evidence of those experiments, viz. that hydrated peroxide of iron deteriorates by age, etc.*

Orfila again observes, " MM. Nonat, Deville and Sandras, have advised, and with reason, to use in preference the dry hydrated peroxide, because it contains in the same weight four times the amount that it does in the state of magma; and they also advise to give 16 grammes of the hydrated peroxide for each grain of arsenious acid to be neutralized."

It cannot be doubted that the dry hydrated oxide can be administered in less space; but at the same time it is equally true that the recently precipitated oxide is much more active, and should always be employed in preference, and besides the recent article from its levity would remain perfectly suspended in the fluids of the stomach and be active at every point.

The case spoken of by Dr. Fisher in his elaborate paper on this subject (in the 12th vol. of the American Journal of Pharmacy) where an oxide eight months old was successfully employed, agrees with the conclusions arrived at in the above experiments, as it has been seen that an oxide two years old, in one instance, removed the arsenic in three hours. But at the same time that we agree with Dr. F. that every apothecary should keep the oxide ready prepared, we believe that in all cases, when the recent is attainable, it should be resorted to in preference as being more active.

Method of preparing the hydrated peroxide.—Dr. Fisher recommends that this preparation be made directly from the metal, by first forming a sulphate of the protoxide and then per-oxidizing by nitric acid, precipitating by ammonia and washing. This course will always give a pure prepara-

---

* Since the above was written, six grains of arsenious acid in solution was introduced into a half pint bottle of the antidote, containing about six drachms of the hydrated peroxide which had been prepared two years. Three weeks afterwards the filtered solution was strongly charged with the arsenic, notwithstanding the mixture had been frequently agitated.

tion, (if the iron is good,) but the length of time it takes is an objection to its adoption, at least in a case of urgency. There are few pharmaceutists but have in their possession a sulphate of iron pure enough for making this preparation. By employing the sulphate ready made, the time of making is reduced one-third.

Take of

Crystallized Sulphate of Iron, in coarse powder,		℥xx.
Sulphuric Acid,		℥iij.
Nitric Acid,	(sp. gr. 1.4)	℥iiiss.
Water,		Oiss.

Add the sulphate of iron to the water, previously boiling in a suitable vessel, and when it is dissolved add the sulphuric acid. To the boiling solution the nitric acid is to be added in small quantities at a time, continuing the ebullition after each addition until the whole of the acid has been added and the solution has attained a deep reddish-brown color. The dark liquid thus obtained is a concentrated solution of the tersesquisulphate of iron, and forms a ready means of obtaining the hydrated per oxide.

Another method which has been proposed is to take any quantity of nitric acid, specific gravity 1.3, and add powdered sulphate of iron in small quantities at a time until effervescence ceases, then applying heat to drive off the absorbed deutoxide of nitrogen. The only objection to this process is that the resulting solution is a mixture of two equivalents of tersulphate, and one of ternitrate of the peroxide of iron, and when an alkali is employed to precipitate the oxide, an alkaline nitrate remains in solution which, if not wholly removed, would be more likely to irritate the stomach than the sulphate of the same base.

However prepared, the strength of the solution should be known. Every hundred grains of the crystallized sulphate of iron employed, yields nearly thirty-eight grains of the hydrated peroxide; and by knowing the quantity of sulphate employed and of solution obtained, the percentage of oxide in the solution is easily found. As made by the first formula, provided the resulting solution measures two pints, each fluid ounce contains one hundred and fourteen grains of hydrated peroxide.

This solution should be kept in every shop as a source for obtaining the peroxide for antidotal purposes, or for any of the preparations of that oxide called for in the course of business.

Having this solution at hand, supposing a sudden demand for the antidote occurs, the pharmaceutist should form a judgment as to the quantity of oxide wanted, and take a corresponding amount of the ferruginous solution, mix it with its weight of water, and add a very slight excess of solution of ammonia to precipitate the oxide.

The whole should be thrown on a coarse flannel, and by gradual pressure as much as possible of the fluid be removed. By again adding water, and compressing, the oxide is obtained sufficiently washed for the first exhibition, so that no time be lost, and the remainder should be treated more completely, yet as rapidly as possible, so as to continue its administration at short intervals. By this course, the first doses may be administered in 10 or 15 minutes, if the manipulator has exercised ordinary skill.

It is, of course, to be understood that the peroxide should be kept constantly on hand by every apothecary. After having washed it he should introduce it into bottles, in the form of a thick magma, so that after standing even for several months there should be little separation of water. This, however long kept, or even the dry hydrated peroxide (the precipitated carbonate of the U. S. P.) should be at once administered while the recent is making, and thus save time, but the importance of having the recently prepared oxide, particularly where the amount of poison taken is large, cannot be doubted.

In the case of the Gigon family, in which nine persons were poisoned by arsenic, reported by Drs. Smiley and Wallace in the Medical Examiner, the writer had an opportunity of putting the above mentioned process in practice, and furnished the oxide to the patients in twenty minutes after being advertised of the demand.

In conclusion we may observe,

1st. That hydrated peroxide of iron, even when kept under water, gradually decreases in its power of neutralizing arsenious acid.

2d. That if kept in the form of a thick magma, it will retain its properties longer than when mixed with much water.

3d. That this decrease in power is probably due 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.

4th. That from the experiments of Orfila, and others, the dry hydrated oxide possesses the power to a considerable extent of neutralizing arsenious acid, and it should be used in the absence of the moist and recent preparation.

5th. That hydrated peroxide of iron may be obtained in a state fit for use in 10 or 15 minutes, by using a solution of the persulphate of iron. And,

Lastly. That the recent oxide should be used in all cases where it is attainable, in preference to that long kept.

REPORT.

The Committee to whom was referred the "Observations on Hydrated Peroxide of Iron," &c. by Wm. Procter, Jr., respectfully

REPORT, That they have little to add to the full remarks upon this subject contained in the paper referred to them. With regard to the change in the state of aggregation, induced by keeping the hydrated peroxide suspended in water, their own observations have confirmed those of Mr. Procter, and they consider his experiments as conclusively showing that we cannot rely upon the hydrated oxide after it has been prepared a certain length of time.

It is a question of some interest, whether the antidote, if carefully dried without, or with a very gentle heat, would not preserve its efficacy longer than when kept suspended in water. Orfila found, as quoted in the paper, that 16 grammes of *dry* hydrated peroxide neutralized 6 decigrammes of arsenious acid, but does not mention how long this oxide had been prepared. In a paper by Dr. Beck* on this subject, he says, that Dr. Van Specz, of Vienna, exhibited rust of iron successfully: and further, that the Academy of Medicine in Paris found the "common subcarbonate of iron" (probably the prepared carbonate of the Pharmacopœia) an efficient antidote. Notwithstanding this, Dr. Beck, in a subsequent part of the same article, says, that "the dry hydrated oxide is inert." There is no doubt that this is the case as respects *colcothar*, which, however, contains no hydrate.

Your Committee endorse the recommendation of Mr. Procter, that the apothecary keep always on hand a solution of the persulphate of iron, from which the hydrated peroxide may be quickly prepared in case of emergency;—and in the mean time the "precipitated carbonate" of the Pharmacopœia might be had recourse to with advantage, as it usually contains more or less of the hydrated sesquioxide.

We believe that it is not advisable to neutralize the ammonia which remains with the precipitate after moderate washing, as advised by Mr. Procter, as we conceive the therapeutic effect of this alkali desirable, as stimulating the tissues of the stomach, and assisting it to reject its noxious contents, and also in counteracting the prostration, which is well known to be one of the earliest effects of the poison. Orfila has found that the insoluble compound of arsenic and peroxide is still poisonous, proving fatal when administered to animals, though far less virulent than the arsenious acid. This poisonous effect he attributes to the action of the acid of the gastric juice upon the compound, decomposing it and liberating arsenious acid, and it may be prevented by giving

---

* See Journal of College of Pharmacy, vol. 13, No. 3.

a large excess of the hydrated peroxide, by which means the arsenious acid, as fast as it is liberated, unites with and is neutralized by a fresh portion of the hydrated oxide. The ammonia, by neutralizing the acid in the stomach, would of course tend to prevent its action upon this compound.

In conclusion your Committee would remark, that however strong may be our dependance upon the antidotal effect of the hydrated peroxide, no available means should be neglected to procure the rejection from the stomach, by vomiting, of as large a portion of the poison as possible, both before and after the administration of the antidote.

Ambrose Smith, } Committee.
Robert Bridges, }

Philadelphia, March, 1841.

ART. V.—OBSERVATIONS ON THE ACTION OF ETHER ON GALLS. By Robert Bridges, M. D.

Read at the Pharmaceutical Meeting of the College, Feb. 28th, 1842.

The process usually directed for the purpose of procuring tannin from galls is that of Pelouze, viz, by the action of ether. This method affords the most ready and easy mode of accomplishing the ultimate result, but with regard to the primary effects of the action there exists some discrepancy in the statements of chemists. According to the original observations of Pelouze, if galls be acted upon by displacement with ether which has been previously washed with water, there will result a liquid, which by repose will separate into distinct layers, the upper of which consists principally of ether, water, gallic acid, and a little tannin, while the lower consists entirely of pure tannin dissolved in water. Immediately on the publication of this statement, the experiments were repeated by Liebig, who, acknowledging the great superiority of this over all previous methods, differs however in his statements as to the results; remarking, that the etherial liquor deposits only a very small quantity of the syrupy solution of tannin, but that this effect is produced by the addition of a small quantity of water. The liquid then forms two distinct strata, the lower of which is a solution of very pure tannin. In explaining this he states that tannin, when anhydrous, is soluble in ether, but becomes insoluble by combining with water. M. Beral states that acting on an aqueous solution of galls by ether, we obtain three layers, the lower of which is the solution of tannin. "The separation of tannin," he remarks, "is solely due to the property possessed by this substance of combining with determinate quantities of water and ether," forming a syrupy liquid which he denominates "liquid tannin."

These discrepancies result from the different circumstances under which the experiments have been performed, as will be evident from the following observations. Ether as in the shops, may be under four different forms, viz: Ether combined with alcohol; ether combined with water; ether combined with both alcohol and water; and, finally, though very rarely, uncombined with either.

By the action of the ordinary ether of the shops* (sp. gr. .750) upon powdered galls in a displacement filter, there results a greenish-yellow liquid, which does not separate, on standing, into two portions. On agitating this solution with ten per cent. of water, it immediately becomes milky; and on repose, separates into two very distinct layers, the upper of which is etherial in its character, and of a light green color, while the lower is dense and syrupy, of a light yellowish-brown color. The addition of a larger amount of water causes the liquid to separate, on repose, into three distinct portions. The upper layer resembles the upper layer before spoken of, but considerably diminished in bulk, while the liquid below consists of two portions of nearly equal density. One portion is of a light yellow color, and aqueous appearance, the other yellowish-brown and syrupy. The specific gravity of these two portions so nearly coincide that the position of each will depend upon very slight causes. At first, the syrupy solution is above, from entangling within itself some portions of air or of the etherial liquid, but, in course of time, subsides, and falls through the other portion like a thick oil. A larger portion of water causes an increase of the aqueous portion, and a diminution of the others.

Each of the liquids by evaporation yields products of different degrees of purity, but all containing tannin. The product, from evaporating the etherial solution first mentioned, contains of course all the impurities dissolved out of the galls by

---

* When eight measures of this ether were shaken with four measures of water, the loss was two measures. The resulting ether again shaken with water, in the same proportion, lost half a measure. This last represents the washed ether subsequently mentioned.

the ether and alcohol. This is a greenish-yellow sparkling powder. The product resulting from the evaporation of the upper layer, formed by the action of a small quantity of water, is of deeper green than the former, consisting of much tannin, green coloring matter, and other impurities: the lower liquid yields a powder of a yellowish color, which is tannin contaminated with a small quantity of brown coloring matter. In the case of three layers the results are similar as regards the etherial and syrupy portions, while the aqueous yields a product apparently intermediate between the others, but small in proportion to the amount of liquid.

This etherial solution, by filtration through animal charcoal, is, in color, greener than before, but of less intensity. The products resulting from the evaporation of the various liquids are also less colored, with the exception of the etherial portion which still retains its green color unaltered. When ether, previously washed with water to separate alcohol, is substituted for ordinary ether, the resulting liquid is greener, but with less depth of colour, and occasionally deposits a small amount of a very light, yellow, oily solution of tannin, and on evaporation yields a smaller product. When the oily matter does not appear, it may be produced by agitation with water, much less, however, of this liquid being required in this than on the former occasion; a larger addition also resulting in three layers as before, the only difference consisting in the lower portions being a yellow of much less depth. These different liquids on evaporation yield products similar to those before mentioned, with the exception that the results from the lower portions contain less coloring matter.

If this etherial solution from hydrated ether be well mixed with alcohol, in proportion of four measures to one, and then agitated thoroughly with one measure of water, the mixture will lose its transparency, but without becoming milky, and on repose will gradually separate into two portions, the lower of which is limpid and colorless, but not syrupy in consistence, while the color of the upper etherial solution has increased in depth. These two solutions on evaporation yield respectively pure, colorless tannin from the former, and a green residue from the latter consisting of tannin, coloring matter, and other impurities. By this means about one half the tannin in the solution may be separated of the utmost purity. The result is not the same with the solution from ordinary ether, the lower always retaining some portion of the brown coloring matter.

Acting on galls by means of ordinary ether, to which water has been united by means of alcohol, there results a liquid of which the brown hue increases in depth with the increase in the proportion of the alcohol and water. This liquid does not separate on standing, but when the alcohol and water bear but a small proportion to the whole, the addition of water has the same result as with solution from ordinary ether; if, however, the latter liquid predominates, then this result is effectual by the addition of ether. The alcohol does not act here as when hydrous ether is used, for both portions into which the liquid separates, contain much coloring matter, the green with part of the brown remaining in the upper portion, the under exhibiting a light yellow color, and on evaporation yielding a yellowish product.

The theories of Pelouze and Beral, which do not essentially differ, afford, with slight modifications, the explanation of the above results. The modifications necessary are to bring into view the relations in regard to the solubility of tannin, whether anhydrous or combined with ether and water, and of coloring matter with ether, alcohol, and water. Anhydrous tannin is freely soluble in water, less so in alcohol and in ether. When in contact with water and ether, combination takes place, which results in the formation of an oleaginous liquid, considered by M. Beral to consist of definite proportions of each of its constituents. This compound is soluble in alcohol, ether, and water, but to much less extent than anhydrous tannin. The coloring matter existing in galls is of two kinds, a brown or deep yellow matter, insoluble in ether and soluble in alcohol and in water, but having a stronger affinity for the alcohol, and a light green coloring matter soluble in ether, and probably also in the other liquids, but with a more especial affinity for the former.

These data will suffice to understand the different results stated in the former part of the paper. Ordinary ether, acting on powdered galls, dissolves tannin, the ether present taking up at the same time the green coloring matter, and the alcohol the brown; the quantity the latter dissolved being proportional to the relative amount of its appropriate solvent. No water being present, the liquid tannin of M. Beral is not formed, and hence there is no separation of an oily liquid. The addition of water affording the necessary prerequisite for the formation of this compound, it is consequently produced on the addition of a small quantity of that liquid, and being less soluble gives rise, on repose, to a separation into two parts. The color of these two portions is different, the upper consisting principally of ether, holding in solution some liquid tannin, retains the green coloring matter, while the brown coloring matter, being insoluble in this fluid, goes with its solvent water to be present in the oleaginous liquids. The addition of an excess gives rise to the formation of an additional layer, consisting of a solution of liquid tannin in water, together with some ether and green and yellow coloring matter, this latter layer being produced at the expense of both the other layers, and is hence intermediate in qualities between them.

Employing ether, deprived of alcohol by previous washing, and in which water has replaced this liquid, a liquor is produced in which there is present both "liquid tannin" and anhydrous tannin. If the water present be sufficient to form more of this liquid tannin than can be dissolved by the ether, then there results a deposit of the excess as a dense oily liquid; but when not sufficient in quantity the addition of more water immediately produces the result, and we then have the liquid tannin separating on repose. The water in the washed ether being small in amount, dissolves but a small quantity of brown coloring matter, from whence it results that the oily liquid possesses less color than when common ether is used. We may here take advantage of the greater affinity of the brown coloring matter for alcohol to procure a purer product. On adding this liquid to the etherial solution, it takes the brown matter from the water and still retains it on the addition of more of this liquid, the lower layer separating free from all color. The etherial compound appears also under the circumstances to be decomposed, for the solution does not, as in the other instances, become milky, and the colorless fluid separated by repose, is not oleaginous. Should this additional alcohol be mixed with the ether previous to its action on the galls, then more of the yellow coloring matter would be dissolved by the alcohol than could subsequently be retained, and some would pass to the aqueous solution and render the product impure.

ART. VI.—REMARKS ON SOME OF THE MERCURIAL COMPOUNDS. By James Hamilton, M. D., Baltimore.

There are few medicinal agents embraced in the Dispensatory, more frequently employed in disease than the compounds of mercury, and of them it is to be regretted many are employed without a due knowledge of their composition, or the principles on which they act.

In this remark, the preparations of *Pil Hydrargyri*, *Hydrargyrum cum cretâ* and *Unguenta Hydrargyri*, are particularly alluded to, and as such are intended to be the subject of this article.

The cause of the efficacy of these preparations has led to the adoption of many opinions, reducible however to two, viz. the presence and agency of the protoxide of mercury, or metallic mercury, in a minute state of subdivision; each of these has been upheld and supported by numerous contributors to periodicals, some teeming with contradictions and assertions which can only be attributed to ignorance of the principles of chemistry or a desire to win popular esteem as authors; it is not to be wondered at, then, that even at the present day this question is acknowledged to be unsettled, inasmuch as but little positive proof has been brought forward by many of those who have thus far enlightened the medical world with their opinions.

As the question is one of undoubted interest to the intelligent physician, and is based on some of the properties of *mercury* itself, these necessarily will require an examination first, in order to relieve us of the discrepancies which appear in many of the articles already published on the subject.

The metals may be divided into two classes as regards the changes to which they are liable under common circumstances, some being oxidized at the common temperature; others remaining unaltered, and mercury in this respect is not sufficiently known to be classed in either; Turner, Green, Brande, Gay Lussac, and a number of others asserting that it is unaltered, when pure, by exposure to air. Lagrange, Murray, Nicholson, Priestly, Fourcroy and others, on the contrary, that it slowly assumes the state of a protoxide.

Wood and Bache, in the U. S. Dispensatory, assert that "when perfectly pure, it undergoes no alteration by the action of air or water, but in its ordinary state suffers a slight tarnish," and follow it up by saying that "mercury, as it occurs in commerce, is *very pure*." From repeated observations, however, it is satisfactory to me, that pure as the metal may be, when exposed to air repeatedly, a gray film forms on its surface, which is increased by agitation and other circumstances to be alluded to hereafter; the mercury used in these observations has not only been carefully distilled, but also tested by appropriate chemical agents to prove its entire separation from any other metals with which it is sometimes adulterated, and which impart to it a facility of oxidation.

By continued agitation it has been long known that this change is easily accomplished, as even in the time of Bœrhaave, (who first obtained it by subjecting mercury to the motion of windmills, carriage wheels, &c.) this fact was well known, and the oxide designated *Ethiops per se,* and many of the authors who have denied its capability of oxidation by exposure to air, grant, that combined with agitation, this change is easily accomplished; there seems to be no doubt in this respect, that mercury when exposed to the action of air, becomes slowly oxidized and more rapidly when agitated; "by long agitation with access of air it becomes converted into a black powder or oxide, which gives out oxygen by heat, the metal being at the same time revived."*

The presence of extraneous matter is, however, acknowledged by *all* to facilitate this change. "It is oxidated even at natural temperatures when subjected to agitation, or *still more easily,* when triturated with any viscid matter, which is interposed between its globules so as to extend their surface;"† but it does not require the aid of trituration to effect

---

* Ure.

† Murray Mat. Med., 1827.

this, as I have been assured by those who are compelled to resort to pure mercury, that simple contact with oils or other viscid matter has this effect to such an extent as to render it useless to them until purified by distillation, and all who have been in the habit of using pure mercury in their manipulations, must have observed the rapid oxidation whenever brought into contact with foreign substances.

PIL HYDRARGYRI.

This mercurial compound is as frequently employed as perhaps any other, though the results often obtained from its use are not equal to what are anticipated. In the United States and London Dispensatories, the mercury is triturated with confection of roses and liquorice root; in the Edinburg with conserve of roses and starch ; in either case the materials are triturated until all appearance of metallic globules has ceased, and the mixture has attained that blueish-gray appearance which has given rise to the name of blue mass.

A diversity of opinions are entertained with regard to the cause of the action which results from its use, some attributing it to the presence of the protoxide of mercury, others to mercury in a very minute state of subdivision. Let us examine the grounds which the latter have for this supposition.

Mr. Carpenter, in a memoir on "the Extinction of Mercury by Trituration," (Philadelphia, 1827,) has been at considerable pains to attempt to prove that the mercury is only in a minute state of subdivision and not oxidized, in which it need only be said he has failed.

Laugier (Cours de Chimie, tom. 11, page 310,) says, "on est fondé a croire aujourdhui que ce changement de couleur tient seulement à l'extrême division desparties du metal," &c.

The United States Dispensatory, (1839,) says: "it was formerly thought that the metal was oxidized in the process, and that the medical activity of the preparation depended on the presence of the black or protoxide of mercury; at present, however, the change is generally attributed solely to the *mechanical division of the metal, which in this state is supposed to be capable of acting on the system,*" &c.

In a paper communicated to the Journal of Pharmacy, (Philadephia, 1829) by Mr. Allison, it is attempted to be proved:

1st. That the presence of the adhesive substances used in the preparation of the mass, "effectually prevent the contact of the air with nearly all of the metal employed."

2d. That the time used in its preparation is too brief for any action to take place even if the first objection were removed, (no doubt alluding to the fourteen years which Dr. Duncan relates that Bœrhaave exposed his mercury to the action of a windmill,) and finally comes to the conclusion, that the popular idea of the inertness of metallic mercury on the system is erroneous.

In opposition to this we have testimony of much more weight, and founded on the authority of the best chemical authors. Ure, Eberle, Paris, Coxe, Murray, and a number of others, confirm the opinion generally received, that mercury in its uncombined state has no action on the system, and the authors of the United States Dispensatory declare, "*that it is considered to be inert.*" No metal can have any action on the system, or form any salts until oxidation first occurs, and those writers whom we have quoted assert that it is difficult to oxidate mercury at common temperature; again, metallic oxides are only active, inasmuch as meeting with the free hydrochloric, acetic or other acids in the stomach they then form soluble and active salts. In order then to prove that mercury has any action on the system in its metallic state, it must first be proved, that *acids act on pure metals,* which is utterly impossible; next, that mercury is an exception to all the rest of the class of metals in its action on the human system.

On what principles of chemical reasoning can it be asserted that the mercury acts by virtue of some exclusive power, or that it can form a soluble salt in the stomach in its metallic state, but when we consider the oxide of mercury as the active agent, then we may readily account for its activity, as we can understand that a chloride or acetate of mercury has been formed from the acids to which we alluded, and a corresponding effect produced.

But it is said by some, (United States Dispensatory, for example,) that the action is attributable "solely to the mechanical division of the metal which in this state is supposed to be capable of acting on the system." If, then, these effects are produced by it in a minute state of division, why is it that in cases where from its weight it has been administered in large doses these effects are not increased? Were it a solid substance, such a supposition might have some weight, as, of course, the more minutely divided the more easily would action be induced; but mercury being a fluid, and its particles easily separated, this supposition is rendered out of the question, and hence it is found necessary to have resort to another mode of explaining it, by supposing, as Mr. Phillips has done, that the mercury exists in the form of a *suboxide;* but let the existence of a suboxide of mercury be first proved before its *supposed action* be used in theories.

As to the idea of the action of metallic mercury on the system, it is contradicted by the knowledge of the properties of all the rest of the metals, as however active or even poisonous their compounds may be, they themselves are entirely inert, as instances of which gold, silver, antimony, arsenic and others may be adduced. As to the idea of mercury in a minute state of subdivision, possessing this action of which so much has been written, it is not entitled to the slightest credence. In cases of persons where large quantities are given to act by its weight, there would be intense action and profuse ptyalism produced if possessed of any property of this kind, whereas, we find the only inconvenience to which the patient is subjected is the weight consequent on its use. It is also known that in the extraction of this metal from its mines, it becomes insensibly so incorporated, (if the term may be allowed) in the system, that a miner on passing a piece of gold or silver coin between his hands, covers it at once with an amalgam, and still suffers no inconvenience from being subjected to its influence. In the latter case the mercury must be in a most minute state of subdivision, to such an extent as not to be visible on the surface, and consequently in a state best calculated to act on the system.

The proof that Mr. Allinson has attempted to bring forward is easily refuted from the evidence which has already been adduced: 1st, those agents which he seems to think prevent oxidation by protection from contact with air, have been shown by the best authority to be the very cause of the rapidity of oxidation which ensues, and the 2d objection, viz. the time not being sufficient for the oxidation of the metal, is removed by the same means.

In his experiments on blue mass to detect protoxide of mercury, he states, "*I boiled* it in successive portions of distilled water until all the soluble matter was dissolved, then digested the residue in acetic acid with heat; no acetate of mercury was found;" but this is not astonishing, as Turner, whom he has quoted in his article, states, that the protoxide "is *easily affected by heat* by the direct solar rays, and even by daylight;" and if so liable to decomposition, the repeated application of 212 F. was quite sufficient to resolve it into peroxide and metallic mercury, neither of which are acted on by acetic acid.

But we have authority of much more weight, proving the presence of the protoxide of mercury as the active agent in this preparation. Eberle,* in the description of its preparation, says, "the globules disappear, and the metal assumes the state of a black oxide," and Paris† confirms it in the following language: "The mercury in this preparation is not, as it was formerly considered, in a state of mere mechanical division, but in that of a black oxide, upon which its activity as

---

*Therapeutics, 1827. †Pharmacologia, vol. 2, 263.

a remedy undoubtedly depends; for mercury in its metallic state is entirely inert with regard to the living system."

In a series of experiments in relation to this subject, Mr. Donovan* has satisfactorily proved that one hundred grains, or parts of mercury, after being rubbed or triturated for forty hours with honey, *yielded ten per cent.* of protoxide of mercury, and "its introduction as a substitute for those preparations in which the metal is oxidated by friction, is supposed to be advantageous from the uniformity of strength, as the others are liable to vary from imperfect preparation; when properly prepared, it appears to be the same in chemical composition, and the medicinal operation of it also extremely similar."†

These experiments of Mr. Donovan have long since decidedly settled this question in Europe, with the exception of some of the French writers, who are generally loth to adopt ideas promulgated by their English cotemporaries, but the opinion of Dr. Thompson‡ on the subject is at least entitled to respect, as proof of the importance which deservedly is attached to them. To counteract the effect of at least some of the essays which have been written on this subject, I have recently examined samples of the several varieties of blue mass which are found in our drug stores, and with the following results. Repeated washings by water, *at common temperature,* was used at first to remove the feculous and saccharine matter, after which the residue was digested with pure acetic acid diluted, which, being slowly evaporated, yielded flaky crystals of acetate of mercury.

Hydrochloric acid was then substituted for the acetic, evaporated, and the white residuum was rendered black by the addition of potassa, ammonia and hydrosulphuric acid, prov-

---

* Annals of Philosophy, vol. 14.

† Murray.

‡ "Every chemical reader who peruses the paper will agree with me in thinking, that it possesses unquestionable merit, and that Mr. Donovan has added very materially to the accuracy of our knowledge of the compounds of mercury," &c. *Thompson's Annals*, vol. 16, page 17.

ing it to be protochloride of mercury; these experiments were conducted in a manner not intended to ascertain the quantity or per centage of oxide of mercury, but to prove its presence, which, to my own mind, they most satisfactorily have done. Finally, as to the cause of the activity of this preparation, no one who has any knowledge of even the elementary principles of chemistry, can ascribe it to any other than the presence of the protoxide of mercury; and to uphold any other belief, to say the least of it, betrays ignorance of the properties of the metal and its compounds.

Among the varieties of this article met with in this country, all or nearly all are prepared in England, and should be carefully examined before being used. Some manufacturers, in order to brighten the color of the conserve of roses, used in its preparation, add to it a small quantity of sulphuric acid, which remaining in contact with the mercury, (or its oxide rather) forms a sulphate of mercury formerly called Turpeth Mineral, violently irritative in its action, which of course it imparts to the mass with which it is incorporated; of this several examples have been recently observed, and the pernicious effects clearly traced to this cause.

One of the best preparations which has been seen for some time past occurs in pound rolls, wrapped in tin foil and brown paper, with a plain label of "Pil. Hydrargyri" on the outside, and presumed to be manufactured by Davy Macmurdo & Co., London.

HYDRARGYRUM CUM CRETA,

Though generally considered as less important and less frequently used than Pil. Hydrargyri, still forms a component of the physician's prescription. It is prepared by rubbing together three parts of mercury, and five of prepared carbonate of lime, until all appearances of globules have ceased to be visible, even with the aid of a lens.

Its action has been attempted to be explained, on the supposition that it is only mercury finely divided, but when decomposed by hydrochloric acid in excess, the residue will be found to darken on the addition of ammonia, &c. indicating the union of the acid with the protoxide of mercury. By this it is not intended to deny that the greater part of the mercury is in a minute state of division, but to assert that in this condition *it is inert,* and only owes its activity to the portion which is oxidized. As this compound is generally obtained, it is from manufacturers in London, where it is made on a large scale, and hence always contains more protoxide of mercury than when prepared according to the directions of the United States Pharmacopœia. This must be evident, inasmuch as in the preparation of eight ounces (the quantity recommended by the United States,) the mercury is not subjected necessarily to the same action and exposure as when prepared by machinery on a larger scale, and is proved by the result that the English article, when given to children, will generally act as an emetic, and occasionally violently so, whereas when prepared in smaller quantities, it exerts an opposite effect, and even will allay vomiting. Numerous cases have confirmed the truth of these remarks, and a compound like this which is generally used in the diseases of children, where the stomach is generally irritable, should always be prepared by the vender; when properly prepared there is no mercurial compound of a milder character, less liable to objection, better suited to the diseases of children, and proves at the same time the fallacy of the idea which attributes its action to aught else than the protoxide of mercury.

UNGUENTA HYDRARGYRI.

In these preparations the mercury is gradually extinguished by trituration with lard, suet, and other oleaginous compounds, and the different varieties only depend on the relative quantity of each ingredient. To enter into any minute investigation as to the cause of their activity is deemed unnecessary, as, if the principles which have been already mentioned be correct, (and they are justified both by chemical reasoning and experimental proof,) the activity of all the varieties of the blue ointments, as they are generally termed, must be owing to the presence and chemical combination of the protoxide of mercury with the fatty matter. If not, why are these changes in color observed in the ointment, which every one who has prepared and used it, must have noticed? Why is it, that an ointment of twenty-one grains of protoxide of mercury to one ounce of lard has been found by Mr. Donovan to possess the same power of producing ptyalism when used in smaller quantities? (and recommendations from the different hospitals in England have testified to its effects.) Why is it, that in the various manipulations of gases with a mercurial trough, in which the hands are frequently dipped in contact with the mercury, that ptyalism is not produced? But those who uphold this theory must explain its action on the system when taken up by the capillaries in the *metallic* state; granting absorption into the capillary and lymphatic system in the *metallic* state, can it be proved that any metal exerts any influence on the system internally or externally applied, unless that influence is occasioned by its combination with some other agent, as oxygen, iodine, &c.

When mercury has been proved in its metallic state to act on the system, as an exception to all other metals, or when acids can be found to act upon metals without oxidation, *then* it will be granted that the action of the preceding compounds are not dependent on the presence of the protoxide of mercury.

Maryland Medical and Surgical Journal.

ART. VII.—ON THE PREPARATION OF IODIDE OF IRON.

By Dr. A. T. Thomson.

Having had the satisfaction of introducing the Iodide of Iron, as a therapeutical agent, to British Practitioners, I feel anxious that its preparation, should be such as will prevent the rapid decomposition of the salt, and the formation of the Sesquioxide of Iron, whenever it is exposed to the air, whether in the sold state or in solution, a circumatance which has been regarded as an objection to its employment.

Daily experience has demonstrated that the solid salt cannot be preserved long, even in well stopped bottles; and when the evaporation has been conducted by the aid of lime, and carried to the greatest point of dryness, as proposed by Messrs. T. and H. Smith, Chemists in Edinburgh, whose process has been adopted in the Edinburgh Pharmacopœia, the salt is still susceptible of rapid decomposition. It is a mistake, however, to suppose, as Messrs. Smith have done, that the result of this decomposition is a peroxide and a Periodide of Iron. On the contrary, it is a mixture of Iodide of Iron, Sesquioxide of Iron, and *free* Iodine. This is rendered obvious by throwing the decomposed mass into water—the sesquioxide falls to the bottom, whilst the solution, which contains the iodide, has the deep brown color of the aqueous solution of Iodine, and a powerful odor of that substance; it instantly, also, forms the Iodide of Amidine when it is added to a cold solution of starch. Unfortunately, it has, too often, been dispensed in this state; and, consequently, it has been productive of much injury in cases in which the Iodide of Iron was clearly indicated, but in which the free iodine, in the decomposed preparation, was likely to prove hurtful.

With these facts in view, it is remarkable that the only preparation of the Iodide of Iron, ordered by the London College of Physicians, is the solid salt; and that this form of the preparation is also ordered in the new Edinburgh Pharmacopœia. But a solution of the Iodide, which is intended to contain about four grains and three-fourths of a grain of the Iodide in each fluid drachm of the solution, is, also, ordered by the Edinburgh College. A piece of iron wire is properly directed to be kept in the bottles containing the solution, a mode of preserving the solution of a definite strength, which was suggested by my friend, Mr. Squire.* Although, in a solution thus treated the Sesquioxide of Iron is formed and precipitated, yet as soon as the oxidizement takes place, the free Iodine instantly combines with an equivalent of the Iron, which supplies the place of that which is oxidized, and the solution remains of the same strength, in reference to the Iodide, as when it was made, even when the bottle containing it is a fourth or more full of the Sesquioxide of Iron. This fact is readily demonstrated by filtering the solution and evaporating a given quantity of it, to ascertain its solid contents. The addition of the coil of soft Iron to the solution, therefore, obviates, in a great degree, the objection to the em-

---

* The following is an extract from an article of Mr. Squire, on the subject, published in the "Annals of Philosophy," in May, 1836 (page 79.)

"The Protiodide of Iron was first employed in medicine in this country by Dr. A. T. Thomson, and has since kept its character as a valuable tonic. The great inconvenience arising from its tendency to decompose when dissolved in water, is completely obviated by a coil of iron wire traversing the whole column of the solution, which was suggested by me, when it came into extensive use as a therapeutic agent, and nearly three years experience proves it to answer most satisfactorily the object intended; it will preserve it perfectly neutral, even if the solution be fully exposed to air and light. It is true, in that case more peroxide is formed; but filter the solution when you will, it is perfectly colorless and transparent as distilled water. This is a very important point, and one which the medical profession should be made fully acquainted with, being a safe test for its neutrality and purity. Any color, however slight the tinge, shows the presence of some iodine in a free state, or some impurities derived probably from one of the materials employed to make it; this, no doubt, has given rise to the difference of opinion as to its action on the animal economy. The colorless neutral compound, when diluted, has an agreeable flavor, similar to that of a chalybeate spring, whereas any free iodine gives a mawkish taste, and is liable to nauseate the stomach."

ployment of the preparation which arises from the difficulty of preserving it; and, as the solution can be made of any definite strength, it forms an excellent mode of prescribing it, for the deliquescent nature of the salt renders it necessary to prescribe it always in solution. I have long been in the habit of prescribing it in a solution of three grains to a fluid drachm, a strength which enables it to be ordered in small doses with more facility than the Edinburgh solution, as every minim contains one-twentieth of a grain of the Iodide.

It might reasonably be argued, that the solution properly prepared, and preserved with a coil of wire in it, is adequate for every practical purpose; but, when it is ordered to be given in drops, the deposition of the sesquioxide of Iron in the bottle has often created a disgust to the medicine in the minds of some patients, and has led to an idea that the preparation was spoiled, and had consequently lost its efficacy, or that it had been improperly prepared. Besides, the keeping it in this manner renders it necessary to *filter* the solution before it is sent from the shop of the chemist; and also to introduce into the phial a coil of Iron, which often leads to ludicrous observations on the part of patients. A lady, to whom I had ordered a bottle of the solution to be sent, and who lived in the country, wrote to me, desiring to know "whether the Iron screw, which the bottle contained, was to be swallowed entire after the solution was finished, or whether it was to be taken, in divided portions, with each dose of the solution?" This query, although a playful manner of inquiring into the use of the coil of Iron, yet displays the impression which it is likely to make on the minds of patients.

For these, and other reasons, as well as to obtain a definite preparation of the Iodide of Iron, not susceptible of decomposition, I made a variety of experiments with different combinations, and at length succeeded, by forming it into a *strong Syrup*, which will not only remain undecomposed, when exposed to the air, for an indefinite length of time, but which may be crystallized, and given in the form of powder with various substances, which would otherwise decompose the solution. The following is the method which I have adopted for preparing the Syrup.*

"Take two hundred and fifty-two grains of Iodine; forty-eight grains, or any quantity, of *pure soft* Iron wire, perfectly *free from rust*, and twelve ounces and a half of *distilled* water. Boil them together in a narrow-necked flask, until the fluid becomes nearly colorless; filter the solution into a deep capsule, kept hot; evaporate to two-thirds, and add as much refined sugar as will make a *thick* Syrup, aiding its solution with a gentle heat. The Syrup should be so thick as to admit of the addition of as much boiling distilled water as will make the whole twelve ounces and a half, so that each fluid-drachm of the Syrup will contain three grains of the Iodide of Iron. It is unnecessary to preserve the Syrup in stoppered bottles, or to seclude it from the light."

Whether the boiling may render it necessary to add water

---

* A Syrup of Iodide of Iron was suggested in Bachner's "Repertoire de Pharmacie," in the year 1839, and is mentioned in the "Journal de Pharmacie," Jan. 1840. But the mode of preparing it is objectionable, a fact which is rendered obvious by the following sentence appended to the notice: "Hengel has observed, that this Syrup is at first brown, but it soon assumes a paler color, without depositing any Oxide of Iron." There is also an article on the subject in the "Journal de Pharmacie," March, 1841.

The reader is also referred to an article "On the Preservation of the Protiodide of Iron, by William Procter, Jun." in the American Journal of Pharmacy. *Vol.* 10, *Page* 13. *April*, 1840.

In the Journ. de Pharmacie, for Sept. 1840, we find a proposition by M. Oberdoirffer, a Pharmacopœlist, at Hamburgh, to substitute a Sesqui-iodide of Iron for the Iodide. He proposes to prepare it in the following manner:—"Take sixteen parts of Iodine, six parts of iron filings, and thirty-two parts of water; and form the Iodide of Iron. Filter the solution, and having diluted it with 128 parts of water, add six parts of Iodine, and as much pure water as will make the whole up to 320 parts." M. Oberdoirffer remarks, that it produces the same effect as the Iodide of Iron, but it is more active.

It is scarcely necessary to say, that this is not a Sesqui-Iodide, but a mixture of the Iodide and free Iodine. It is the presence of the latter that the Syrup is intended to prevent.—T.

to the Syrup, or whether after the Syrup is made, the augmentation of bulk may render evaporation necessary, the Syrup, when completed, should measure exactly twelve fluid ounces and a half.

This Syrup, well prepared, undergoes no decomposition when it is exposed to the air or the light. It admits of combination with astringent vegetable infusions, decoctions, and tinctures, and also with the diluted mineral acids, all of which decompose the aqueous solution of the Iodide. To make the crystallized Iodide, the Syrup should be exposed to a warm dry air in a shallow vessel until crystals form.

The same method may be employed for making the syrup of *Iodide of Zinc,* which may be crystallized also, in the same manner as that of Iron.

I propose to name the crystallized Syrup, Crystalli Ferri Iodidi Saccharati.

The specimen of the Syrup, which accompanied this Essay, was prepared in December, 1840, and has remained perfectly limpid.

Lond. Pharmaceutical Transactions, August, 1841.

ART. VIII.—ON THE PREPARATION OF UNGUENTUM HYDRARGYRI NITRATIS. By Mr. Alsop.

The remarkable difference in the appearance and quality of the Unguentum Hydrargyri Nitratis as usually met with, has long engaged my attention, and being a matter of considerable practical importance, I am induced to submit a few observations to the consideration of the Society. The want of success so frequently experienced, has been rendered the more puzzling by the uniformity of result in the hands of some persons, by whom no small degree of mystery has been long affected: and while we cannot doubt that the experimenters of the college obtained a good article by the formula of the Pharmacopœia, it is a reasonable subject of inquiry, Why so many, although professedly using the same formula, are not equally successful? and, Why such discrepancy of opinion in this particular should be found amongst medical authors?

The Edinburgh Dispensatory of 1794 gives the following formula, viz.—" Quicksilver, 1oz., nitrous acid, 2 ozs., hog's lard, 1 lb. Dissolve the quicksilver in the nitrous acid by digestion in a sand heat, and while the solution is very hot, mix it with the lard previously melted by itself and just beginning to grow stiff, stir them briskly together in a marble mortar, so as to form the whole into an ointment."

In this process the directions appear to have been framed with a view especially to restrain the violent action of the nitrate on the fat, and speedily to cool the ointment.

In the valuable Dispensatory of Dr. A. T. Thompson, 1824, after giving the present formula, he recommends the use of only one-sixth of lard, by which an excellent ointment appears to have been produced; he adds, the observation that " when made with a larger proportion of lard, it becomes hard and brittle, of a pale, dirty, yellow hue, marbled with green blotches."

On the other hand we find, in the Dispensatory of the

United States, this view of the subject pronounced to be a "mistake ;" that it is "the olive oil which is hardened by the supernitrate of mercury, and that the ointment is firmer when made with that oil alone, than with a portion of lard." Hence in the last edition of their Pharmacopœia, they have directed neat's-foot oil to be substituted for that of olive, with, it is stated, decided advantage, thus,—"Take of purified mercury, 1 oz., nitric acid, 11 fluid drachms, fresh neat's-foot oil, 9 ozs., lard, 3 ozs.; dissolve the mercury in the acid, then melt the oil and lard together, and when they begin to stiffen (upon cooling) add the solution and mix them." It is admitted, however, that change had taken place in some which had been prepared upwards of four months, which, although soft, had partially assumed a greenish color. The acid is stated to have been of specific gravity 1.325.

Amid these contradictory statements, I made a few experiments a few years since, which I think afford a practical solution of the difficulty: Under the idea that the hardening of the ointment was due to the olive oil, I prepared some by the substitution of oil of almonds, and obtained an ointment of beautiful color and consistence, and which was not altered by keeping. The next trial was not equally successful; from which it was evident that the result depended more on the manipulation, and perhaps on the acid, than on the particular kind of fat employed. Since that time I have never had my ointment become hard, or materially changed by keeping. On a comparison of various experiments, I am satisfied that the point most important to be attended to, is the due regulation of the heat, so as to effect the needful decomposition of the nitrate. If the mixture be made at a low temperature, no effervescence takes place, and the ointment so produced will become hard in a few days, of a greenish white color, and eventually of a consistence that may almost be powdered; but if the oil or fat is heated to a sufficient temperature, or the quantity operated upon is large enough to generate the heat required, strong effervescence takes place, much gas is evolved, and a perfect article is produced, of a fine golden color and the consistence of butter.

In the laboratory of John Bell & Co.,* and also in the army laboratory (in both which establishments a most perfect article is produced) I find that but little heat is employed beyond what is required to melt the lard, but on the other hand the quantities are large, so that a considerable temperature results from the decomposition, and the stirring is kept up at intervals for several hours, by which the evolution of gas is assisted. I have not as yet minutely examined the gas evolved, or the state of the lard and mercury, on which field of labor much time might be employed; but I find that the extrication takes place at a temperature of about 180°, and that at 212° it is so violent that the mixture frequently boils over unless the vessel is capacious.

In my first successful experiment with oil of almonds, such a temperature was employed, by which the required change was effected. If this effervescence is pushed too far, although the consistence of the ointment is not injured, the color is deteriorated either immediately, or after a few days, by the partial reduction of the mercury; the same result is also sure to happen if the proportion of acid is not sufficient, and this will of course be the case wherever the proportions of the Pharmacopœia are observed, *without regard to the specific gravity of the acid employed.* This is the second point on which I place peculiar stress. I find the nitric acid supplied to us by the most respectable manufacturers ranges usually from 1.375 to 1.4, equivalent only to from 66 to 73 per cent. of standard acid of 1.5, it is therefore necessary to increase the quantity in proportion to its deficiency in strength. I apprehend that this dilution is adopted on account of the spontaneous decomposition of the strong acid, observing at the same time that the nitric acid of the Pharmacopœia is not colorless

---

* The following is the formula of J. Bell & Co.
℞ Hydrarg. ℥viij.
Acid. Nit. f℥xiv. (Sp. g. 1.43.)
Solve et adde.
Adipis, lb. iij.
Ol. Olivæ, lb. ij.

acid, but a pale nitrous, which latter acid is supplied in commerce of a much greater density, and approaching 1.5.

At first sight I was struck by the large proportion of acid in the formula of Dr. Duncan, viz. three times the quantity of the mercury, and in that of the army laboratory which is as follows,—mercury, 1.lb. 5½ ozs., nitric acid 3.lb. 9 ozs., lard 8.lb. 4 ozs., olive oil, 5 pints, wine measure, but on reducing the proportions to accord with the relative strength of the acid, as regards that of the army laboratory, I find no material variation from the Pharmacopœia order.

The difficulty in the preparation of a good article, from the reasons stated, is less obvious to those who prepare it in large quantities, and much stress has been laid on the long continued stirring. In order to meet the case more fully, I have made my experiments on very small quantities, and will now detail one of the series.

The acid employed was colorless, and of sp. gr. 1.41 containing by Dr. Ure's tables about 73 per cent. of acid of 1.5, and estimating the fluid drachm at 57 grains,* we have the following construction of the formula, $11 \times 57 \times 1.5 = 940$ weight of 11 fluid drachms of standard acid, $940 \times \frac{100}{73} \div 8 = 160$ grains of acid of 1.41 to a drachm of mercury.

One drachm of mercury was accordingly dissolved without additional heat, in 160 grains of acid as above; the solution was then added to 6 drachms of lard and 4 fluid drachms of olive oil (the proportions of the college) previously melted together in a water bath, and heated to about 190°; a brisk effervescence took place; it was kept in the water bath about fifteen minutes, when it assumed the proper color, and slightly boiled over; it was then taken out, and the stirring continued for about ten minutes, and then left until the next morning, when it was slightly stirred. A specimen of this I have the pleasure to submit to the Society; it has been made about three weeks.

---

* Fifty-seven grains is the weight of a fluid drachm, old measure, but in the imperial scale it is reduced, I find, to 54.7.

In one experiment with a less proportion of acid, and in which the heat had been carried too far, so as to produce a greenish color, the proper yellow was restored on adding a few drops more of the acid, by which the nature of the change appears to be indicated.

From these experiments and observations, it is evident that it is not indispensable to operate on large quantities in order to obtain a good article; and that a long continued stirring is not required: a careful regulation of the temperature, with attention to the strength of the acid employed, are the points of chief importance. We are also confirmed in the belief that the proportions ordered by the college, are fully adequate to the purpose, if acid of standard strength be employed, or an equivalent quantity if of inferior density.

Before concluding these remarks, I will quote the directions of Dr. Duncan, before alluded to, which have but recently attracted my observation, seeming, as they do, to embody the principles which I have recognized. "Dissolve the mercury in the acid, and pour the solution, while still hot, into the lard, melted in the oil, and also still hot, and mix in a vessel capable of containing five times the quantity, as a violent effervescence takes place. If it should not froth up, the action must be assisted by heat." This process, we are informed, is originally that of Mr. Duncan, of Edinburgh, and yields the most perfect citrine ointment, preserving a fine golden color, and the requisite softness.

Lond. Pharm. Trans. Sept. 1, 1841.

ART. IX.—ON WHITE LEAD By JAMES C. BOOTH.

THE large quantities of white lead employed as a pigment by our painters, the number of patents which have been issued abroad, proving its extensive employment, the large amount of capital invested in its manufacture, bespeak a material of no ordinary importance, and lead us to inquire whether the processes by which it is produced may not be improved relatively to economy and convenience. Undoubtedly one method by which this end may be attained is by a thorough knowledge of the chemical principles which are involved in its production, ere we can take a higher step in the application of chemistry to its improvement; and it is to this point the following remarks will be directed, by investigating the theory of the processes which are now pursued.

There are three principal modifications of the processes for producing white lead, which will include all the patents that have been granted, subject of course to such variations as secure the privileges of numerous patentees. They are those in which the formation of white lead is in whole, or in part, induced by atmospheric agency, those operating by single, and lastly those by double elective affinity.

I. *Triturating Processes.*—1. The earliest account which I have been enabled to procure of the manufacture of white lead by the action of atmospheric agents alone, or in chief part, will be found in this Journal, vol. i, 3d series, p. 158, from which it appears that G. F. Hagner obtained a patent for such a process in 1817. Finely granulated metallic lead was made to revolve in cylinders with water and a portion of vinegar, the air having access; by which means it was converted into a white substance, a mixture of carbonate and hydrate, as we shall find below. When used as a pigment, this white lead was very liable to become yellow, in consequence of which the process was so varied as to fall more evidently under those dependant on single elective affinity. The manufacturers performed upwards of two thousand experiments in the course of five years, and produced an article of such a quality that in 1826 they obtained a premium for it from the Franklin Institute.

2. In 1818, J. Richards obtained a patent for a process on similar principles, excepting that he appears to have employed only lead, air and water, (Jour. Frank. Inst., vol. xxvi, pp. 125, 175.) The white lead was deficient in color and body, as may be seen in the Technical Collection of the Franklin Institute.

3. In the Lond. Jour. of Arts and Science, vol. v., 1835, may be found a patent of Torassa, Muston and Wood, in which granulated lead was shaken in a moistened state on trays and the comminuted gray mass exposed to the air until a white lead was formed. From the date of the patent, 1833, it is very possible that the first ideas of the process were derived From G. F. Hagner, while the latter was in England in 1817–18, (Jour. Frank. Inst., vol. i., 3d series, p. 159.) "It is said that upwards of £100,000 have been expended at Chelsea, by a joint stock company, for executing this most operose and defective process." (Ure's Dict., p. 1300.)

4. Notwithstanding the ill success of these processes, we find another patent, (Jour. Frank. Inst., vol. xxvi., p. 119,) taken out by Homer Holland, in which the same mode of making the white oxide, &c., is claimed by the patentee, excepting that to make the carbonate, he introduces a portion of carbonate of soda into the water. In an amended patent (1838) he claims the use of any alcaline salt or substitute, whose elements consist of oxygen, carbon and hydrogen instead of alcaline carbonates.

5. The Jour. Frank. Inst., vol. xxvi., p. 123, presents another patent by Smith Gardner for making white lead by attrition, with this variation, that the operation is conducted in close vessels into which carbonic acid and air are driven during the attrition, thereby presenting them, says the patentee, " to the suboxide of lead in its nascent state." "By

ntroducing a very small portion of vapor of vinegar" with the gases, a superior article is at once obtained perfectly free from color.

Before passing to a consideration of the principles involved in the above processes, we may be allowed to remark, 1st. That by a comparison of the dates of the 2d and 4th patents, it is clear that it would be very advisable for patentees to examine previous patents on the same subject, before they lay open their patent to legal attacks and flaws. 2d. That by comparing the 3d patent with the first two, it is evident that a vast amount of capital might be saved by first ascertaining what results others have obtained before we enter the same field of research. 3d. That the 4th patent shows that to give a clear scientific view of a chemical process, something more is requisite than a superficial knowledge of the science, for in the patentee's first project, he calls the compound produced by attrition of lead a suboxide, and in the amended project he is constrained "to disclaim the opinion, that plumbic pulp, under any circumstances, can be considered a definite compound, and much less an oxide; but that it is a compound of lead, into which the elements, hydrogen, carbon and nitrogen enter, as well as oxygen." Neither of these views being correct, it would have been better to have avoided such theoretic expressions altogether.

Bonsdorf* exposed a clear surface of lead to moist air, which soon coated it with suboxide. A similar piece of lead, laid in pure water containing air, soon began to form a cloud of hydrated oxide of lead which dissolved in the water. The smallest quantity of foreign matter, particularly of a saline nature, except nitrates, prevents this action; and so delicate is the test that Bonsdorf thinks it may be employed to try the purity of water, by throwing filings of metallic lead on the surface and observing a few minutes whether the small cloud of hydrate appears; which only occurs when the water is pure. This fact shows why the first project of the fourth patent could not be successful, by introducing a carbonated

---

* Berzelius Jahresbericht, 1837.

alcali into the water in which metallic lead was triturated to form an oxide, and from that a carbonate, even if there were no other grounds to repudiate such a process. So far from accelerating, it must have retarded the operation.

Bonsdorf found still farther, that if, instead of permitting the lead to form a hydrate by resting in the water, it were put into a flask and the latter closed up and shaken, suboxide alone formed on the surface. He explains the fact on the theory, that when the lead is at rest, electric currents are formed between the metal and its oxidized points, which determine a higher oxidation, even as far as red lead, according to his observations, while, by shaking, the currents are disturbed, and the whole surface of the lead becomes suboxidized, which prevents further oxidation even if left at rest. Hence it follows, that the lead must first be uniformly suboxidized by trituration, and as it passes into a higher state of oxidation takes up water and carbonic acid, but in the third patent a portion of the oxide and carbonate evidently formed after exposure to the atmosphere. It is probable that in all such cases where carbonic acid is not artificially used, a certain quantity of that acid will be absorbed by the oxides upon exposure to the air subsequent to attrition. The comminuted lead, when taken from the trays, where lead was only moistened, has the dark gray color of suboxide, and first assumes its white appearance by exposure to the atmosphere.

The same chemist exposed a lead plate to moist air until the whole surface was suboxidized, then removed it from a portion of the surface and covered this with water, at which place a vegetation was formed, which he found to consist of one atom of carbonate, and one atom of hydrate of lead. It is therefore a simple hydrocarbonate of lead. This is, in all probability, the substance that is formed in the first four patents, where carbonic acid was not artificially introduced; for where the quantity of this acid is as small as that contained in the atmosphere, and, where the tendency of the lead is also to form a hydrate, it is not probable that this acid should in its very diffused state usurp the place of much of the hydrate.

When vinegar is introduced in these processes, another operation takes place, which induces the more rapid formation of an oxide of lead, preventing at the same time the formation of as much hydrate, and the acetate which forms being simultaneously decomposed by carbonic acid, the vinegar as rapidly passes to another portion of oxide.

In Bonsdorf's experiments the hydrocarbonate was tried as a pigment and found to possess little body, a circumstance which will probably hold good with nearly all white lead made by the above processes, excepting the last, and the modified operations of the first patent. In the fifth patent carbonic acid is forced in with atmospheric air, and probably acts in part catalytically by inducing the formation of oxide, and in part by uniting with the oxide "in its nascent state," and thereby preventing the formation of as large a quantity of hydrate. It is said, moreover, that the white lead thus obtained is equal to that manufactured by the older processes, (Jour. Frank. Inst., vol. xxvi., p. 125,) but I question whether it will be found to contain the requisite quantity of carbonic acid to prevent its liability to become yellow. It remains to be seen, however, whether by any one of these processes, in which trituration of metallic lead is the chief point, the mingled hydrate and carbonate of lead contains a sufficient amount of carbonate to prevent its becoming yellow by employment as a pigment; for that was the chief difficulty experienced by the first patent, and probably will be an objection to all the others; and it will be shown below that the more highly carbonated the lead is, the less it is subject to this change. The economy of the process of attrition certainly demands attention, as well as the simple arrangements by which it may be effected, but then the question returns, whether the tendency to become yellow by exposure to the atmosphere, or of vapors, can be obviated by giving the highest dose of carbonic acid, partly by driving that gas through the apparatus, and partly by introducing another ingredient into the water employed. If this point be attained, the question may again be asked whether body can be given to the compound, and whether it can be thus made destitute of a crystalline structure, for in the experiments of Bonsdorf, given above, the vegetation evinced a strong tendency to crystallization, and it appears that the same objection is generally urged against white lead made by attrition, viz.: it is deficient in body.

If the theory advanced in the fifth patent (Jour. Frank. Inst., vol. xxvi, p. 123,) be correct, that the white lead formed by attrition, where carbonic acid is presented to oxide of lead in its nascent state, is possessed of a body and of a good color, then we may hope that the process of attrition may yet be productive of good results. It should not be forgotten, however, that in all these processes carbonic acid is really present and in considerable quantity, if we suppose a large amount of air to pass over the agitated lead, but then the quantity relatively to the oxygen of the atmosphere is very small. I would suggest whether it would not be desirable to perform an experiment in a similar manner to the above, in which water may be omitted and due proportions of air and carbonic acid driven through an agitated apparatus containing simply moistened lead, either without, or, perhaps, better with the aid of steam, or at a higher than the ordinary atmospheric temperatures.

II. *Processes more or less dependent on Single Elective Affinity.*—These processes all depend upon the decomposition of a subsalt of lead by carbonic acid. 1. Thènard made the first suggestion relative to the principle, and MM. Brechoz and Leseur, who arranged the contrivances for conducting the process, received a prize for their white lead. Neutral acetate of lead was digested with litharge forming a soluble subacetate, through which, diluted with water, was passed a stream of carbonic acid. Carbonate of lead precipitated, and there remained a neutral acetate in solution, which being redigested with litharge, again formed a subsalt, and was again precipitated as before. Thus the acetate of lead first employed was constantly used in the operation, a small portion of new material being added each time to allow for accidental loss and waste. All subsequent patents based on a similar principle were derived from the above patent, which was carried out on a large scale by MM. Roard and Brechoz. At this day a large portion of white lead used in France and Sweden is similarly manufactured, and the process is also employed in Germany, England, and at one establishment in this country, in Brooklyn, New York. It is generally believed that the old processes for manufacturing white lead by using fermenting tan, &c., and that in which vinegar, air and carbonic acid are driven into chambers containing lead and vinegar, are governed by different principles, but it will be shown that they are essentially the same with those where carbonic acid is passed through a subsalt of lead.

A. Precipitating Processes.—2. It was stated that G. F. Hagner obtained a patent in 1817 for manufacturing white lead by attrition, but that the quality of the material being inferior, the proprietors varied the apparatus and process in such a manner as to approach Thènard's method. For a more minute description of their plan, see Jour. Frank. Inst., vol. i., 3d series, p. 158. They forced carbonic acid through a mixture of litharge, pulpy oxide produced by attrition, and vinegar, and their white lead was of such a quality as to receive a medal in 1826.

3. Button and Dyar took out a patent for making white lead, the specification of which will be found in Rep. Pat. Inv., vol, x., 1838, with a drawing illustrating the apparatus. They employed purified carbonic acid from the combustion of coke, which was passed through a mixture of litharge and nitrate of lead dissolved and suspended in water, and kept at the boiling point of water in the state of agitation by the issue of steam in the bottom of the decomposing vats. The carbonate as it is formed was drawn up by a pump, suspended in water, and falling on a filter, where it remained, suffered the liquid to fall through into the first vat.

4. In the Jour. Frank. Inst., vol. xxv., p. 197, are remarks on the manufacture of white lead by Mr. Benson, who is

probably the same one engaged with Mr. Gossage in the manufacture, near Birmingham, England. According to their patent, they employ of vinegar $\frac{1}{300}$ of the weight of litharge, and add so much moisture to the latter that it merely "feels sensibly damp to the touch." Heated carbonic acid (from coke) is passed over this mixture in stone troughs, while the contents are powerfully stirred up, (Ure's Dict.)

5. Cory's patent in Rep. Pat. Inv., vol. xii., 1839, employs carbonic acid derived from a lime-kiln, introducing it into a chamber, the upper part or ceiling of which is perforated with numerous small holes. A solution of subacetate of lead is pumped up to the roof of the chamber and falls through the small holes like a shower, absorbing carbonic acid in its descent.

These are the principal variations in the precipitating method of Thènard; all are referable to the same theory, viz., the decomposition of a subsalt of lead by carbonic acid. The last is evidently the same, excepting that the operation is inverted, and instead of passing carbonic acid through the solution, the latter drops through an atmosphere of the acid. The second is somewhat analogous to the fourth patent, excepting that the latter prescribes less moisture and employs heated carbonic acid. In both, the acid operates by forming carbonate of lead from a part of the oxide in the basic acetate, while the latter, becoming more neutral, is acted upon by the excess of litharge, forming again the basic acetate, which is again decomposed. The third patent employs a basic nitrate of lead, i. e. nitrate of lead and litharge, instead of an acetate, which, together with the boiling state of the solution, constitutes its difference from the others.

According to the observations of Robiquet, Pfaff, and others, the carbonate of lead obtained by precipitation with carbonic acid is a neutral salt, consisting of one atom each of acid and base, the only water present being hygroscopic. In the Bullet. d. Sciences, &c. en Neerlande, vol. i., p. 302, Mulder has shown that the white leads of commerce consist of two atoms of carbonate of lead and one atom of hydrate, but I do not know whether he experimented on white lead precipitated by carbonic acid among the rest; the probability is that he did, for the process is evidently similar to the older method, in which a fermenting material is employed.

The carbonate of lead formed by these processes, whether similar or not in composition to the ordinary kinds, differs in one essential point, that it will not cover as well, and has less body; and Dr. Ure appears to have first pointed out the cause of this defect; for on examining it microscopically, he found it to consist of small crystalline particles, with a certain degree of translucency. White lead produced by the older methods is superior to it in these respects, which Mr. Benson, and I think justly, refers to "its never having departed from the solid state," and that the particles "have not been at liberty to arrange themselves symmetrically." In his patent, therefore, (fourth) he employs a quantity of moisture just sufficient to determine the action of the carbonic acid. It is said that Messrs. Gossage and Benson produce forty tons of excellent white lead per week, (Ure's Dict.) La Societé d' Encouragement made a large number of experiments on the various kinds of white lead, and came to the conclusion that that produced by precipitation will cover as well as the others, but requires more coatings, that it has a degree of translucency, but that it is whiter than that made by the older processes." (Dict. de l' Industrie, &c., tome iii., p. 164.) It may be that this defect of body may be remedied by violent agitation during the process of precipitation, which would disturb the crystallization. If so, the third patent should produce a dense material, and it is probable that the violent stirring in the fourth may have this effect in addition to its exposing a greater surface to the action of the carbonic acid. We shall dismiss the fifth patent with the remark that the extent of apparatus required is decidedly objectionable, and that it is inefficient, since the liquid must be pumped up several times, and suffered to fall in showers before the decomposition is sufficiently effected.

There are several points deserving of notice, relative to this mode of manufacturing white lead. The quantity of litharge obtained in different processes of the arts is greater than the commercial demand for it, and as a reconversion of it into metallic lead is attended with a loss of more than one-sixteenth of its weight, it is desirable to find purposes to which it may be directly applied, unattended with loss. These processes for making white lead are of such a character, and hence, if the best quality of white lead cannot now be made by them, it is worth devoting time to their improvement. But, again, there is a much greater nicety in conducting these operations over the old methods, and there may be introduced into them a greater certainty in regard to the amounts of the several materials employed, circumstances which certainly impart some value to them considered with reference to the health and cleanliness of operatives, and to economy to the manufacturer. Of all the processes given above I should be inclined to prefer that of the fourth patent, as being most likely on theoretic grounds to produce the best result. Before closing this portion of our subject, we must make reference to the manufactory in Brooklyn, New York, the only one in this country, as far as my information extends, where Thènard's principle is successfully pursued. The sample of white lead from this establishment, offered at the exhibition of the Franklin Institute last fall, was considered to be about equal to the others, and spoke well for the method, if it was made on this principle, for I understand they pursue both the older and the precipitating processes.

B. Older processes.—Among these we include the old Dutch method, where a fermenting material was employed, and that which substitutes a heated chamber for the fermenting beds. The oldest among these is probably that which originated in Holland, where rolled sheet lead is placed in earthen pots containing a small quantity of vinegar in the bottom, and these pots then buried in dung, which, by its fermentation, produces both heat, steam, and carbonic acid. This method being that which is chiefly pursued in this country, we shall not enter into technical details respecting it. The English substitute fermenting tan for dung, otherwise the process is the same. The Kremser white is produced by a variation of the same process. It is conducted in different parts of Austria, particularly at Klagenfurth, in Carinthia, and the lead, which is very pure, is obtained from Bleiberg, in Carinthia. Sheets of lead are hung in small wooden troughs, in the bottom of which is poured mixtures, varying in different establishments, sometimes equal parts of wine lees and vinegar, &c. The troughs, to the number of ninety, more or less, are placed in a chamber, each one closed up, and the whole chamber heated by a furnace to about the temperature of 100° Fahrenheit. If the heat be too high, carbonic acid escapes, and less white lead is the result. It is generally conceded by the best judges that the best Carinthian white lead is superior to all other kinds.

Now, if we suppose that twenty-three out of twenty-four hundred weight of lead are converted into white lead, then for these twenty-three hundred weight may be employed nearly 1300 lb. of vinegar, of such a strength that it would convert 128 lbs. of lead into neutral acetate. It is true that in different establishments the relative quantities of vinegar and lead vary, but still the variation is an immaterial point, for the former is rarely more than the fractional part of the lead employed; thus a pint, or a half pint of comparatively weak acid is used to three pounds of lead. It is, therefore, clearly evident that the former theory, that vinegar both yielded oxygen and carbonic acid, or either one, to form white lead, is either wholly without foundation, or else its service in this respect would produce but a very small part of the white lead which is actually obtained; or suppose that a bed of 6,000 pots, of ten tier, and 600 in a tier, or layer, contained one pint of vinegar, and three pounds of lead in each, and that the pint of acid contained one ounce of *dry* acetic acid; the whole bed would then contain 18,000 lbs. of lead, and 6,000 oz. of dry acid. But this acid would consist of 2852.4 carbon, 2798.4 oxygen, and 349.2 hydrogen in ounces. Then the 2852.4 oz. of carbon, if converted into carbonic acid, would take up 3,015 lbs. of lead to form a carbonate, or about one-sixth of the metal contained in the bed, while the above amount of oxygen would only take up 2,268 lbs. of lead to make an oxide, or one-eighth of the amount of metal which is present. It follows clearly that the acetic acid is neither employed to yield oxygen for oxidizing, nor carbon for producing a carbonate, to any appreciable extent, and, moreover, it should not be forgotten that a much smaller quantity of vinegar will suffice to produce a carbonate than is specified above. The chief products arising from the fermentation of dung are carbonic acid, carbonate of ammonia and water, the second of which may be omitted, as it arises in small quantity from tan, which is employed with success in England. The heat of fermentation then will raise vapour of vinegar, carbonic acid and water; but there is another material of value present in this process, the atmosphere, notwithstanding experiments made in Europe,* which seemed to show that its presence deteriorated the color of the white lead; for in all the ordinary processes it must be present, and in those which follow it has been shown by direct experiment to be essential to the formation of oxide. The moisture which is present appears to act chiefly by determining the action of the other substances, and not to be decomposed, for we have no evidence of its decomposition, and the changes which ensue to the lead can be satisfactorily explained without it. It may, however, be maintained that it assists in forming oxide, but in the subsequent experiments, air being found necessary, proves that the chief use of the latter is to oxidize the lead. We have shown above that in Bonsdorf's experiments the lead will oxidize in a moist atmosphere, and that the presence of carbonic acid tends to hasten the operation, with the production of a carbonate; acetic acid, then, by its more energetic action, will surely produce an acetate, and where its

---

* Berzelius' Elements of Chemistry.

quantity is small, this will be a subsalt. But there is carbonic acid also present, and the material must be moist enough to determine its action in decomposing the acetate; while the acetic acid, thus slowly disengaged, will act similarly on another portion of the metal, or its oxide. To this it may be objected, that at length there will be a neutral salt formed, which the carbonic acid cannot decompose. It is, however, shown that this acid will decompose even the neutral salt to a certain extent, when it is in solution. It is not, however, necessary to suppose this, for during the length of time required for the conversion of the lead, the whole of the vinegar might be evaporated without its being noticed by its odour above the bed to any appreciable extent, and as each successive portion of acetate is decomposed, a portion of the acid may thus be volatilized and escape into the atmosphere. Another explanation of this presently appeals. That acetate of lead is thus formed is shown from the amount of it lost upon washing white lead, which is so great that it becomes a question with the manufacturer whether it might not be re-extracted as acetate, or better in some other form. It may be farther objected that if carbonic acid is thus employed to decompose the generating acetate, why will it not do it, when a piece of the lead in a pot dips into the acid, for in this case only acetate is the result. To this may be answered that from the known superior energy of the acetic acid, it forms an acetate with great rapidity, the small crystals of it below acting with capillarity to convey the acid to the upper portions of the metallic coil, while the slowly disengaged carbonic acid can affect the merely moistened crystalline mass with difficulty, and certainly not materially, excepting on its surface. The conclusion, then, is that the process is substantially the same as in Thènard's method, after the lead is oxidized by a moist atmosphere, viz., that a sub-acetate is formed which is simultaneously decomposed by carbonic acid, and that the more neutral salt thus generated being again rendered basic by another portion of oxide is again decomposed, while the final formation of an acid salt is prevented by the gradual escape of a portion of the vinegar. We are not, however, left in doubt as to the latter point, for it has been found that a peculiar etherial substance is obtained during the process, called *acetone*, which may be obtained by passing acetic acid through a heated glass tube, or by the dry distillation of an acetate. It is composed, according to the views of the best chemists, of 3 vol. carbon + 6 vol. hydrogen + 1 vol. oxygen, and its origin from acetic acid may be thus expressed,

1 atom acetic acid, - - -	$4\,C + 6\,H + 3\,O$
Subtract 1 atom carbonic acid, -	$C \qquad + 2\,O$
There remains 1 atom of acetone,	$3\,C + 6\,H + 1\,O$

So that acetic acid is resolved into acetone and carbonic acid. By heating the neutral dry acetate of lead, it fuses and evolves carbonic acid and acetone to a given point, when it congeals and forms a basic (two-thirds,) acetate, which requires a higher temperature for its decomposition. One-third of the acetic acid in the neutral salt is thus decomposed, and there remains a basic salt.* Now if the above given explanation of the formation of carbonate of lead be correct, then from the middle, towards the close of the process, when a neutral salt will be forming, the constant presence of a considerable amount of heat will tend to form acetone and carbonic acid, the former of which escapes into the atmosphere, while the latter assists in decomposing the basic acetate which remains. The latter is thus re-resolved into a neutral salt to be again subjected to the same decomposition as before. It might be supposed that this theory would account for the formation of all the carbonate of lead, but it has been shown above that the quantity of vinegar is too small as compared with the metallic lead, and from the relative amount of the two, the conversion of the greater part of the lead into its carbonic must be explained on Thènard's principle.

These views of the author were first cursorily expressed in

---

* Wöhler in Berzelius' Chemistry, vol. viii., p. 698.

a report by the Franklin Institute, (Journal for 1839,) and I find that the same views are held by Mitscherlich, in vol. ii., of his Elements, Berlin, 1840. Benson alludes to a similar view, (Jour. Frank. Inst., vol. xxv., p. 197,) but refers it chiefly to his process, (see above.) I have given my opinions more at large on this subject, since some of the most eminent chemists have advanced the opinion, and I believe it is generally held, that the formation of carbonate of lead by the old process depended mainly on the decomposition of acetic acid.

C. *Newer processes.*—I have understood that experiments were performed many years since, with the view of making white lead, by the introduction of vapour of vinegar, air, and carbonic acid, into heated apartments containing lead, but as I am unable to find the authority for this, I shall pass to those with which I am acquainted.

Mr. E. Clark took out a patent in 1828 for a process for making white lead in close chambers, heated by steam, into which he introduced carbonic acid and air, the vinegar being in a trough, and running through the chamber, and heated by steam passing through its double bottom, (Jour. Frank. Inst., vol. xxv., p. 232.) Richard's patent was taken out subsequently, and differed in the introduction of steam into the chamber, besides some minor differences of arrangement. I should suppose that the vapourized vinegar would afford sufficient steam, as in the first patent, the object being merely to ensure the action of the other materials.

It will be observed that the process, chemically speaking, is the same in these patents as in Thènard's method, or the older processes, viz., that an oxide and acetate are formed and decomposed by carbonic acid.

The carbonate formed by the above processes, the older and newer, is composed of two atoms of carbonate, and one of hydrate of lead, but the difference between them and Thènard's lies in the crystalline granular state of the latter, while in the former "the lead has not departed from the solid state," and is therefore more compact or amorphous, and has greater body.

A portion of white lead manufactured according to Clark's process was exhibited at the Franklin Institute last Fall, and pronounced equal to the others, it not being known at the time that it was thus manufactured. A sample of Richards' is in the Technical Cabinet of the Franklin Institute.

The main question relative to the newer processes touches their economy, a point which we do not propose to discuss, as foreign to the nature of this essay. Certainly they offer greater neatness of arrangement, and avoid the heavy losses from breakage of pots, while the materials employed are economical, but then again they require their peculiar expenditure for the production of carbonic acid and steam.

III. Processes dependent on double elective affinity.—The principle of these processes is not novel, although various patents have been taken out latterly based upon it, depending on the precipitation of a salt of lead by a carbonated alkali. Some are simple, others of a very complicated character, as the following selections will show.

Hemming's Lond. Jour., vol. xii. Nitrate of soda is decomposed by sulphuric acid, by which nitric acid is obtained, and sulphate of soda. The sulphate of soda is decomposed by charcoal, chalk, &c., and a carbonate of soda produced. The nitric acid first obtained is employed to form a nitrate with lead or its oxide, and this in solution is precipitated by the carbonate of soda. Thus we have obtained a carbonate of lead and nitrate of soda, the latter of which is again decomposed as above. To say the least of it, the process is highly ingenious, and involves not a little chemical knowledge, while, like Thènard's process, the original salt is recovered, except an allowance for accidental waste.

Watt & Tebbutt's patent, Lond. Jour., vol. xiii. Chloride of sodium (common salt) and litharge are heated to make chloride of lead. Three parts of the latter are mingled with one of red lead, and sulphuric acid added, while steam heat is applied. There remains sulphate of lead, and chlorine is evolved. The sulphate is then treated with carbonated alkali, which, according to the patent, will make hydrate with a little carbonate of lead, through which carbonic acid is passed to fully carbonate it. The chloride of lead is also treated with nitric acid, and carbonated in a similar manner. Farther, lead is dissolved in nitric acid, and precipitated by a caustic alkali, or earth. This patent is evidently complicated, perhaps too much so for practical purposes, and unless the patentee employs a mixture of carbonated with caustic alkali, I do not know how he is to obtain a hydrate with a little carbonate; I would rather reverse it, and say carbonate with a little hydrate. By employing red lead with the chloride, the metal is oxidized by it, so that chlorine, and not hydrochloric acid, is the result; but why should the evolution of chlorine be connected with a white lead establishment?

Leigh's patent, Rep. Pat. Inv., vol. xiv., 1840, employs first, nitric acid to act on galena, to obtain a nitrate of lead; 2d, carbonate of ammonia purified from gas liquor, or from the distillation of organic substances; 3d, decomposes the nitrate by this carbonate, obtaining carbonate of lead and nitrate of ammonia; 4th, decomposes the sulphate, or chloride, of lead by carbonate of ammonia. In consequence of the amount of litharge produced collaterally in several branches of art, the action of nitric acid on galena appears to be no improvement, particularly as a portion of the acid is decomposed and lost by yielding oxygen to the lead to form the whole of the oxide. If the carbonate of ammonia can be obtained at a cheaper rate than those of soda, or potassa, and of a sufficient degree of purity, the process might be a good one, but this may be questioned, and even if a sulphate or a muriate of ammonia, be obtained, for which there is a ready sale, I question whether the process would then be economial.

It is not necessary to enumerate more of these highly chemical processes, for it must be evident to any one acquainted with the present state of chemical science, that they might be varied "ad infinitum." The main questions are the economy of the processes and the quality of the material produced. In reference to the former point, I would merely remark that I doubt much whether such processes can be successful, where the only object is the manufacture of white lead; they ought to be connected with other chemical manufactures, the various processes of which should be "dovetailed" into each other, so that collaterial products may be wrought up to other products of great utility in the arts. I have not yet seen a good analysis of white lead made by these chemical processes, but from my own experiments I believe it will prove to be like the others, a mixture of hydrate and carbonate, for upon precipitating concentrated solutions of carbonate of soda and acetate of lead, carbonic acid is uniformly generated, and escapes with slight effervescence. With a pure basic acetate this does not take place, because the carbonic acid which would have escaped unites with the soda. The decompositions may be thus illustrated.

Carbonate of soda,	$C\,O^2$	Carbonic acid.
	$2C\,O^2$	Basic carbonate of lead.
	$3Na\,O$	Acetate of soda.
Neutr, acet. of lead.	$3\bar{A}$	Acetate of soda.
	$3Pb\,O$	Basic carbonate of lead.
Carbonate of soda,	$C\,O^2$	Acet. and carb. of soda.
	$2C\,O^2$	Basic carb. of lead.
	$3Na\,O$	Acet. and carb. of soda.
Basic acet. of lead	$2\bar{A}$	Acet. and carb. of soda.
	$3Pb\,O$	Basic carb. of lead.

So that in either case a basic carbonate of lead results, the excess of oxide uniting with a proportion of water to form a hydrate. It would, therefore, appear that the white lead thus produced is similar to that resulting from Thenard's principle, under all its modifications. Whether it forms as good a pigment as that produced by the older processes I cannot determine, having never heard the results of its application.

Conclusion.—Mulder, (before quoted Bullet. d. Sci. &c., in Neerlande I., p. 302,) examined a white lead made by a process lately patented by Stratingh, and found it to consist of three atoms of carbonate, and one of hydrate. This method of manufacture, which I have not seen described, has a decided advantage over others, by its not becoming yellow in a short a time when employed as a pigment, and Mulder therefore believes that the hydrated oxide is the principal cause of this change of color, as sulphuretted hydrogen affects the carbonate less than the hydrate. That this view is correct is shown from the great tendency to become yellow possessed by the compound containing one atom each of carbonate and hydrate. (See the commencement of this essay.) The ordinary carbonates will absorb a certain quantum more of carbonic acid, but never so much as to expel all the water and form a neutral salt. This curious fact seems to show that there is a stronger affinity between the hydrate and carbonate than between carbonic acid and oxide of lead, to form a neutral salt, and from all the above processes it is evident that there is a superior tendency to form a compound, consisting of two atoms of carbonate and one atom of hydrate.

It appears then from the preceding, that we are acquainted with at least three distinct varieties of white lead.

Hydrotricarbonate,	$(PbO+HO)+(PbO+CO^2)$
Hydrobicarbonate,	$(PbO+HO)+2(PbO+CO^2)$
Hydrotricarbonate,	$(PbO+HO)+3(Pb+OCO^2)$

Journ. Frank. Inst. Jan. 1842.

MISCELLANY.

Toxicology.—Although Toxicology is not numbered among the educational objects of the Pharmaceutical Society, yet a knowledge of the important matter embraced in its consideration, appears to be so necessary to the Pharmaceutical Chemist, that we shall include an occasional notice of it in our pages.

We believe the Council were induced to omit toxicology in the list of subjects upon which the qualification of the Members of the Society should be tested, merely from a fear of appearing to grasp at too much, and trenching in any way upon the peculiar province of the medical practitioner. But, while we fully appreciate these motives, we still continue of the opinion we have always entertained, that a practical acquaintance with the properties and modes of operation of poisons, together with their proper antidotes and means of detection, are legitimate and essential acquirements for the fully qualified Pharmaceutical Chemist.

As a retailer of drugs, it is important that he should possess a well grounded knowledge of the properties of those substances, which exercise a destructive influence upon human life. Almost all the substances of this description under the name of Poisons, which pass into the hands of the public, do so through the medium of the retail Chemist, and he is held accountable for the exercise of due caution in supplying them. It is evident, therefore, that he ought to be intimately acquainted with the properties of these bodies; for upon such an acquaintance only can judicious precautions be founded.

In considering the position of the dispenser of medicines in relation to the physician and to the patient, the importance of his being able to detect any accidental error in a prescription, and thus to prevent the evil consequeuces that might otherwise result, is doubted by none. In order to perform this duty, he must be acquainted with Toxicology; he is, in most cases, ignorant of the particular symptoms of the disease, to which the remedy is directed; he presumes not to form a judgment as to what, within the limits of Therapeutics, should be the dose administered, but the moment the intended remedy outsteps these limits, it becomes his province, and indeed his especial duty, to consider the probable effect, and by referring to the prescriber to prevent the occurrence of injury.

The public advantage and safety then require a knowledge of Toxicology in the Pharmaceutical Chemist, which knowledge would not imply any departure from his legitimate province.

The medical treatment of cases of poisoning, as well as those of suspended animation from drowning and other causes, belongs undoubtedly to the medical practitioner; but as in the one case no less than in the other, the success of any remedial means depends in a great measure upon the promptness with which they are adopted, it is perfectly justifiable, in the absence of a medical man, *for others possessing the requisite knowledge to act until medical advice is obtained.* In the case of poisoning, the public, under such circumstances, naturally look to the Chemist, from his presumed acquaintance with the properties of drugs, and his knowledge of Chemistry, which science must regulate the treatment; and it is consistent and proper that he should be enabled to administer an antidote on such an emergency, as that persons possessing no medical qualification should, in the other case, be armed with the means of restoring suspended animation.

Beyond this we should, of course, deprecate the interference of the Chemist in the medical treatment of cases of poisoning. He will frequently, however, be enabled to render efficient assistance to the Physician or Surgeon, in determining the nature of the poisonous substance present, and as it seems desirable in these cases to bring as great an amount as possible of chemical as well as medical knowledge to bear upon them, the joint labor of the two may often be more successfully bestowed than either separately.

But there is yet another branch of Toxicology, no less important than those already adverted to, and having especial relation to the fulfilment of the ends of justice. We mean the detection of poison in the subject after death. Deep, indeed, is the responsibility which those incur who, in cases where other evidence is doubtful or wholly wanting, undertake the duty of determining the cause of death, and thereby perhaps fixing upon a fellow-being the stigma of guilt, for which his life will be sacrificed. There are few, it is presumed, who would not gladly shrink from so erroneous a task, yet the welfare of society demands that it should be performed, and performed by those whose education, experience, and general knowledge, shall enable them most efficiently to execute it.

The detection and determination of poisonous matter is a purely chemical process. It requires an intimate acquaintance with the principles of Chemistry, and a practical experience in the manipulations of the laboratory; in the absence of which, no man, however eminent in other respects, would be competent to undertake so delicate an operation. There are few, indeed, in the present day among us, who, without much previous study, and a lengthened practical ordeal, would presume to embark in this difficult department. Yet we can but consider, that being strictly a branch of chemical science, requiring a practical acquaintance with chemical agents and chemical manipulations, and the devotion of uninterrupted attention to, perhaps, a searching examination, this branch of Toxicology comes more immediately within the province of the Chemist than of the Medical Practitioner.

These are the views which have induced us to contend for the adoption of Toxicology as a branch of education essential to the Pharmaceutical Chemist; and we yet hope to see it admitted as such by the Council of our Society. We perfectly agree in opinion with those who object to adding to the list of subjects in our educational scheme, any one that is not absolutely required by the circumstances in which we are placed. It is especially, *with reference to these circumstances*, that we are brought to the conclusion we have expressed; and we see nothing in the condition of the medical profession in this country that should deter or prevent our Pharmaceutists from attaining to that eminence in Toxicology which has distinguished those of continental nations.—*Trans. of Pharm. Soc.*

Sulphurous Acid as a Reagent. By A. Duflos.*—Sulphurous acid is employed in analytic Chemistry, as a means of reducing the selenious and telluric acids. M. Wöhler has likewise shown that it converts the arsenic into arsenious acid, and consequently, in the case where we are compelled, during the research for arsenic in organic mixtures, to submit this metal to the action of oxidising substances, it may be useful in reducing the arsenic acid formed, with the view of facilitating the precipitation of the arsenic in the state of sulphuret.

To these analytic applications, we may add another, which does not merit less attention. Suphurous acid is a very valuable auxiliary in the separation and quantitive determination of iodide of copper. When a solution of deutoxide of copper is added to a liquid which contains a solution of iodine in metallic combination, one half of the iodine separates as an insoluble iodide of copper, the other half as free iodine, which remains in solution. This solution may be prevented by using along with the solution of oxide of copper, another of protoxide of iron; this latter then passing to the state of peroxide. This method of separating iodine is certainly very good to obtain it on a large scale, but not when the object is the quantitive determination of the iodine in certain compounds, because the iodide of copper thus formed always contains iron, which renders the result incorrect, and in addition it may happen that the avoidance of the use of iron in the investigation may be especially desired. Sarphati has, it is true, already endeavored to obtain a remedy for this inconvenience, by using, instead of the mixture of the sulphates of iron and copper, a solution of chloride of copper in hydrochloric acid; but, first, this reagent is not always at hand, and is decomposed with great facility; again, it is not a rare circumstance that we desire to deter-

---

*Ann. der Chem. und Pharm.

mine at the same time, both the quantity of iodine and of chlorine in one and the same liquid : it is therefore indispensable to avoid every addition of chlorine. All these inconveniences are set aside by the use of a solution of sulphate of copper in a concentrated aqueous solution of sulphurous acid. All the iodine existing in the liquid as hydriodate, is then completely precipitated, as an iodide of copper totally insoluble in the liquid which contains free sulphuric acid; while under the same circumstances the chlorine and the bromine does not form an insoluble combination. The iodide of copper is collected on a filter of unsized paper well washed, dried, and finally heated to a temperature of 120° C., in a bath of chloride of calcium, in a small glass tube closed at one end, until it ceases to lose weight. Dividing the weight of the iodide of copper by 1,501, the result will be the quantity of the iodine.—A. G. V.

Journ. de Pharm.

On the Existence of Free Acid in Spiritus Ætheris Nitrosi. By Mr. Harvey.—This spirit, however recently or carefully prepared, contains a portion of free nitrous acid, one effect of which is to decompose various substances, with which the spirit is frequently combined in prescriptions. Thus, if it is ordered in a mixture with iodide of potassium, it will liberate free iodine ; if prescribed with mistura ferri composita, it will convert a portion of the proto-carbonate of iron into the inert peroxide; if added to simple infusion of roses, or to a mixture colored with red poppy syrup, it will gradually decolorize it. For mixtures such as the above, I use the Sp. Æth. Nit. deprived of its acid, by being kept standing on crystals of carbonate of potash. If the spirit be of full strength no appreciable quantity of the alkali or nitrate of potash is dissolved, and by the use of the Spiritus Æther Nitrosi so treated, all the objections above described are obviated.

Pharmaceutical Journal and Transactions. Jan. 1842.

THE
AMERICAN JOURNAL
OF
PHARMACY.

JULY, 1842.

ART. X.—OBSERVATIONS ON THE MAGNOLIA GRANDIFLORA. By STEPHEN PROCTER, M. D.

(*An Inaugural Essay presented to the Jefferson Medical College.*)

THE subject of the following essay is one that calls forth the deepest admiration of the botanist, as well as the ordinary observer, for the "majesty of its form, the magnificence of its foliage, and the beauty of its flowers." Although others can be found that exceed it in size, yet, as Michaux justly remarks, the Big Laurel is the most remarkable of all the trees of North America, east of the Mississippi. Its large shining deep green leaves form a verdant bed, worthy as a place of repose for its large and beautifully formed flowers, whose agreeable odor sent forth on the breeze seems to invite the admiration of the passer by.

MAGNOLIA *grandiflora.*

Generic characters.—Calyx, three-leaved. *Petals,* six to nine. *Capsules,* two-valved, one-seeded, imbricated in a cone. *Seeds,* pendulous, arillate.—(*Nuttall's Genera,* p.18.)

Specific characters.—Leaves perennial, oval, lanceolate, thick, coriaceous, ferruginous underneath; petals obovate, abruptly contracted into a claw.—(*Michaux, Flor. Boreal. Amer.*

Elliot states that this magnificent tree rises sometimes sixty, seventy, or eighty feet in height, with a naked, smooth columnar stem; and the head, when not injured by accident, is always pyramidal or semi-elliptical. From May to August, in favorable situations, it is almost always covered with its brilliant white flowers, terminating the young branches. The *petals* are large, oval or obovate, abruptly narrowed at the base, concave, coriaceous, of a brilliant white, but becoming instantly ferruginous when scratched or bruised. Stamens very numerous, imbricate, much shorter than the corolla. *Germs* superior, aggregated on an oblong receptacle. *Style* short, recurved. *Capsules* sitting on the receptacle, imbricated, splitting longitudinally. *Seed* one or two in each capsule, covered with a scarlet pulp; hanging for a few days after they quit the capsule, by a thread attached to their base.

Habitat.—This tree appears to grow in rich light soils, and is very common all along the sea coast of Georgia and Carolina. In Georgia it extends higher up the country, being found in the neighborhood of Milledgeville, and in Alabama I found it growing plentifully as high as Fort Jackson. (Botany of South Carolina and Georgia.)

It grows abundantly in Mississippi. Michaux says, "It is found only in cool and shady situations, where the soil is composed of brown mould, loose, deep and fertile." Such soil is found principally on the borders of the great swamps caused by the overflow of the rivers; and so much is it confined to this characterized soil, that the planters in that section of the country, in selecting land, place great confidence in this evidence of its fertility.

Properties.—The trunk of this species of Magnolia is covered with a smooth grayish bark, resembling that of the beech. The inner bark is fibrous, and appears to be formed of layers easily separable. It possesses a peculiar and intensely bitter taste. The external portion of the bark is much less fibrous and less strongly impregnated with the peculiar bitterness than the internal layers, which is, undoubtedly, due to age and exposure. In the older trees this external part gradually exfoliates in spots, causing an irregularity on the surface of the bark.

Medical History.—Little can be said in regard to the medical history of the *Magnolia grandiflora.* Like the officinal varieties it is stimulant, aromatic, and tonic. It has been little, if at all, used by the scientific physicians, but in many of the southern states it is occasionally employed in domestic practice, in the treatment of the intermittents so common in that section of the country. As a febrifuge it is doubtless inferior to cinchona, but in obstinate cases, where the system has become accustomed to that drug, the disease has been found to yield to the bark of this magnolia, given in doses of from one to two drams, frequently repeated. The best form for its administration is powder or infusion ; the decoction is nearly inert,[1] and the tincture is objectionable in many cases on account of the menstruum employed.

Chemical History.—Little is yet known of the chemical history of the Magnoliaceæ. The *Magnolia glauca* seems to have received more attention, both in a medical and chemical point of view, than any others of the species. The only other plant of this natural order, (native of North America,) so far as I am acquainted, which has received attention from the Chemist, is *Liriodendron tulipifera.* Professor Emmet of Virginia, in a paper read before the Philadelphia College of Pharmacy, details an analysis of the bark of that plant, and succeeded in demonstrating the existence of a peculiar principle in it, endowed with some remarkable properties, of which the following is a sketch.

"Crystallized *Liriodendrin* is solid, brittle, and inodorous at 40°, fusible at 180° and volatile at 270° Fahrenheit. When carefully heated in a glass tube closed at one end, it gives off a white vapor, which condenses again without signs of crystallization ; but it is impossible, even with the utmost care, to effect the complete sublimation of this substance. About one-half remains, which appears to consist of a solid, brittle resin."

The most remarkable peculiarity of this principle, is its refusal to crystallize under certain circumstances, while under others it does so with extreme readiness. It is important that water be present, and Professor Emmet inclines to the opinion that water enters into its composition. He obtained it by treating the coarsely powdered bark with successive portions of boiling alcohol, (of 89 per cent.,) evaporating the tincture thus obtained to one-third, and treating the soft resin-like matter which separates, with a weak solution of potassa. By this treatment the impure liriodendrin is deprived of most of its coloring matter, and by repeated washing the liquor will finally pass off colorless. It now has a drab color and the consistence of putty. To obtain it in crystals, all that is necessary is to dissolve this putty-like mass in alcohol; add water very gradually until the alcoholic solution begins to appear opalescent; then set it aside to evaporate spontaneously, and crystallization will readily take place.

It has been conceived necessary to preface the experiments on *Magnolia grandiflora* with the above observations on a plant allied to it from belonging to the same natural order. The sequel will show that a crystalline principle, very similar to liriodendrin in many of its properties, exists in this species of Magnolia; and independent of its abstract interest as a new addition to our stock of chemical knowledge, it confirms the true natural alliance which exists between these two nobles of our forests.

It will be proper to go into a full detail of the experiments which have been made, and conclude by comparing the results with those of Professor Emmet.

A decoction of the bark of the *M. grandiflora* is precipitated yellowish-white by subacetate of lead, brown by nitrate of silver, dirty-white by bichloride of mercury, brown by lime-water, and light-brown by baryta water. Persulphate and perchloride of iron turn the color of the decoction instantly to a dark green, and, after standing many hours, a precipitate forms which has a dark greenish olive hue. Iodine causes no change.

The decoction has an acid reaction with litmus, though not very decided. When added to a solution of gelatin, no perceptible change takes place at first; but after standing, a slight precipitate occurs, but whether owing to a precipitation of coloring matter or of tanno-gelatin, has not been determined. It may be doubted whether tannin exists in this bark; if it does, it must be in a modified form, as the usual reagents do not indicate it. This would seem to be corroborated by the statement elsewhere made, that tannin and gallic acid do not exist in the bark of the *Magnolia glauca.*

Half a pound of the dried bark was macerated in alcohol (36° Baumé) for six days, and the tincture decanted and filtered. This was suffered to evaporate spontaneously, when a semi-fluid mass, interspersed with numerous acicular crystals, was obtained. This matter was treated with a mixture of one part of solution of potassa (U. S. P.) to sixteen parts of water, until every thing soluble was removed, leaving a yellow flocculent matter unaffected by the menstruum, which was collected on a filter. This substance was tenacious, adhesive, resembling soft putty, and had the taste of the bark in a concentrated degree. By drying, it became dark colored.

This substance was dissolved in alcohol, and water added to the alcoholic solution until it became slightly opalescent; it was then allowed to evaporate spontaneously. Numerous acicular crystals were thus obtained, associated with a brownish matter, to be noticed hereafter.

The crystalline matter possessed the following characteristics: It was insoluble in water, soluble in alcohol, cold or hot, and in ether. It crystallizes in four sided acicular prisms, with obliquely truncated terminations; they are very fragile, crack under the teeth, and when free from the *brownish matter*, have very little taste or odor. They melt at a low temperature, and when put in contact with flame instantly ignite and burn with a brilliant light, giving off much smoke and leaving a residue of carbonaceous matter.

A small quantity of the crystalline matter was placed on the bulb of a thermometer, the greater portion of which was immersed in mercury, to which heat was applied. When the instrument indicated a temperature of 180° to 190° Fahr. the substance fused; at 250° it began to volatilize; and at 270 to 300 it passed rapidly into vapor. About one-half was thus volatilized, and a transparent light-brown brittle resin remained, which was tasteless, inodorous, and readily inflammable, burning with a smoky flame. This resin was heated to 400° Fahr., without the slightest evidence of melting.

The brownish matter, before mentioned, was uncrystallizable, resinous in its aspect, possessing the odor of the bark, and much of its bitterness and pungency. A portion of this when gradually subjected to heat, melted, and white vapors gradually passed from it, leaving a transparent brown, brittle resinous substance, which was tasteless and inodorous.

To the liquor remaining after separating the putty-like substance, sufficient acetic acid was added to saturate the potassa, when a brown flocculent precipitate was thrown down. This was collected on a filter, washed and dried. It had a dark olive brown color, the consistence of wax, and the peculiar odor of the bark. Although possessed of a slight taste, it had neither the peculiar bitterness nor pungency of the bark. It was inflammable, burning readily with much smoke and leaving a residue of charcoal.

The liquid remaining after the separation of the last mentioned product, was evaporated nearly to dryness. A reddish-brown extract was thus obtained, which had no odor and little taste, except what was communicated by the acetate of potassa contained in it.

A pound of the bruised bark was macerated in twice its weight of water for twenty-four hours, and subjected to distillation, till two-thirds of the water had passed over. The product was opalescent with globules of oil floating on the surface. This was returned on another pound of the bark and again distilled. The product was more opalescent than before, and a larger portion of the oil was obtained. This was separated, and possesses the following properties: it is very sparingly soluble in water, but very soluble in ether, alcohol, and oil of turpentine. Its alcoholic solution has a taste intolerably pungent, bitter aud nauseous; a drop of it placed on paper and held over a lamp was rapidly volatilized leaving no residue. The vapor given off by heating it resembles that obtained by the brown matter, before mentioned, by a similar process. A portion of the *fresh* bark distilled some months ago, yielded a much larger proportion of volatile oil.

Two ounces of the bruised bark were macerated in four ounces of sulphuric ether (56° Baumé) for two weeks, and the ethereal tincture suffered to evaporate spontaneously, when numerous tufts of acicular crystals were obtained, having similar properties to those obtained by the other process. Associated with them was a greenish substance, apparently consisting of resin, greasy matter and chlorophyl, the last probably due to the lichens growing on the surface of the bark.

From the foregoing observations it may be inferred that among the principal constituents of the bark of the *Magnolia grandiflora*, may be enumerated *green resin, volatile oil*, (upon which its remedial virtues probably depend,) and *a peculiar crystallizable principle* analagous to *liriodendrin.* To these may be added an acid, the character of which has not been ascertained; and which produces a green precipitate with the sesqui-salts of iron, having some analogy to tannic acid, but not precipitating gelatin; salts of lime and iron, and finally lignin.

It remains, in conclusion, to speculate on the character of some of the above mentioned principles, and compare them with liriodendrin. Professor Emmet says, "The alcoholic solutions of both varieties of liriodendrin, possess anintensely bitter taste, and always leave an impression of heat upon the tongue." The alcoholic solution of the uncrystallized principle of the *Magnolia grandiflora* is bitter and pungent, but not so much so as that of liriodendrin is described to be. The crystalline principle appears to be very analogous to that of the Liriodendron. They both fuse at 180°, volatilize at about 270° Fahr., and both leave a brittle, transparent resin, when subjected to a higher temperature, and crystallize in prisms, although the shape of those of liriodendrin was not determined. Professor Emmet concludes by observing that the properties of liriodendrin seem to place it by the side of camphor, between the resins and volatile oils. The propriety of this position may be doubted, as camphor, and those stearoptenes analogous to it from the volatile oils, are wholly volatile ; hence, as one-half of both liriodendrin and the principle from Magnolia, is constituted of a non-volatile resin, the impropriety of giving them that situation is evident. It is more probable that these principles are compounds of a resin and a volatile principle analogous to the volatile oils, and that their peculiar taste depends on the latter.

What part this principle plays in the remedial influence of the bark has not been determined, but it is more than probable that the volatile oil acts most prominently, and may indeed, enter into the composition of the crystalline principle.

ART. XI.—PHARMACEUTICAL NOTICES. NO. XXII.

By Augustine Duhamel.

Turlington's Balsam.

One of the best evidences of the advantages of the displacement system, in its application to substances of the *gummo-resinous* class, is afforded by the preparation of the Comp. Tinct. of Benzoin. When desirous of preparing some of this Tincture, according to the U. S. Pharmacopœia, from our experience being confined, with but few exceptions, to the simple tinctures of the resins, we were not prepared for a full realization of our hopes, as this compound embraces a variety of substances, which, with the exception of one, were of an exclusively resinous character. The Storax, Benzoin, Aloes and Tolu, of which last we happened to have some in a perfectly dry state, were reduced in a mortar to coarse powder, and then mixed together with a portion of clean and dry sand, and the whole submitted to the action of the alcohol in a displacement apparatus. It only remains to say, that we were in a few hours put in possession of a tincture as effectually made, if not better, than if it had been allowed to macerate for six months, when we would have found it difficult to filter it through paper.

The residuum afterwards emptied upon a sheet of paper and exposed to the sun, displayed, upon becoming dry, some loose sand, interspersed with woody and extraneous matters which were contained in the Benzoin—and, what is of importance to know, *was completely exhausted of resin.*

Oxide of Silver.

We have lately had calls for Oxide of Silver for medicinal purposes, elicited, probably, by a publication in some medical Journal.

It is obtained by dissolving silver in nitric acid and precipitating the solution by caustic potash or lime water; or take,

Crystallized Nitrate of Silver,	℥j.
Caustic Potash,	℥vij.
Pure Water,	℥xviij.

Dissolve the nitrate of silver in two or three ounces of the water, and then separately the pure potassa in the remainder of the water; mix the two solutions, stir with a glass rod, and throw the whole upon a filter: finally, wash the precipitate from adhering alkali, and dry carefully. The product will be seven and a half drs. Oxide of silver is of a brownish gray color, but becomes darker by drying. It is very sparingly soluble in pure water, and exerts an alkaline re-action upon litmus reddened by an acid.

Lozenges of Proto-carbonate of Iron.

Since the introduction of the Vallet's Pill, or pure proto-carbonate of iron, rendered insensible to the attack of the oxygen of the atmosphere, by conversion into a pillular mass with honey, the old formula of Dr. Blaud has fallen into disuse. The last, as well as the more recent improvements first mentioned, it will be recollected, was designed by the inventors to supersede that familiar, though very inconstant preparation known as *precipitated carbonate of iron.* This formula directed pills, formed with some difficulty, of sulphate of iron and carbonate of potash in equal proportions, and resulting in carbonate of iron and sulphate of potash from mutual decomposition. The only advantage gained by these pills, was the administration of a freshly prepared carbonate of iron, while no remedial value was anticipated or derived from the sulphate of potash given along with it. These pills were not invincible to oxidation, and it was found that to preserve their efficiency it was necessary to coat them over with gelatine.

The mass of Vallet's has been extensively employed in chlorosis, debility and nervous affections, where the use of a chalybeate is indispensable, in three grain doses, made into pills. As it has a ferruginous taste not the most palatable to the ladies, various devices have therefore been tried with the view to its administration in the most acceptable form. In the pursuit of this object, a syrup was recommended in place of the pills, to which many patients have a decided objection; then troches, more agreeable, on account of the sugar; and finally a ferruginous chocolate. This last has been most popular with physicians, both on account of the nutritious nature, as well as the rich flavor of the chocolate, which effectually disguises the chalybeate, and was therefore considered a valuable addition to Pharmacy, to which it properly belongs, though brought out here and in other places under the auspices of the confectioner. In a prospectus obtained from such a source, after detailing its properties, recommendations, &c., mention is made that the iron is incorporated in the form of a powder with the chocolate.

This led us to suppose that the true protocarbonate was not used, but the ordinary RUST OF IRON instead, which, upon subsequent inquiry turned out to be the case. The plea urged for the substitution was the impossibility of mixing a substance containing aqueous moisture with chocolate ; water and fat being antipodes.

This circumstance induced us to devise a formula, which would ensure a certainty of the effects to be derived from Vallet's mass, with the grateful flavor of chocolate and sugar, and in the enticing form of a lozenge. It is as follows :

Take of Vallet's ferruginous mass,	15 drs.
Prepared Cocoa,*	2 oz.
Powdered Gum Tragacanth,	4 drs.
Refined Sugar,	6 oz.
Tincture of Vanilla,	1 dr.

Reduce the cocoa to fine powder along with the sugar, then

---

* This is the chocolate nut roasted, deprived of its outer covering and broken up.

add the other ingredients, and make into a mass with water; lastly, divide into 360 troches, (about 14 grs. in weight.)

This will allow 2½ grains of the protocarbonate to each lozenge—six of which, (15 grs. of the iron,) taken in a day, constitute a regular dose.

New Opodeldoc, or Liniment of hydriodate of Potash.

Iodide of Potassium has been rendered highly valuable by its very successful application in glandular affections, and of late as an internal remedy in rheumatism. Externally, it is principally used in the form of an ointment, either alone or combined with an additional portion of iodine.

Every one has observed the change this ointment undergoes from the re-action of the alkali, and the acid of the grease: the potassium becoming oxidized and the iodine set free, which colors the ointment yellow.

In the *Journal de Pharmacie et Chimie* for April, of the present year, is published a formula for a solid liniment of Hydriodate of Potash, intended as a substitute for the ointment of the same, which possesses the advantage of keeping a long time without becoming decomposed. It is called *Baumé Hydriodate*—and is prepared as follows:

Iodide of Potassium,	ʒj.	Soap of animal oil,	℥iss.*
Alcohol of 20°,	℥iv.	Alcohol of 20°	℥iv.

Make these solutions separately—that of the soap upon a sand bath, assisted by a mild heat; when effected, mix the two together, aromatize with a small quantity of oil of lavender, and before it congeals, pour it into wide mouth vials.

I have prepared some of it, and so far its appearance and uses have given general satisfaction. It resembles Steer's Opodeldoc, and, like it, when applied, melts by the natural heat of the body.

---

*I have increased the quantity of soap from 1½ to 2 ounces to suit our Summer temperature.

Displacement of Senna.

Some of my colleagues have mentioned to me a difficulty they encountered in preparing the Fluid Extract of Senna, agreeably to the directions submitted by me in the 4th No. of the last volume of this Journal.

By reason of the large proportion of water composing the menstruum, the organic tissues become swollen and impenetrable, from the developement of the albuminous matters which cover them, and the mass assumes a pasty consistence, especially if the Senna is in a finely divided state, which renders percolation slow and difficult, if it does not entirely cease.

As this same difficulty has since presented itself to my own observation, I naturally sought a remedy. I was unwilling to employ a large proportion of alcohol, from the necessity of either losing it, or the trouble of recovering it by distillation; neither was I willing to employ decoction, as it would require a larger quantity of water, and my preparation would be exposed to the injurious consequences attending long evaporation. I therefore resorted, after maceration, to mechanical pressure, which in depriving the Senna of its fluid parts, carried away nearly the whole of the mucilage.

The Senna after this was transferred to the displacement apparatus, and being treated with the remaining menstruum, no longer occasioned any difficulty.

The quantity of alcohol, however, in the formula might be increased without any disadvantage, as also the oil of fennel.

Facts connected with the Detection of Arsenic.

Some time ago I prepared for the use of the readers of this Journal, a paper upon the detection of Arsenic, compiled from the best authorities, and in which were summed up all the latest improvements made in Toxicological Chemistry. Of late, more than ordinary attention has been given to this branch in England and France, particularly the latter. So much so, that we find every number of the "Journal de Pharmacie" more or less occupied with contributions of this nature. These have grown out of a discussion between Messrs. Orfila and Raspail, founded on differences of opinion, regarding certain facts published in a memoir of the former, after the investigation of the body of Monsieur Lafarge. Mr. O. it will be recollected was consulted in this case, and his opinion in a great measure guided the Court in fixing condemnation upon Madame L. Among these interesting papers I have collected a number of facts which form an important acquisition to my compilation—two of which are here subjoined.

A. D.

Easy Method of distinguishing Antimony from Arsenic by Ammoniacal Nitrate of Silver.

"Mr. Marsh remarks that the apparatus to which his name is given, may serve the purpose of distinguishing arsenic from antimony, by putting in practice the process indicated by Hume, for detecting arsenic by means of the double nitrate of ammonia and silver, as follows :

"Moisten a piece of glass, porcelain, or mica, with the solution of salt of silver, and present horizontally the wet part to the jet of inflamed hydrogen, holding it about half an inch above the flame. If there is any arsenic in the mixture, the citron yellow color so characteristic of this metal is immediately produced. If there be antimony, a curdled white precipitate is produced.

"Again, if neither of these metals exists in the mixture under examination, the silver is immediately reduced by the hydrogen to the state of metal. Mr. Marsh says, that as delicate as this test would appear, it gives such nice and precise results, as to satisfy the most cautious experimenter, in detecting the minutest portions of these two poisons."—*Journ. de Pharm., from the Brit. Phil. Mag. June,* 1841.

Means of purifying Zinc, for making hydrogen in Toxicological Experiments.

Mr. Alphonse Meillet, says:*—"By the following means I have invariably succeeded in obtaining chemically pure, at a single operation, so simple and abridged as to require only a quarter of an hour to purify several pounds of zinc. Melt the zinc of commerce in a common crucible, and throw it into a tolerably deep vessel of water, having care that the metal be very hot at the moment of running. This operation is not without its use, for the more granulated the zinc, the easier is it purified ; dry the grains and dispose them by layers in a Hessian crucible with one-fourth of their weight of nitrate of potash, using the precaution to place a slight excess at the top and at the bottom. Cover the crucible, and secure the lid, then apply heat: a vivid deflagration takes place with great disengagement of light ; after which remove the crucible from the fire, separate the dross with a tube, and lastly, run the zinc into an ingot mould. This zinc submitted to Marsh's apparatus during entire days has never given any stain, and in solution the most sensible reactives, such as Hydrosulphocyanic acid, have never indicated the least atom of iron."

---

* Journal de Pharmacie.

ART. XII.—ESSENTIAL SALT OF BARK.

By C. Ellis.

Salt of bark is a preparation from Cinchona, which was used to a considerable extent in this city, previous to the discovery of Sulphate of Quinia.

It is now scarcely known even by name; and the few remarks which follow, I am induced to offer from its close resemblance to an article recently received from Europe, called "Febrifuge Powder of Cinchona."

I am indebted to my friend William L. Rushton, an intelligent member of our profession in New York, for a portion of this powder, which is prepared by "Bassano Cavezzali di Lodi, first Chemist of the Governor of Milan." The directions which accompany the article, state "that it is used in the same manner as the sulphate of quinine—in pills, powder or solution—the dose varying from one to two drachms, according to the nature of the case; that it has been used in Naples, Belgium, and other parts of Europe, and is preferred, or has superseded the use of quinia, and that its perfect solubility in water and the low price at which it can be furnished, are among the advantages it possesses."

The essential salt of bark is certainly not identical with the "Febrifuge Powder," but their close resemblance in taste, smell, color, and solubility in cold water, will be perceived by an examination of the two preparations. The latter appears to possess a peculiar aroma, and a slight caustic taste, which the former has not to the same extent.

Salt of bark, when carefully prepared, is an efficient remedial agent in the cure of intermittent and remittent fevers. It enjoyed a high reputation at one time in this city, and was one of the principal remedies employed by some of our physicians during the prevalence of those fevers, for several successive years previous to the introduction of sulphate of quinia.

The following is the mode of preparing it:

Take Calisaya bark finely bruised, q. s.

Put it into a displacement filter, with sufficient cold water to cover it—set it aside for twelve to twenty-four hours—then displace in the usual manner, until the strength of the bark is exhausted. Evaporate the clear liquor to the consistence of a soft extract, spread the same in layers over plates or evaporating dishes, placed over the gentle heat of a stove or sand bath; continue a low heat until the extract is dry, separate the scales from the dishes, and having reduced the whole to fine powder, secure it in close vials, to prevent the absorption of moisture.

The product would probably be chiefly composed of kinate of cinchonia and quinia, and might no doubt be used with advantage in many cases, instead of sulphate of quinia. No attempt has been made to analyse the febrifuge powder, (but a small quantity of which having been received in this country,) the object being merely to present it to the meeting as a new remedy, and consequently a subject of interest, and at the same time to notice an old preparation of cinchona, which at least bears a strong resemblance to it in many of its sensible properties, as the specimens of the two articles before you will attest.

Philadelphia, Fifth Month 9, 1842.

ART. XIII.—REMARKS ON SOME PHARMACEUTICAL PREPARATIONS OF LOBELIA INFLATA. By W. Procter, Jr.

The only preparation of *Lobelia inflata* which has been recognised by the Pharmacopœia, is the tincture. It has been generally admitted, both by Thomsonians and others that heat exercises an injurious influence on the activity of this plant, and hence preparations in which heat is requisite have been necessarily dispensed with. In some observations of a chemical character on this plant, published in the thirteenth volume of the Journal of Pharmacy, the writer demonstrated several of the conditions under which this change by heat takes place, and showed that while the active principle in a free state was readily destroyed by heat, when it was in saline combination with an acid, it was capable of being subjected to a heat of 212° Fahr., without injury.

Any one may be satisfied of this, by making two decoctions of Lobelia, into one of which a small quantity of carbonate of potassa is thrown, and into the other as much acetic acid. The former will possess none of the peculiar acrimony of the plant; the latter, all.

The object of this communication is to take advantage of the above suggestion in making several pharmaceutical preparations which require heat in their formation. It is believed that *Lobelia inflata* has yet to receive from professional men that share of attention which it deserves, and it is hoped by presenting to the practitioner the virtues of the plant in a condensed form, that he will take up the subject.

Acetous extract of Lobelia inflata.

Take of Lobelia seed, bruised,	eight ounces.
Diluted Alcohol,	four pints.
Acetic Acid,	one fluid ounce.

Macerate the bruised seed in the diluted alcohol, to which the acetic acid has been added, for forty eight hours, and then throw the whole on a displacement filter, and after the liquid has ceased to pass, add sufficient diluted alcohol, that four pints of tincture shall be obtained. Evaporate this by means of a water bath, until it attains the consistence of an extract. The product thus obtained is about one-eighth of the seed employed. In this form (as a pill) Lobelia can be administered without that peculiar disagreeable effect upon the fauces, so characteristic of its exhibition in the form of tincture.

Vinegar of Lobelia inflata.

Take of Lobelia, in powder,	four ounces.
Diluted Acetic Acid or distilled Vinegar,	a pint and a half.

Macerate the Lobelia in the dilute acid, for twelve hours, and subject it to displacement on a proper filter, until twenty-four fluid ounces are obtained.

Syrup of Lobelia inflata.

Take of Vinegar of Lobelia,	six fluid ounces.
Sugar,	twelve ounces.

Dissolve the sugar in the vinegar, by the aid of heat, remove the scum which rises, and strain.

The oxymel may be prepared from the vinegar in the same manner as oxymel of squills ; and a combination of the two has been highly spoken of by a physician of this city, in catarrhal affections.

In making an infusion of Lobelia, some acid—vinegar, for instance—should always be added.

ART. XIV.—CITRINE OINTMENT.

To the Philadelphia College of Pharmacy.

Gentlemen,—Having noticed considerable discussion at various times in the American Journal of Pharmacy, as to the best mode of preparing Citrine Ointment, I submit, for the inspection of the College, a sample of Camphorated Citrine Ointment as prepared by me for thirty years past, according to a recipe obtained from the late Doctor James Gallagher, of this city, and which possesses all the requisites of an elegant and efficient Citrine Ointment, retaining the suitable consistence for any length of time.

Obtain from any dairy farmer, one pound of unsalted butter, put it in an open stone ware pot or jar, where there will be sufficient heat to soften the butter, so as to be stirred with a wooden spatula ; to a portion of this add ʒiv. of camphor, in powder, then stir the whole together.

Dissolve ℥ii. of quicksilver in ℥ii. of pure nitric acid, and as soon as it is dissolved stir it in gradually. It first assumes a whitish appearance, then, in a short time, an orange reddish, and lastly a fine gold color.

Respectfully yours,

Peter Lehman.

April 28, 1842.

ART. XV.—AN INAUGURAL ESSAY ON STATICE CAROLINIANA, WITH A CHEMICAL ANALYSIS OF THE ROOT OF THIS PLANT. By EDWARD PARRISH.

(Presented to the Philadelphia College of Pharmacy.)

THIS plant appears in the secondary list of the United States Pharmacopœia, under the officinal name of Statice.

The Genus Statice belongs to the class Pentandria, and order Pentagynia, and to the natural order Plumbagineæ of Jussieu.

Its generic characters are thus stated: Calyx one-leaved, plaited and scariose. Petals five; seed one, superior.—*Nuttall.*

A difference of opinion exists among botanists, as to whether the *Statice Caroliniana* is a distinct species, or a mere variety of the *Statice limonium* of Europe, from which it is distinguished chiefly by its smaller flowers and plain or flat leaves. From the *Statice Gmelini*, an Asiatic species, it is said to differ still less in its general form. Walter, Pursh, Bigelow and others, maintain that it is entitled to the rank of a separate species, while Nuttall, Torry, and some others, incline to the opposite view.

This plant in common language, is known as Marsh Rosemary, or Sea Lavender ; it has a perennial root, sending up annually tufts of leaves, which are narrow, obovate, entire, obtuse, mucronate, smooth, and supported on long slender footstalks. They differ, as before stated, from the leaves of the *Statice limonium* in being perfectly flat on the margin, while the latter are undulated. The flower stem is round, smooth, about a foot in length, and near its summit sends off numerous alternate branches which terminate in spikes, forming altogether a loose panicle.

The flowers are small, bluish-purple, erect, upon one side only of the common peduncle, with a mucronate scaly bract at the base of each, a five-angled, five-toothed calyx, and spatulate obtuse petals.

The *Statice Caroliniana* is a maritime indigenous plant, growing all along our sea coast, from New England to Florida, where it is very conspicuous for its purple tops appearing among the grass during all the summer months.

As found in the shops, the Marsh Rosemary root is in pieces, from one to three inches in length, about the thickness of a finger, though in some specimens considerably larger, sometimes branched, and irregularly annulated upon the surface. It is compact, fleshy, and with difficulty reduced to powder. Externally of a dark-brown, and internally of a light purplish red color.

It has an exceedingly astringent taste, with a slight degree of bitterness. Its virtues are imparted to alcohol and water, but to the latter more readily when boiling than when cold.

Though seldom prescribed by regular practitioners in Philadelphia or its vicinity, and scarcely to be found in our shops, it is regularly kept by the druggists in Boston, and other parts of New England, where large quantities of it are annually sold. Its medical properties are those of a powerful astringent, and its most popular application is to apthous and ulcerative affections of the mouth and fauces, though it is stated by Wood and Bache to be useful for all the purposes for which kino and catechu are given. Dr. Baylies, of Massachusetts, found it highly useful in cynanche maligna, or putrid sore throat, both as an internal and local remedy, and Dr. Mott, of New York, states, that in the chronic stages of dysentery, after inflammatory symptoms have been removed, a strong decoction of this root has restored persons to health, where various other tonics and astringents have failed.

Statice occupies an important place in the Materia Medica of the Thomsonian or Botanical system of medicine, and it is extensively used by Thomsonians as a tonic and emollient, as well as an astringent. A compound decoction, infusion and plaster, are recommended by them in the treatment of putrid sore throat, and they frequently employ it in other diseases.

Analysis.

With a view of ascertaining the chemical constituents of this root, the following experiments were made.

Experiment First.—A decoction was made by boiling one ounce of the bruised root in a pint of water. This was not discolored by animal charcoal, but was of a deep brown color, astringent taste, and had an acid reaction with litmus. With this decoction, solution of gelatin produced a copious curdy precipitate, muriate of iron a deep blue, and sulphuric acid a whitish precipitate; by the addition of a solution of the sulphate of morphia, a beautiful white tannate of morphia was thrown down. On the addition of alcohol, a coagulum was produced, and nitrate of silver separated a precipitate. Subacetate of lead being added, a whitish precipitate was thrown down, which was reddened by nitric acid. Tested with tincture of iodine, it failed to produce the blue color, indicative of the presence of starch. Precipitation by the subacetate of lead deprived the decoction of color.

Experiment Second.—The cold infusion made by the displacement process, produced a white precipitate with corrosive sublimate, and upon the application of heat a coagulum was formed. Both this infusion and that made by the ordinary method of maceration, possessed the sensible properties of the decoction, in a dilute state, and both afforded evidences of vegetable albumen.

Experiment Third.—A portion of the decoction was digested for twenty-four hours, with hydrate of alumina, filtered and tested for gallic acid. It produced slight precipitates, with tincture of muriate of iron and lime water, but which I am induced to believe, since depriving the root more thoroughly of tannic acid by the process of experiment fourth, were occasioned by traces of that acid remaining in the solution, or probably oxidized by boiling in contact with the air.

Experiment Fourth.—One hundred grains of the powdered root were boiled with successive portions of water, until the soluble parts were entirely dissolved; these were then mixed, filtered and treated with solution of gelatin, in the proportion of ten grains of gelatin to one ounce of water, till it ceased to afford a precipitate of tanno-gelatine. This was then separated on a filter, washed and dried, when it was found to weigh twenty-three grains: equal to 12.4 grains of tannic acid. This experiment was repeated, and the same result, with a very slight variation, was obtained.

Experiment Fifth.—A tincture of the root was made by subjecting one ounce to two ounces of alcohol for three weeks. This was of a dark wine color, and possessed a very astringent taste; a precipitate was afforded on the addition of water, and being evaporated, a dark colored astringent substance was left, part of which was soluble and part insoluble in water. The insoluble portion being then separated and dried, was found to possess the properties of resin, and was dissolved in a solution of caustic potassa, from which it was precipitated on the addition of an acid.

Experiment Sixth.—A small portion of the root was distilled with sufficient water, in a glass retort, when the liquid condensed in the receiver was found to possess the odor of the root, thereby indicating the presence of a small quantity of volatile oil. Owing to the limited quantity of this root that could be obtained, I was unable to procure any of the volatile oil for experiment.

Experiment Seventh.—An etherial tincture was made, by macerating one ounce of the root in two ounces of ether, for three weeks. Upon evaporation this yielded a dark-brown, very astringent extract, the properties of which were due to a portion of tannin dissolved by the water contained in the ether: with a view of separating this, it was digested with water, when a tough, elastic, sticky substance subsided, which was sparingly soluble in ether and the volatile oils.

It was not readily inflammable, but swelled up on the application of heat ; and when dropped upon a hot iron, rolled off in globules, unchanged. I am convinced that this precipitate was a mixture of tannic acid and caoutchouc. The solution of a salt of iron being dropped upon this, struck a blue color.

Experiment Eighth.—A portion of the root, which had been macerated for a long time in alcohol, was placed on a displacement filter, and a quantity of hot water passed through it. After this it was boiled in ether, and again placed on the filter, when on the addition of another quantity of ether, a light colored, oily fluid was displaced, which left apparently a permanent greasy stain upon paper, had an unctious feel, and was readily inflammable. This, however, on evaporation, yielded a brown colored extract, which possessed the properties of a mixture of resin and caoutchouc, and must have been a solution of these substances in ether.

Experiment Ninth.—A small quantity of the root was subjected to the action of boiling water in a displacement apparatus, and then alcohol passed through it ; after this it was treated with ether in the same filter, and the cold etherial tincture evaporated; this left a slight residuum of resinous matter, which being washed left a small portion of matter insoluble in alcohol, and having the peculiar characteristics of caoutchouc. This was soluble in oil of turpentine, and was exceedingly sticky to the touch.

Experiment Tenth.—The residue of experiment ninth, was boiled in a small quantity of ether, and an additional quantity of the same product was obtained.

Experiment Eleventh.—After treating a portion of the root with alcohol and water, it was subjected to the action of the oil of turpentine, on a displacement filter, when, by evaporation, the oil of turpentine was volatilized, and a thick, elastic, exceedingly sticky substance remained, possessing the properties of caoutchouc.

Experiment Twelfth.—A lye was obtained by incinerating a portion of the root, and lixiviating the ashes with boiling water. This restored the color to reddened litmus, and turned the yellow of turmeric to brown. It yielded a white precipitate with oxalate of ammonia, and also with nitrate of silver and nitrate of baryta, but none with tincture of galls, ferrocyanide of potassa, or carbonic acid water. The existence of salts of magnesia was proven by its affording precipitates with lime water, with phosphate of soda, and ammonia.

Summary.

From the foregoing experiments we may conclude that the root of the *Statice Caroliniana* contains: *First.* 12.4 per cent. of tannic acid. *Second.* Gum. *Third.* Extractive matter. *Fourth.* Vegetable albumen. *Fifth.* Volatile oil. *Sixth.* Resin. *Seventh,* Caoutchouc. *Eighth.* Coloring matter. *Ninth.* Lignin. *Tenth.* Salts of lime, soda and magnesia; of which common salt and the sulphate of soda and magnesia are probably the principal.

Preparations, etc.

Since making the foregoing experiments, I have met with some account of the Statice root in Bigelow's Medical Botany, vol. ii. p. 51, which differs from them in some particulars. It is stated that the cold infusion was found to be more powerful than the hot, which is accounted for by the escape of part of the gallic acid by evaporation. My observations, on the contrary, have led me to conclude that the decoction is the most astringent preparation of the root, because it extracts almost entirely the tannin, and as the volatile oil exists in very minutes quantities, and probably possesses little activity, its loss cannot impair the strength of the solution. As regards the evaporation of gallic acid by the heat employed in making a hot infusion or decoction, it may be remarked that in most of the processes for extracting that acid, the temperature of boiling water is used, in which it is certainly much more soluble.

This, however, is little to the point, inasmuch as, if my experiments are correct, this root contains very little if any of that acid. The tincture is probably equal in strength to the infusion, and nearly so to the decoction; it is a more elegant preparation, being exempt from the liability to precipitate after standing a few days, to which the infusion and decoction are subject to a great extent.

The account quoted by Bigelow states, that the astringency of this root was found fully equal to that of galls, which contain from thirty to forty per cent. of tannin; but it is rendered probable, by the subsequent part of the sentence, that this judgment was formed rather from the intensity of its precipitates with the salts of iron, than from any estimate of the quantity which it contains. Certainly had it possessed the astringency of galls, it would have long since acquired a much greater degree of importance in the materia medica than has yet been attached to it.

An Adulteration.—An article appears in our market under the name of Marsh Rosemary, which differs materially in chemical constitution from the genuine drug. It may be distinguished by its comparative lightness, its short starchy fracture and light grayish color, and by generally occurring sliced longitudinally, instead of in whole pieces. The spurious root may also be known by its reaction with tincture of iodine, indicating starch, which the genuine root does not contain.

ART. XVI.—OBSERVATIONS ON TWO OF THE SPECIES OF ARISTOLOCHIA WHICH AFFORD THE SERPENTARIA OF COMMERCE.

The article of the Materia Medica, denominated Serpentaria, although defined in the United States Pharmacopœia to be the root of A. *serpentaria*, is indiscriminately collected from several species. Three species are enumerated as contributing the article found in the market, viz. : A. *serpentaria*, A. *tomentosa*, and A. *hastata*. To these we may add two more species, one of which certainly, and the other probably, has been met with in commerce. These species are the A. *reticulata*, of Nuttall, and the A. *hirsuta*, of Muhlenberg, both as yet undescribed, although discriminated, and thus named by these botanists. There has lately appeared in this market, a Serpentaria which is certainly derived from the former species, being accompanied by stems, leaves, flowers, and fruit, presenting the well marked characters of this plant, as compared with the specimen contained in the Herbarium of the Acadamy of Natural Sciences, of this city, and marked in the hand writing of Mr. Nuttall, "A. *reticulata*, Red river." The locality in which this root was collected is uncertain, all the information on this point being that it was transmitted from Virginia, whether collected in that state or not being unknown. The A. *reticulata* is characterized by a root resembling Serpentaria, which send off numerous short stems, most usually simple, but occasionally branching near the root. These are slender, round, flexuose, jointed, and slightly villous in old, from numerous scattered, yellowish-white hairs, but in young specimens amounting to a dense pubescence. The leaves are large, subsessile, varying from round to oblong cordate, obtuse, reticulate, with very prominent veins, and villose on both surfaces, more especially on the veins, and very short petioles. The peduncles, several in number, (4 or 5,) given off from the lower joints of the stem, are hairy, jointed, and support at the joints small leaffy villous bracts, (tomentose when young,) and several flowers, on short sub-peduncles. The flowers are small, purplish, and densely pubescent, especially at their base, and on the germ. The hexangular deeply sulcate capsule, which may be sometimes seen on the same general peduncle with unexpanded flower, is sprinkled with scattered hairs, and bears at its apex the decayed corolla.

This root, as found in the drug market, is in appearance of a coarser character than the common kind. From a knotty caudex it sends off numerous long fibres, two or three times the thickness of those from the A. *serpentaria*, of a yellowish color. Its smell is aromatic, its taste warm, aromatic, and very bitter; appearing in these respects fully equal to the ordinary article. The whole of this parcel is derived from the same species, all the stems and leaves collected from the bale presenting similar characters. It is in all probability derived from a locality in which it is the only species; perhaps the only known locality, west of the Mississippi river, in the States of Louisiana and Arkansas. Had its source been Virginia, from whence it was received by us, it would have probably been mixed with the other species, A. *hirsuta*; the ascertained locality of which is from the northern part of Georgia, up to Virginia. A new locality for this article, of such a quality as the above, is of some importance, Serpentaria of late years being scarce in the market, and consequently of a high price.

The A. *hirsuta* of Muhlenberg, has been mentioned as distinct from A. *tomentosa* of Sims. These two names being, by the highest authority, considered as synonymes, it becomes necessary to state why they should be attributed to two distinct species. In the year 1813 Mr. Muhlenberg published a catalogue of the hitherto known and naturalized plants of North America, in the 81st page of which he enumerated five species of Aristolochia.

This was, as its name imports, a mere catalogue, and being unaccompanied by descriptions, the character derived from the Scientific or English name, was the sole guide to a knowledge of the plant. An analogy of character conveyed by the name "*hirsuta, hairy,*" hence induced Mr. Nuttall, in his *Gen. of N. Amer. Plants,* page 200, to set down the A. *hirsuta* of Muhl., *catal,* as a synonyme of A. *tomentosa.* This error can now be corrected by access to a manuscript in the hand writing of Mr. Muhlenberg, contained in the library of the Academy of Natural Sciences, and by reference to specimens in the Herb. A. N. S., labelled, A. *hirsuta,* Muhl., in the hand writing of Lewis David Von Schweinitz, P. D., also, to a specimen sent from Virginia, to Prof. Wood. The manuscript above alluded to, is entitled "*Observationes Botanicæ de Plantis Americæ Septentrionalis. Auctore Henrico Muhlenberg,* 1807." This work is written in a very small hand, which renders it difficult to decipher completely. At the 166th page of volume first, there are descriptions of several species of Aristolochia, the first of which is as follows :

"*Aristolochia* —— *Cherokee Lyons*
caule flexuoso spithameo simplici hirsuto
foliis alternis cordatis obtusiusculis margine et petiolo hirsutis.
flore subradicali pedunculata, pedunculo bracteato
cor. hirsuta
Rad. fibrosa odora
—— *hirsuta* ——,"

The above description is applicable to the specimens labelled *hirsuta,* in the Herb. A. N. S., the locality of which is given "Cherokee," but no donor's name is appended, as well as to the specimen in Prof. Wood's collection, sent from Virginia, under the name of A. *serpentaria.* The blanks in the descriptions are to supply words which could not be satisfactorily made out ; the first so totally illegible as to render it uncertain whether of two or three letters ; the second bears a strong resemblance to *erist* or *arist,* the last to *Jaqn.*

The *hirsuta* is allied to the species with subradical peduncles—serpent. hastata, &c., and not to those bearing axillary flowers, tomentosa, sipho, &c. It is an herbaceous plant, with a knotty caudex, sending off numerous slender, simple fibres, some of which are more than six inches in length, of a yellowish color, aromatic odor, and aromatic bitter taste. It sends off several jointed, flexuose pubescent stems, bearing one or two pubescent bracts and several leaves at the joints. Leaves large, cordate, rounded, obtuse, becoming as they rise on the stem abruptly acuminate, pubescent on both sides and margin, petiolate; petioles pubescent and bracteolate; principal veins more prominent than in serpentaria, and very pubescent on each side. From the lowest joints near the root, there are produced several solitary peduncles, (1 to 3) each bearing three to four leafy bracts, and one flower. The peduncles are hirsute, with long scattered hairs; the bracts hairy, and when young thickly covered with short, whitish hairs; corolla hairy, more evident at the base; germ pubescent.

This article has not been met with for certain in this market; but may be in the southern market, undistinguished from the Serpentaria. The leaves, &c., being not very dissimilar in form to those of the latter, it may have been taken for it; or if the pubescence were noticed, for the tomentosa; the characteristic leaves of which are said to have been detected in the parcels brought to this market.

R. B.

ART. XVII.—THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA, BY AUTHORITY OF THE NATIONAL MEDICAL CONVENTION HELD AT WASHINGTON, A. D. 1840: 8vo., Grigg & Elliot, 1842.

The proceedings of the Convention for the revision of the Pharmacopœia, which met in January, 1840, have been placed before the public through the medium of this and similar journals: it is therefore unnecessary to detail the initiatory steps taken to secure the execution of the work for which that body was organized. The only feasible plan was the one adopted—the appointment of a committee to whom the revision was entrusted, and from the hands of this committee the present revised edition has emanated. The delay in publication has arisen from circumstances which rendered it expedient for the advantage of the work, and which were inseparable from the course which the committee were authorized to pursue: the whole ground of the subject had not only to be gone over, but as assistance was solicited from associations capable of rendering it, a length of time was unavoidably consumed in awaiting their contributions, and these again required deliberate consideration. As the sources whence these contributions proceeded are the pharmaceutical bodies of all the cities where such combinations exist, namely, of New York, Boston and Philadelphia, and particularly as most important aid was afforded by the College of Pharmacy of the latter place, from which an amendment of the whole Pharmacopœia, by a special committee, was obtained, the present work possesses the recommendation of being the production of both the bodies interested, the medical and pharmaceutical, and by both should therefore be assumed as authority.

The general outlines adopted in the edition of 1830 have been preserved in the present; thus the two great divisions into the *Materia Medica* and *Preparations*, the subdivisions of the former into primary and secondary lists, the alphabetical arrangement, and general system of nomenclature, have been retained; the alterations made involve details solely, and are in accordance with the experience that ten years has communicated, and with the advance of scientific information.

In the Materia Medica lists, the changes that have been deemed expedient are, the introduction of new substances into one or the other, as they presented claims, founded upon their so far ascertained comparative merits, and the ejection of others which have been proved to possess no determinate value, the elevation from the secondary to the primary list of such as have come into more general use, and consequently have an increased importance, the degradation from the primary to the secondary list of those which have been ascertained not to be worthy the position they held, and lastly, the removal from the Materia Medica to the class of Preparations, of substances which more properly belong to this head. It appears upon inspecting the appended tables, that 32 introduced medicines are named, 19 of which belong to the primary and 13 to the secondary list; the number that have been dismissed amount to 7; the articles that have been transferred to the primary list are calamus, cimicifuga, and lactucarium; those removed to the secondary are mucuna and iris florentina; two substances have been placed among the preparations, acetate of potassa and ferrocyanuret of iron.

There is no greater evidence of the improvement of modern pharmacy than that presented in the character of the additions which have been made to the number of preparations, most of which have arisen from the progressive perfection of chemical knowledge, and its happy adaptation to pharmaceutical purposes. No fewer than eighty have been introduced into the present edition of the Pharmacopœia, which the demands of medicine have required, and which have not only been sanctioned by their position in European authoritative works of the same kind, but have been shown, by their general employment, to have more than ordinary pretensions to notice—most of them are essentially simple, or if compound, in strict relation with the principles of chemical combination. The most striking feature of pharmacy at the present day, is its extreme simplicity, exhibiting a vast difference in this respect from the polypharmacy of the last and preceding centuries. A still further enlargement of the catalogue of preparations might, we conceive, have been advantageously ventured upon. Of the 27 preparations dismissed, several are, no doubt worthy the fate appointed them. As this is a point, however, about which there is most difference of opinion, we question whether the repudiation in all instances will meet with entire approbation.

We have long regarded the nomenclature of the United States Pharmacopœia as chaste and classical, without redundancy, yet not meagre, always clear and expressive. Borrowed as it must be from the tributary sciences of botany, chemistry, mineralogy and zoology, the alterations that have been made in it, have originated from the improvements and discoveries engrafted on them by the most distinguished savans of the age. For an explanation of the principles which constitute the basis of the system adopted, with an able and satisfactory exposition of its merits, we recommend not only the perusal, but the attentive study of that portion of the preface of the edition of 1830, appropriated to this topic, to every physician and apothecary. The improvements made in it are strictly in accordance with the principles first laid down, and consist of alterations of names to those now adopted generally, or rendered expedient by their brevity ; thus cetraria has been assumed for lichen, mucuna for dolichos, and acacia for acaciæ gummi, creta for calcis carbonas, marmor for calcis carbonas durus, &c. A marked improvement is also evident in the designation of the portion of plants which afford or yield medicinal articles, as, for instance, in the case of the umbelliferous plants, the "fruit" of which are designated instead of the inaccurate expression "seeds."

With respect to what we regard an improvement on the old Pharmacopœia, it will suffice to present a quotation from the preface as follows:—"Another novel feature in the present edition is the introduction, in connection with certain articles of the Materia Medica and certain preparations, of brief notes indicating the readiest means of ascertaining their genuineness and purity. In this improvement the example of the London and Edinburgh Colleges, in the late edition of their respective Pharmacopœias, have been followed, and use has been made of the rules given by these Colleges, so far as they are deemed applicable."

The most decided characteristic of the new Pharmacopæia, and that which strikes one accustomed to the previous edition, is the complete English garb in which it is put forth; this may not please those who are sticklers for an universal language of science, and whose ideas of medicines and medicinal preparations are clothed in antiquated Latin, with its forced and sometimes ludicrous correspondence in tenses; but the argument of the committee is all sufficient to convince an unbiased and unprejudiced mind of the correctness of the step they have taken, and in fact it is so pithily expressed, as to be unanswerable; it is as follows: "*There seems to be no sufficient practical advantage to counterbalance the inconvenience of attempting to present ideas in a language which has no appropriate words to express them, and the labor and expense incurred in printing twice as much matter as is necessary to convey the meaning intended.*" With so forcible a presentation of the case, it is hardly necessary to extenuate the omission by pleading the precedents afforded by the French Codex and Edinburgh Pharmacopœia.

The last point of novelty we have to notice, is the mode of preparation, to which has been given the title of "method of displacement:" this has now come into such general use, and is so highly thought of by the most skilful and best qualified pharmaceutists, as to have been almost entirely substituted by them for the former method of maceration and filtering. It requires considerable practical tact, however, and considerable practice to adapt it to the cases where it can be employed, and the committee have therefore given the choice of the two modes of manipulation. An outline of the mode of conducting the new method has been judiciously presented. The subject for several years past has occupied the attention of pharmaceutists, and those who should wish to understand it thoroughly from details, we refer to the pages of the Journal of the Philadelphia College of Pharmacy.

We cannot close this brief sketch, without expressing the opinion that the American medical and pharmaceutical public are under deep obligations to the learned and accurate individuals, who for a year and a half have devoted themselves to the production of a work, which, whatever may be its defects, and however open to criticism isolated portions of it may be, still as a whole presents a favorable evidence of the condition of the science in the United States, and which cannot but be regarded as a monument of our intellectual condition.

J. C.

Amer. Journ. Med. Science.

ART. XVIII.—MEDICINAL PHOSPHORIC ACID.

Mr. Vakenroder gives the preference in the preparation of Medicinal Phosphoric Acid to a process already known, but which he has modified, both in relative proportions and manner of manipulation. He mixes 200 grammes of calcined bones, reduced to fine powder, with 1300 parts of water, adds 150 grammes of concentrated sulphuric acid, diluted with 200 grammes of water, and after twelve hours of contact in the cold, he digests the whole, at a gentle heat, for half an hour, replacing the water as it evaporates. He then strains with expression, and washes the residuum with 200 grammes of water. He then filters and passes through the liquid, a current of sulphuretted hydrogen ; then filters again, and evaporates, until only 160 grammes of liquid remain, and adds to this 320 grammes of alcohol, at 84 C. At the end of twenty-four hours he passes it again over the filter, and washes the acid phosphate of lime remaining upon the filter, with a new portion of alcohol, (30 parts.) He then distils, to recover the alcohol, and goes on with the evaporation, until the liquid weighs only 36 grammes, then dilutes it with sufficient water to make 120 grammes, adds a little vegetable charcoal, digests it for a little while, filters, and lastly concentrates the acid.

Phosphoric acid thus prepared, still contains, as Mr. V. is convinced, a little acid phosphate of lime, but is sufficiently pure for medicinal use. He thinks, that by a new precipitation with alcohol, it might be obtained perfectly pure.

A. D.

Journ. de Pharm.

ART. XIX.—THEORY OF THE PREPARATION OF CARBONATE OF LEAD—CERUSE.

M. Pelouze has opened new views upon the theory of this preparation, which completely explain the facts observed.

The process followed in France, for this prepartion consists in passing a current of carbonic acid through a solution of tribasic acetate of lead, which is thus brought to the state of a neutral acetate, with a precipitate of carbonate of lead. The carbonate of lead being separated, a new portion of litharge is dissolved in the neutral acetate, which is again converted into a triacetate, to be again operated upon as at first. This, process, has been modified in England, in the following manner. The litharge is mixed with the hundredth of its weight of acetate of lead, and this mixture, moistened with a very small quantity of water, is subjected to a current of carbonic acid. After a few hours the whole of the litharge is carbonated and the operation completed. It is evident that in this process the acetate of lead acts as in the French process—working successively upon every part of the litharge, which it changes to sub-acetate of lead—then abandons it to the carbonic acid, which transforms it to a carbonate.

In the Dutch process practised in France, and particularly at Lille, for several years past, the lead is placed in the form of thin plates, upon small earthen vessels, in which vinegar is placed. The whole is then placed in dung and disposed in such a manner that air may have access to it through the mass.

According to Pelouze, the vinegars employed in this factory contained but one thousandth of real acid. This acid, volatilized by the heat of the fermenting compost, acting upon the oxide of lead, gives a small quantity of acetate of lead, which under the influence of moisture and air, transforms the lead into a sub-acetate, which is decomposed by the carbonic acid, forming ceruse and neutral acetate. So the whole theory consists in this: the constant action of a very small quantity of acetic acid upon lead, converts it with the assistance of the oxygen of the air into oxide of lead ; this is changed to sub-acetate by the vinegar, and this again into carbonate, by the carbonic acid of the air and dung-heap.

The theory of these three processes is then definitely the same.

Mr. P. has made an experiment which plainly shows the part which the acetic acid plays in this operation, the presence of which appears indispensable.

In a vessel of suitable capacity he introduced a piece of sheet lead, which he placed upon a much smaller vessel, containing vinegar. The atmosphere of this vessel in which he conducted the experiment, had been artificially composed of carbonic acid and oxygen in the proper proportions for obtaining ceruse. After a certain time, this atmosphere had mostly disappeared, and there remained a quantity of ceruse, corresponding exactly to the proportion of carbonic acid and oxygen absorbed. Nearly the whole of the vinegar was recovered. A similar experiment was made, but in which formic acid was substituted for the vinegar, (very analogous in its chemical affinities to acetic acid, but not having the property of forming sub-salts with oxide of lead,) gave no result whatever; from which Mr. Pelouze concluded that in the formation of ceruse, the oxygen and carbonic acid are furnished at the expense of the air, and that the acetic acid is only useful by reason of its property of forming with the oxide of lead, a basic salt necessarily intermediate between the oxide of lead and ceruse. A. D.

Journ. de Pharm.

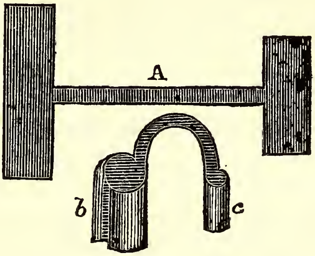
ART. XX.—UPON A NEW CONSTRUCTION OF THE GALVANIC PILE. By WOHLER.

To obtain the greatest galvanic effects, Mr. Grave, in his later days, substituted for the gigantic and inconvenient apparatus that had been used up to his time, a pile, composed of small cells or cylinders, of porous pipe clay, baked, filled with nitric acid, and placed in other vessels, containing dilute sulphuric acid. In the nitric acid were placed thin platina plates, and in the diluted sulphuric acid, amalgamated zinc plates, the communication being established by means of thick copper wire.

The expense of the platina plates has limited, up to the present time, the use of these convenient and energetic piles.

Professor Poggendorff has since discovered that the platina plates may be replaced, with almost equal success, by plates of iron; but subsequent researches have further shown to Messrs. Wohler and Weber, that these same iron plates might be substituted for the plates of amalgamated zinc. They have thought that the iron in concentrated nitric acid, (the concentration of the nitric acid ought to be to such a degree as no longer to attack iron; for this purpose a mixture may be employed, of fuming nitric acid, and one part to one and a half of common nitric acid,) acts in relation to the iron in the dilute sulphuric acid, (one to four of water) as platina does to zinc. Their opinion has been confirmed, and they have obtained, by the simple aid of iron in the two liquids, a pile of the greatest force, a phenomenon of the highest interest for the theory of the pile in general, and for the study of the galvanic actions of iron in particular. One can now easily establish for himself a very powerful galvanic pile, with a constant current. All that is required, is a small number of bent sheet iron plates, and some argilaceous vessels. The nitric acid is the only expense of any consequence.

The following details, relate to the construction of the apparatus.



Cut the plates out of stout sheet iron, previously cleaned and freed from rust, according to the shape indicated by figure A ; then bend the plates in the form of cylinders, in such a manner that they remain united by the narrow arched band, shown in figure *b c*. The smaller cylinders, *c* are placed in the nitric acid of the porous clay vessels, whilst the larger, *b*, dip in the weak sulphuric acid which surrounds the argillaceous vessels placed in this acid, itself being contained in a glass box or bowl.

The largest iron cylinders have only about 0^{m},0812 squares of superficies ; two pairs of this nature have carried to a white heat a fine platina wire of 0^{m},0541 in length, and have very briskly decomposed water. The disengagement of hydrogen gas by the plate, immersed in the weak sulphuric acid, is very feeble, and may be altogether avoided by using plates of tinned iron. The layer of tin produces with this metal the same effect as the amalgamation with the zinc ; it appears even preferable. An apparatus constructed entirely of cast iron would most likely be the best. The authors used argillaceous vessels of excellent quality made in Berlin, evidently of calcined porcelain paste. It remains to say that Hessian crucibles might be employed in case of emergency. A. D.

Ibid.

ART. XXI.—NOTICE RESPECTING A NEW HYPONITROUS ETHER FROM PYROXYLIC SPIRIT. By Dr. ROBERT HARE, Professor of Chemistry, &c.,

(*Extracted from the Proceedings of the American Philosophical Society,* Vol. ii. No. 21.)

DR. HARE made an oral communication respecting a new ethereal liquid which he had succeeded in obtaining.

He mentioned that he had procured by means of hyponitrite of soda, diluted sulphuric acid, and pyroxylic spirit, an ethereal liquid in which methyl ($C_2\ H_3$) might be inferred to perform the same part as ethyl ($C_4\ H_5$) in hyponitrous ether. In fact, by substituting pyroxylic spirit for alcohol, this new ether was elaborated by the process for hyponitrous ether, of which he had published an account in the Society's Transactions, Vol. vii., Part 2.

The compound which was the subject of his communication, had a great resemblance to alcoholic hyponitrous ether, similarly evolved, in color, smell and taste ; although there was still a difference sufficient to prevent the one from being mistaken for the other.

Proxylic spirit appeared to have a greater disposition than alcohol to combine with the ether generated from it, probably in consequence of its having less affinity for water. The boiling point appeared to be nearly the same in both of the ethers ; and in both, in consequence of the escape of an ethereal gas, an effervescence, resembling that of ebullition, was observed to take place at a lower temperature than that at which the boiling point became stationary. The ethereal gas, of which Dr. Hare had given an account in his communication respecting hyponitrous ether, seemed to have escaped the attention of the European chemists ; and, even after it had been noticed by him, seemed to be overlooked by Liebig, Kane, and others in their subsequent publications.

Dr. Hare attached the more importance to his success in producing the ether which was the subject of his communication; since, agreeably to Liebig, no such compound exists, and it is to be inferred that efforts to produce it had heretofore failed. It was presumed that this would excite no surprise, when the difference was considered between the consequences of the reaction of nitric acid with pyroxylic spirit, and with alcohol.

The liquid last mentioned is now viewed as a hydrated oxide of ethyl, while pyroxylic spirit is viewed as a hydrated oxide of methyl. When alcohol is presented to nitric acid, a reciprocal decomposition ensues. The acid loses two atoms of oxygen, which by taking two atoms of hydrogen from a portion of the alcohol, transforms it into aldehyd; while the hyponitrous acid, resulting inevitably from the partial deoxydizement of the nitric acid, unites with the base of the remaining part of the alcohol. But when pyroxylic spirit is presented to nitric acid, this acid, without decomposition, combines with methyl, the base of this hydrate; so that, as no hyponitrous acid can be evolved, no hyponitrite can be produced. Thus in the case of the one there can be no ethereal hyponitrite; in that of the other, no ethereal nitrate.

Dr. Hare regretted that Liebig should not have been informed of the improved process for hyponitrous ether, to which he had referred in commencing his communication. Instead of recommending a resort to the process, it was advised that the fumes, resulting from the reaction of nitric acid with fecula, should be passed into alcohol, and the resulting vapor condensed by means of a tube surrounded by a freezing mixture.

This process Dr. Hare had repeated, and found the product very inferior in quantity and purity to that resulting from the employment of a hyponitrite. In this process, nascent hyponitrous acid, as liberated from a base, is brought into contact with the hydrated oxide. In the process recommended by Liebig, evidently this contact could not take place ; since it was well known that hyponitrous acid could not be obtained by subjecting fecula and nitric acid to distillation, and condensing the aëriform products.*

---

* The process alluded to is as follows :—Seven parts of acid, eight parts of alcohol, fourteen parts of water, and fourteen of hyponitrite being prepared, add seven parts of water to the salt and seven to the acid, and allow the mixture to cool. The saline solution and alcohol are introduced into a tubulated retort, of which the recurved and tapering beak enters a tube, which occupies the axis and descends through the neck of an inverted bell-glass, so as to terminate within a tall phial. Both the tube and phial must be surrounded by ice and water. The diluted acid is then added gradually. A water-bath, blood-warm, is sufficient to cause all the ether to come over.

Agreeably to another plan, the materials, previously refrigerated by ice, are introduced into a bottle, also similarly refrigerated. Under these circumstances the ether soon forms a superstratum which may be separated by decantation.

This last mentioned process does not answer so well for the hyponitrite of methyl, on account of the pyroxylic spirit being prone to rise with the ether. Yet, the spirit may be separated from the ether by anhydrous chloride of calcium.

ART. XXII.—PROCESS FOR SEPARATING GOLD FROM PLATINA. By M. KEMP.

THE author has discovered that oxalic acid decomposes the solution of gold without exercising any action upon the solution of platina. The two metals may be thus separated and their proportions determined, by dissolving in aqua regia, and precipitating the gold in a metallic state by oxalic acid, and the platina by formic acid.

The difficulty heretofore experienced, in separating gold from platina, gives a great importance to this process.

A. D.
Ibid.

ART. XXIII.—ON THE DECOMPOSITION OF THE BINOXALATE OF AMMONIA BY HEAT, AND THE PRODUCTS WHICH RESULT THEREFROM. By M. BALARD.

WHEN crystallised Binoxalate of Ammonia is exposed to heat, or an oil bath, it enters into fusion and begins to decompose at the temperature of 220° to 230° C. The fusion is at first observed in the portions of the salt, near to the side of the retort; on introducing a rod into the tubulure of the retort and intermixing a portion of the fused oxalate with that which remains solid, the whole soon softens, then becomes fluid, afterwards pasty, and puffs up greatly, disengaging abundance of gas, which, by the agitation produced, maintains the uniformity of temperature and the regularity of the decomposition. This gas consists of a mixture of carbonic oxide and acid, and there condenses in the receiver a notable quantity of formic acid, and a small proportion of very white oxamide. But if on the cessation of the disengagement of gas, the action of the heat be continued, new phenomena are observed. There is formed, besides other products, a yellow matter of bitter taste, hydrocyanate and carbonate of ammonia are disengaged, and the liquid which condenses in the beak, effervesces on falling into the acid liquor of the receiver. At this point the operation should be finished.

The solid matter remaining in the retort is a light and porous mass, but slightly colored yellow, if the heat has been properly managed, and from which cold water separates the insoluble oxamide and a soluble matter, with peculiar properties. In fact the aqueous solution is acid ; neutralised by ammonia, it does not trouble the salts of lime, or even of baryta when dilute, but produces in their solutions, when strong, a crystalline precipitate, soluble in boiling water. This lets fall, on cooling, very distinct crystals, which may be obtained colorless by means of animal charcoal, and which contain in the state of salt a new acid, which the author denominates oxamic acid.

The oxamate of baryta disengages ammonia, when treated by the alkalies, and is changed into an oxalate of the alkali. Subjected to concentrated sulphuric acid, it furnishes equal volumes of carbonic oxide and acid, and the colorless acid which is left behind contains ammonia in combination.

This double mode of decomposition shows that oxamic acid is susceptible, like oxamide, of change in the presence of the elements of water, into oxalic acid, or products which represent it. The oxamate of baryta loses all its water of crystallization, when exposed to a current of air heated to 150° C. One gramme of this salt loses thus 0.1545 of water, and gives on analysis 0.636 of sulphate of baryta, 0.364 of carbonic acid, 0.279, and $67^{c.c.}$ of nitrogen, at the temperature of 14° C., and the pressure of 0.755.

We may hence represent its composition as follows :

Formula.		Calculated.	Found.
C^4	300.	29.94	30.08
O^5	500.	49.90	49.26
H^2	24.95	2.49	3 33
N	177.93	17.67	17.33
	1001.98	100.00	100.00

Oxamate of ammonia contains only the equivalent of water, indispensable to the constitution of the ammoniacal salts, while that of baryta contains three equivalents. This latter salt treated in the cold by the proportional quantity of sulphuric acid freely diluted with water, yields, on the evaporation of the liquid at ordinary temperatures, free oxamic acid.

The analysis of oxamate of ammonia and oxamate of silver, confirm the composition deduced from the salt of baryta; as to the free acid, the following is the formula deduced from experiment, and calculated on the supposition that it contains one equivalent of water.

Formula.			
C^4	300	26.9	26.1
O^6	600	53.8	54.8
H^3	37	3.4	3 9
N	177	15.9	16.6
	1114	100.0	100.0

Anhydrous, or such as it exists in the dry oxamates, this acid contains the elements of binoxalate of ammonia, less one equivalent of water ; it is to the binoxalate, what oxamide is to the neutral oxalate ; and is isomeric with the alloxane of MM. Leibig and Wohler. In the free state it contains an equivalent of water, and thus reunites the elements of anhydrous binoxalate of ammonia. Like the amides, to which it should be assimilated, it may resume the equivalent of water, and reproduce the binoxalate of ammonia, from which it was formed. This return to its primitive state is effected by the action of water aided by the temperature of 100° C.

Oxamic acid presents a remarkable analogy with oxaluric acid, which contains the elements of two equivalents of oxalic acid and one of urea, less one equivalent of water, and is converted into oxalic acid and oxalate of urea by the action of boiling water. Beside, oxamic acid may be obtained from oxalate of ammonia itself; this salt in fact changing into the binoxalate by the action of heat, ammonia being disengaged, and if the heat be well managed, leaves a residue containing oxamate of ammonia.

M. Balard concludes his paper with important considerations on the nature of oxamethane and analogous compounds, which furnish oxalic ethers and divers alcohols. These compounds, which contain in their equivalent, the elements of an equivalent of oxamic acid, and an equivalent of ether, may be regarded, says he, as ordinary compound ethers, formed by oxamic acid; and experiment justifies this supposition.

In fact, if, as MM. Dumas and Polydore Boullay did, we boil oxamethane with water, this compound is changed into alcohol and binoxalate of ammonia, but this salt is but a secondary product of the reaction, of which the formation of oxamic acid is the direct result ; this is proven by submitting to ebullition an aqueous solution of oxamethane, to which weak ammonia is carefully added, drop by drop, so as to neutralize the acid developed by ebullition, then the liquor contains only oxamate of ammonia when the oxamethane has been decomposed. Precipitated by nitrate of silver, there is produced a gelatinous magma, which by its appearance, its solubility in hot water, and its analysis, may be recognised as oxamate of silver.

F. Boudet.

Journ. de Pharm.

ART. XXIV.—EXTRACTION OF LILACINE, A CRYSTALLIZABLE BITTER PRINCIPLE, FROM THE SYRINGA VULGARIS. By ALPHONSE MEILLET.

SEVERAL practitioners have turned their attention to the lilac, and proved its febrifuge virtues. Mr. Cruvelhier, now deceased, made numerous experiments, which put all doubts to rest concerning the important properties of the capsules and leaves of this indigenous shrub.

In a number of our provinces, and especially in that part of Berry called Brenne, a marshy country notable for its insalubrity, the country people have no other remedy for intermittent fevers. It then became of interest to extract its active principle. Messrs. Petroz and Robinet, have analyzed the fruit of the lilac, and have made known a saccharine and a bitter principle, but did not obtain it in a sufficient state of purity to decide upon its nature and properties.

The process I have followed for its extraction is very simple, and with some slight modification is essentially the same as that pursued for other proximate principles. Take lilac leaves, or rather the green capsules, which yield the most, bruise them and make two strong decoctions; evaporate to one-half—then add subacetate of lead to the liquid,—concentrate to the consistence of a clear syrup—and add an excess of calcined magnesia ; reduce the whole to dryness in a water bath, and powder the extract, adding a little more magnesia to facilitate trituration. When in powder, digest it in water, heated to 30 or 40° C., by separate portions successively. Then treat it with boiling alcohol of 40°; add prepared animal charcoal, to discolor; then filter and evaporate to one-half—the lilacine crystallizes. The subacetate of lead precipitates a resinous matter, which, unless separated from the lilacine, prevents it from crystallizing. The washing of the extract with warm water, serves to remove the acetate of magnesia formed, together with a considerable portion of mannite, which I have proved to exist in the fruit. Lilacine appears to be combined in lilac with malic acid, though it is not alkaline. When crystallized from a boiling solution by cold, it is in tufts, formed of small and delicate needles, resembling meconine, but if you allow a solution, made cold, to evaporate spontaneously, it crystallizes in long quadrilateral prisms with dihedral summits. It has a decided bitter taste, somewhat like the salts of quinine, but less intense. It is insoluble in water, and does not dissolve in, or neutrallize acids. Boiling acetic acid dissolves without combining with it, the pure crystals subsiding upon cooling. All the lilacs do not afford a similar quantity, and this is but small; certain kinds did not present to me even a trace. It is much to be desired that some experiments be made with this substance, in order to fix its therapeutic value. A. D.

Journ. de Pharm.

ART. XXV.—NEW METHOD TO DETERMINE THE AMOUNT OF NITROGEN IN ORGANIC COMPOUNDS. By MM. VARRENTRAPP and WILL.

THE necessity of a more simple and certain method of determining nitrogen, is rendered evident by the difficulties and uncertainties of the modes ordinarily pursued. The methods are of two kinds; one, the determination of the nitrogen in the gaseous state, and from its volume comprises the modes hitherto followed; the other, the determination from one of its compounds, of known composition, has not as yet been constituted a method. M. Dumas, in his researches on oxamide, has already determined the proportion of nitrogen under the form of ammonia, and the experiments of M. H. Rose, leaves no longer in doubt the possibility of obtaining the weight of ammonia, under the form of hydrochlorate of ammonia and platinum, with the greatest degree of exactitude. These facts, and the researches of M. Wohler, who arrived at the rigorous determination of nitrogen in uric acid, under the form of ammonia, and its weight in the state of hydrochlorate of ammonia and platinum, (as reported by M. Liebig,) induced us to hope that this would afford us a certain method for all bodies containing nitrogen, and we believe that our efforts have been crowned with success.

The mode which we are about to describe is as simple in execution and as certain, as the determination of carbon and hydrogen by the method of Liebig, and affords as much exactitude in its results.

It is based on the manner in which organic bodies containing nitrogen react with the hydrates of the alkalies at a high temperature; it consists in the determination of the *weight* of the nitrogen, under the form of ammonia, that is from the hydrochlorate of ammonia and platinum or from the metallic platinum.

If an organic matter, not containing nitrogen, be fused with hydrate of potassa, the water of the hydrate is decomposed, its oxygen unites with the carbon and hydrogen of the organic compound, while its own hydrogen is set free in the gaseous state. The products formed during this energetic action, vary according to the temperature to which the mixture is exposed, and according to the composition of the organic compound. It is sufficient, however, for us to remark here, that *nitrogen being absent, hydrogen is liberated in a free state.* If the substance submitted to this action contain nitrogen, then the hydrogen combines with the whole of the nitrogen, and forms ammonia. This property, up to the present time, has not been taken advantage of, except to detect the presence of nitrogen in any matter.

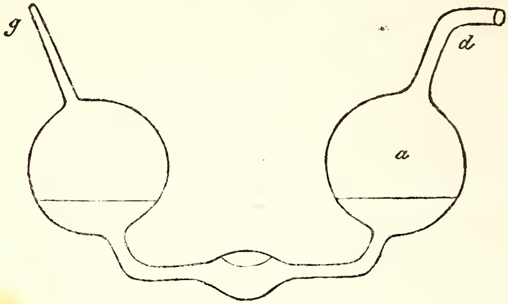
With substances containing much nitrogen, such as uric acid, melamine, mellone, &c., the whole of the nitrogen is not at the commencement of the decomposition used up in the formation of ammonia; part unites with a portion of the carbon of the matter, to produce cyanogen, which in this form combines with the metal of the alkali, or as cyanic acid with the alkali itself. The fixed nature of the cyanic compounds, at a high temperature would lead us to presume, that it might be impossible to convert the whole nitrogen into ammonia. But the direct experiments which we have made, have shown that by the use of a sufficient excess of the hydrate of the alkali, and of a sufficiently high temperature, the whole cyanic combination, or compound of nitrogen, if not under the form of nitric acid, undergoes such a decomposition, that all the nitrogen is obtained as the final product, under the form of ammonia.

If cyanide of potassium, cyanate of potassa, or para-cyanogen be fused with an excess of hydrate of potassa, at a red heat, or if at the same temperature, these bodies be heated with a non-fusible mixture of hydrate of potassa or of hydrate of soda and quick lime, a considerable amount of ammonia is produced, and the residue does not yield the least trace of cyanogen or its compounds. It is necessary in this case to employ sufficient hydrate of the alkali, that the oxygen of water may combine with all the carbon of the organic matter. The residue should be white. According to the richness of the substance in carbon, and according to the temperature, there is likewise disengaged along with the ammonia, permanent gases, such as proto or deuto-carburetted hydrogen, hydrogen, or rather a mixture of these gases, and in certain cases also liquid carbo-hydrogens, as benzine ; at least the oily drops which occasionally form have the odor of this substance.

To substances most rich in nitrogen, belong melamine, mellone, cyanogen and its combinations; but they all contain, in proportion to their carbon, as much, or even a little more carbon than is sufficient by its union with the oxygen of the water of the hydrate, to liberate enough hydrogen to combine with all the nitrogen to form ammonia. With some of these combinations, mellone, for example, of which the formula is $C^6 N^8$, and melamine, $C^6 N^{12} H^{12}$, the decomposition is effected by the aid of a sufficient amount of hydrate, without producing a trace of permanent gas. The whole of the carbon is converted into carbonic acid, which remains in combination with the alkali, and all the nitrogen into ammonia, which is disengaged in its gaseous state.

Our method, based as we have said, on this property of substances containing nitrogen, not at all, or only in small part, under the form of nitric acid, consists in collecting completely this ammonia by the aid of some acid, and to *weigh it in the solid form*, as hydrochlorate of ammonia and platinum.

We use, for the accomplishment of this purpose, an apparatus consisting of a tube of slightly fusible glass, from 0^{m},433 to 0^{m},487 in length (16 to 20 inches) such as is usually employed in ordinary combustions to determine carbon. This tube is drawn out at its end into a point, turned up obliquely and sealed, the other extremity is fused on the edges. It differs from the ordinary tube of combustion only in its diameter being much less, say about 0_{m},0067 (quarter of an inch) in diameter. To the open extremity there is to be adjusted hermetically, by means of pierced cork, which need not be dried, an apparatus of the following form,



containing hydrochloric acid for the absorption of the ammonia. The form of this apparatus differs but little from the potassa apparatus of Liebig: this latter doubtless fulfils its object, absorption; but its construction renders it difficult to wash completely, a necessary condition after each experiment. The form of apparatus which we have chosen answers well, without rendering the absorption less complete; as the absorption of ammonia by the acid is much more rapid than that of carbonic acid by potassa, it is useless, in the determination of nitrogen, to multiply the points of contact of the gas and liquid, as is done so ingeniously in the potassa apparatus.

The apparatus is filled by plunging the point in hydrochloric acid of ordinary strength, (sp. gr. 1.13) and inspiring the air from *d*, until the liquid assumes the height indicated in the figure.

We use, as the means of decomposing the organic matters containing nitrogen, for the purpose of oxidizing their carbon and hydrogen, a mixture of hydrate of potassa, or of soda with quick lime, in such proportions, that, still energetic in action, it will not fuse at a red heat, but only slightly agglutinate. This mixture offers at the same time the advantage of easy reduction to powder, and at the same time does not rapidly attract moisture, and is moreover as easily procured as oxide of copper or chromate of lead. Since hydrate of soda, by reason of its inferior atomic weight, contains in an equal weight, more water, and consequently more of the oxidizing agent than hydrate of potassa ; as, moreover, the mixture of hydrate of soda and quick lime attracts moisture more slowly ; and as finally one part of hydrate of soda only requires two parts of anhydrous lime, to form a mixture which agglutinates only slightly at a red heat, we have concluded to give the preference to this, over that which contains hydrate of potassa. One part of hydrate of potassa requires three parts of quick lime to form a suitable mixture. The most ready method to procure the mixtures consists in moistening the quick lime with a solution of potassa or soda of known strength, then to calcine the whole in a crucible, and reduce it to fine powder ; or, promptly to pulverise in a slightly heated mortar, fused and cooled hydrate of potassa or soda, and mix intimately in the proportions indicated with caustic lime, obtained in fine powder by slacking, and subsequently calcining. The mixture is again calcined, to obviate all humidity, and preserved in large-mouthed vessels, which can be hermetically sealed.

When the matter to be examined, containing azote, has been dried, weighed and reduced to fine powder, the tube of combustion, previously weighed and dried, is to be filled half full of the mixture of the alkali and lime, so as to have a determined quantity for mixture with the quantity of substance to be analysed. The quantity of the latter necessary for combustion, should vary slightly according to the presumable proportion of nitrogen; it is rarely necessary to take for substances poor in azote more than four hundred millegrammes, (6 grs.) and for those which are rich in this element less than two hundred millegrammes, (3 grs.)

The incorporation of the matter containing nitrogen, weighed with the mixture of soda and lime, is to be performed in a porcelain mortar, with an unpolished bottom, which has been previously heated, carrying the pestle with great lightness in a circular direction. If these directions be strictly observed, we avoid completely any loss from adherence of the matter to the sides of the mortar, or the pestle. When the mixture is strongly compressed, or reduced at once to fine powder in the mortar, or if it is not dry, a loss is sustained by the attachment of the substance to the sides of the mortar and the pestle. Having in the usual manner introduced the mixture into the tube of combustion, the mortar is to be several times cleaned with a portion of the mixture of soda and lime; the tube is to be filled to within $0^m,0271$ (one inch and one-eighth,) of its mouth, and on top of all is placed a loose plug of asbestus, previously calcined. The asbestus plug prevents the gas developed by the combustion from carrying over fine particles of the powder, an accident which would, especially when the potassa mixture is used, lead to very inexact results, inasmuch as chloride of potassium and platinum react with solvents in the same way as hydrochlorate of ammonia and platinum. This circumstance would also render it more expedient to operate with the soda mixture, because the soluble chloride of sodium and platinum would be removed by the subsequent washings.

The tube of combustion and the hydrochloric acid apparatus are to be closely connected by means of soft cork; the former is to be placed in a common furnace of combustion, and the air is to be expelled by heating with a hot coal, the ball *a* with the view of ascertaining whether the apparatus be hermetically closed; in which case the tube of combustion is to be heated to red heat by burning charcoal, precisely as in the method for carbon. The cork should be maintained as hot as possible so as not to absorb moisture; as also to prevent a loss of azote by absorption of ammonia.

As soon as the tube is red hot, the fire is to be withdrawn to a distance. Carbonic acid is formed by the combination of the oxygen of the water with the carbon of the substance; the hydrogen set free, at the moment of its liberation, unites with the azote to form ammonia which escapes in a gaseous state. There is developed at the same time, according to the quantity of carbon in the organic matter, pure hydrogen gas, or carburetted hydrogen, which is not absorbed by the acid.

Attention should be paid that the combustion proceed promptly, and that the gas is disengaged without interruption. There is no danger of loss of ammonia, the absorption is so complete and so rapid that there is more fear of the rise of the liquid. When the disengagement of gas experiences a short interruption the liquor rises in the bulb *a*, and when the fire is carelessly managed, so rapidly that part passes through the tube *d* into the tube of combustion ; in which case the experiment is a failure.

There are but few substances which contain nitrogen sufficient to render the oxidation and conversion of all the carbon into carbonic acid necessary to set free sufficient hydrogen to form ammonia with all the nitrogen. But we know of only one organic matter containing nitrogen, not in the form of nitric acid, which does not contain at least enough carbon. In this number is found, as already stated, mellone, mellamine, &c.; these substances, as well as sulpho-cyanogen, yield perfectly exact results, if we observe in their analysis the following precautions:

When the greater part of the air of the apparatus is expelled by the first application of heat, nearly pure ammonia is disengaged ; this is then absorbed with so much force by the acid, that however large the bulb of the absorption apparatus may be, a rapid rise of the hydrochloric acid, even to the tube of combustion, is almost inevitable. It is very easy to obviate this inconvenience, by incorporating with the mixture of theorganic matter, containing nitrogen with soda and lime, an organic substance not containing nitrogen, such as sugar. These bodies give, during their decomposition by the hydrate of the alkali, permanent gases, which, by diluting the ammonia, moderate the absorption by the acid, and thus completely prevent the rise in the tube of combustion.

After the tube is carried to red heat by degrees, throughout its whole length, and the disengagement of gas ceases *completely*, which takes place when all the carbon set free is oxidized, that is when the mixture becomes white, the posterior turned up end of the tube of combustion is to be broken, and several times its bulk of atmospheric air is to be inspired by means of the absorption apparatus, so as to draw through it all the ammonia which yet remains in the tube. This inspiration of the air may be affected by means of the potassa apparatus, placed at the point *g* of the absorption apparatus, by which means the acid vapors following the current of air are completely obviated.

The restoration of its white color to the mixture in the tube of combustion, is an essential condition, for the ammonia, in contact with an alkali and carbon at a high temperature, readily forms hydrocyanate of ammonia, and consequently cyanogen, which involves a loss of azote in the experiment. But if the heat be sufficiently high, all the carbon is burnt, and there is no fear of the formation of cyanogen.

By this process all the nitrogen in solid organic matters, may be changed into ammonia. The number of liquid organic matters containing nitrogen, are not considerable; nevertheless their combustion does not offer other difficulties, and the quantity of nitrogen may be determined by our method with as much exactness as the solid combinations, supposing, nevertheless, that the nitrogen does not exist as nitric acid.

We proceed with liquids precisely as in their combustion with oxide of copper: a little of the mixture of soda and lime is placed in the tube, then the bulb containing a known quantity of the substance, the point being previously broken, then fill the tube with the alkaline mixture, and finally the asbestus plug.

The most certain and most regular mode of operating, is to heat first the anterior third of the tube, and then to drive off the contents of the bulb by heat applied to the posterior part : it is thus spread throughout the middle of the tube, without being suddenly decomposed ; and if the heat be gradually carried backward it is easy to effect a uniform disengagement of gas.

After the combustion is terminated, and air by inspiration has traversed the whole of the apparatus, the contents of the apparatus of absorption is to be discharged through the tube *g* into a small porcelain capsule. By the aid of a washing bottle, a small quantity of a mixture of alcohol and ether is to be thrown into the apparatus, and brought in contact successively with every portion of the bulb ; this liquor is then added to the acid containing the hydrochlorate of ammonia, and washings with water continued until they no longer exhibit an acid reaction. The first washing with alcohol is with the view of dissolving the hydro-carburet, which is sometimes found, and which prevents the interior of the bulbs being completely washed by the water. It is rarely necessary to use more than thirty to forty-five grammes, (450 to 675 grs.) of liquid to carry off all the hydrochlorate of ammonia of the apparatus.

There is then to be added to the liquid containing this salt, an excess of solution of pure chloride of platinum, and the whole evaporated to dryness, on a salt water bath heated by a spirit lamp, and moreover, completely protected from the dust. When the combustion has been well conducted the dry hydrochlorate of platinum and ammonia will always have a fine yellow color ; if the matter was very rich in carbon or difficult to burn, the hydrochlorate of ammonia and platinum possesses a deeper color, because the hydrochloric acid in contact with the carburetted hydrogen blackens it ; this color, however, has no influence on the result, provided it be carefully washed.

To the dry residue in the porcelain capsule, when cold, a mixture of two volumes of alcohol and one of ether is to be added, in which the hydrochlorate of ammonia and platinum is totally insoluble, while the hydrochlorate of platinum is very soluble; hence the color of the liquid will indicate whether this latter has been added in excess, it not being in excess if the liquid remains uncolored.

The precipitate is then to be placed upon a filter which has been dried at 100° C., and weighed in a covered crucible, or in a tube. The most simple and prompt manner to perform this operation consists in placing the capsule vertically over the filter, and by means of the washing bottle detaching the precipitate. It is then to be completely washed on the filter with the mixture of alcohol and ether, until the liquid which passes is colorless, leaves no residue, or has not an acid reaction. The precipitate perfectly washed, is then dried with care at 100° C., and weighed in a covered crucible, or a tube; from its weight may be calculated the quantity of nitrogen. It is advantageous to prove this weight by calcining with care the hydrochlorate of ammonia and platinum, and from the platinum obtain the amount of nitrogen. The hydrochlorate of ammonia and platinum was pure, if by a decomposition carefully conducted, the quantity of nitrogen deduced from the platinum does not sensibly differ from the former.

In this calcination of the hydrochlorate of ammonia and platinum, it is best, as recommended by M. Rose, to decompose the precipitate enveloped by its filter, in a covered crucible, commencing the heating with great precaution. If this precaution be neglected it is very easy to experience a loss of platinum, and consequently of nitrogen, for this metal is readily carried off mechanically, by the vapors of sal ammonia and the chlorine.

It is especially necessary in this mode of determining the nitrogen, to use a *perfectly pure chloride of platinum.* It should not contain any hydrochlorate of ammonia and platinum in solution, since this latter would form, on evaporation, a residue insoluble in alcohol and ether, and thus augment the weight of hydrochlorate of ammonia and platinum. It is difficult, by the simple application of heat, to separate the whole sal ammonia from the sponge obtained by the decomposition of pure hydrochlorate of ammonia and platinum. If this sponge be boiled with pure water, the decanted liquid commonly yields a precipitate with nitrate of silver. It is, therefore, necessary to subject the platinum sponge to frequent ebullitions in water, before dissolving it in *aqua regia.*

In our opinion, it is both as simple in execution as certain in result, to reduce the weight of nitrogen from the hydrochlorate of ammonia and platinum, as to transform this latter into platinum by calcination. If the nitrogen be weighed as hydrochlorate of ammonia and platinum, for 177 parts of the former, the balance must indicate 2788 of the latter ; while for the same quantity of nitrogen, we will have only 1233 parts of metallic platinum.

The errors of weight should therefore be twice as considerable with the hydrochlorate of ammonia and platinum, to effect the result as with platinum. The weight of hydrochlorate of ammonia and platinum remains constant under prolonged dessication, at 100° C., and the filter does not alter at all, if the salt be perfectly washed ; but a trace of free acid remaining, it blackens and becomes very friable.

MM. Varrentrapp and Will have applied their process to the determination of nitrogen in numerous organic substances, some rich and others poor in this element, which had been previously analysed by the best chemists. (*Melamine, urea, uric acid, oxamide, cafeine, asperagine, taurine, hippuric acid, brucine, &c.*) The results which they have obtained, possess a strong resemblance with those of their predecessors, and prove in an incontestible manner the advantages of their process. "*I do not doubt,*" says M. Liebig, "*that it will replace very promptly and to the satisfaction of all analyses, the processes employed at the present time.*"

A. G. V.

Journ. de Pharm, and de Chim.

ART. XXVI.—OBSERVATIONS ON ARSENIURETTED HYDROGEN. By M. HENRI ROSE.

(*Extracted from Comptes Rendus of the Berlin Academy.*)

WE employ to detect the presence and destroy the slightest traces of arseniuretted hydrogen, a solution of deutochloride of mercury, in which this gas produces a precipitate of a yellow color, bordering on brown, a character which discriminates this precipitate from that obtained by phosphuretted hydrogen from the same solution.

The composition of this precipitate is wholly unknown. Stromeyer appears to be the only chemist who has examined it. According to him, arseniuretted hydrogen forms, with deutochloride of mercury in solution, at first arsenious acid and protochloride of mercury, afterwards an amalgam of arsenic. The precipitate is gradually decomposed under a large quantity of water; it becomes black, and finally consists solely of mercury, in a state of minute division; the supernatant liquid contains hydrochloric and arsenious acids.

This decomposition is analogous to that which water effects on the precipitate formed by phosphuretted hydrogen, in a solution of deuto-chloride of mercury; this precipitate changes into mercury and phosphorous and hydrochloric acids. Nevertheless, this latter decomposition takes place more rapidly than the preceding.

The two precipitates are similarly affected, when treated with nitric acid; they change, by the assistance of a slight heat, into protochloride of mercury, and at the same time the arsenic and the phosphorus are oxidized.

This similarity of reaction would appear to indicate similarity of composition; this is confirmed by analysis; the arsenical precipitate according to analysis, is represented by the formula.

$$As^2Hg^3 + 3\,HgCl^2.$$

This differs from the precipitate by phosphorous only in the latter containing three atoms of water, while the former is anhydrous. These precipitates likewise differ in their mode of reaction under the influence of heat; the chloro-phosphuret of mercury contains such a quantity of water, that its hydrogen changes all the chlorine into hydrochloric acid, and its oxygen all the phosphorus into phosphoric acid. The chloro-arseniuret of mercury, on the contrary, yields under the same circumstances no gaseous product; it sublimes without residue, being decomposed into proto-chloride of mercury and metallic arsenic. There is sublimed at the same time a small quantity of a reddish substance, which consists of mercury, chlorine and arsenic, and is nothing else but the substance sublimed without decomposition. Sometimes the sublimate is accompanied by a small quantity of metallic mercury.

The analysis of the arsenical precipitate and the action which it exerts on water fully confirm the composition of arseniuretted hydrogen, as admitted by MM. Dumas and Soubeiran.

The precipitate produced by antimoniuretted hydrogen in deuto-chloride of mercury, differs from the preceding in its composition; from which we may conclude that antimoniuretted hydrogen does not possesss a composition analogous to that of arseniuretted and phosphuretted hydrogen.

Ann. de Chim. et de Phys.

ART. XXVII.—A MODIFICATION OF MARSH'S APPARATUS,

For the detection of arsenic, by Mr. Morton, of the Veterinary College, being on the table, that gentleman, at the request of the chairman, explained the difference between this and the instrument as usually made. Mr. Morton's apparatus is similar in construction to Dobereiner's hydro-platinum apparatus for obtaining instantaneous light, consisting of an external cylindrical glass jar open at the top, and an internal conical receiver, in which the gas is collected and discharged at will through a stop-cock. Two coils of platinum wire are inserted in the base of the outer cylinder, the one under the certre of the receiver, the other external to it. The former being connected with the negative electrode of a galvanic battery, and the latter with the positive, the water contained in the instrument is decomposed—hydrogen being collected in the receiver, and oxygen escaping outside. If any arsenic be present in the liquor, arsenuiretted hydrogen will of course be formed, and may be detected in the usual way.

The advantage of this instrument consists in its obviating the necessity of using sulphuric acid and zinc, which are so frequently found to be contaminated with arsenic. Mr. Morton stated, that the presence of arsenic in the proportion of one grain to a gallon could be detected by means of this instrument. *Lond. Pharm. Journ. and Trans.*

ART. XXVIII.—AN IMPROVED PROCESS FOR PREPARING THE HYDROCHLORATE OF MORPHIA. By A. T. THOMSON, M. D., F. L. S.

THE best known and the most extensively employed of the salts of morphia is the hydrochlorate; hence many processes have been proposed for preparing it. I shall not occupy the time of the Society by criticising these, although some of them display little acquaintance with the subject. The officinal preparations, contained in the London and the Edinburgh Pharmacopœias, are sufficiently pure for medicinal use; but the processes for making them are operose, and are besides susceptible of considerable loss in the quantity of the salt obtained from the weight of opium ordered to be employed.

In the London formula, the solution of opium is ordered to be decomposed by the chloride of lead dissolved in boiling distilled water; the result of which is a hydrochlorate of morphia, held in solution in the water employed, and an insoluble meconate of lead, which are easily separated, and all the soluble matter washed out of the precipitate. The evaporation of the solution and the washings form impure crystals of hydrochlorate of morphia, which are ordered to be pressed, re-dissolved in distilled water, digested with animal charcoal, strained; and, with the washings of the charcoal, again evaporated cautiously that pure crystals may be produced.

So far this process is efficient, although in repeating it I have never been able to obtain pure crystals of the hydrochlorate, without a third, and sometimes a fourth crystallization. As a quantity of the hydrochlorate, also, remains in the solution, expressed from the first crops of crystals; and is ordered to be converted in morphia, by the aid of the solution of ammonia; and again formed into the hydrochlorate, by dissolving the morphia in hydrochloric acid, digesting with animal charcoal, and crystallizing the solution in conjunction with the washings of the charcoal, in this part of the process much loss is sustained. From the results of repeated experiments, I have no hesitation in asserting, that it is no less than one-twelfth of the quantity which might be anticipated.

The Edinburgh college orders the concentrated solution of opium to be decomposed by a solution of chloride of calcium, in four parts of water, the quantity of the chloride to that of opium being in the proportion of one to twenty. By this operation an insoluble meconate of lime and a soluble hydrochlorate of morphia are formed, and are readily separated; and, every thing soluble being washed out of the meconate, the liquid is evaporated in a water-bath, sufficiently for it to solidify on cooling. The next step is to press the cooled mass in a cloth; then to re-dissolve it in warm distilled water; and, after adding a little fine powder of white marble, to filter: this filtered fluid is acidulated with hydrochloric acid, and a second time concentrated to crystallization. The crystals after being a second time strongly pressed, and again submitted to the process of solution, clarification, by marble and hydrochloric acid, the concentration and crystallization are to be repeated until a snow white mass is obtained.

The loss in this process is greater than the former, for the hydrochlorate remaining in the fluid expressed from the first crop of crystals, is directed to be obtained by allowing it to remain at rest for a few months, when the hydrochlorate will be deposited in impure crystals, which must of course undergo the same purification as those procured in the first stage of the process.

Besides these objections, the modes of procuring the solution of opium, in both the London and the Edinburgh formulæ, is inadequate to exhaust completely the opium; and this constitutes another source of loss in these processes.

In the process which I am now to lay before the Society, these objection are endeavored to be obviated; and, if I am authorised to draw a conclusion from repeated comparative experiments, the produce obtained from operating upon the same quantity of opium, and the same sample, has been considerably greater by my process than by that of either of the British colleges.

In describing the process I shall divide it into three stages :—

1. The exhaustion of the opium.
2. The formation of the hydrochlorate of morphia.
3. The purification of the salt.

For exhausting the opium of its soluble matter, I follow the method of the Pharmacopœias to a certain extent, namely, dividing, or rather slicing, the opium into thin fragments and macerating it for thirty hours, after which it is strongly pressed ; but, instead of macerating the marc a second and a third time, as directed by the London college, I rub it in a mortar with an equal weight of pure white siliceous sand, and a sufficient quantity of water to form the whole into a soft past ; and, having introduced it into a percolator, pass through the mixture distilled water until the fluid comes off perfectly devoid of color and of taste.

In following the directions of the Edinburgh and Dublin colleges, the marc has always yielded to alcohol not only color but bitterness ; whilst that which is afterwards triturated with sand and left in the percolator, yields nothing but a slight degree of color to alcohol passed through it. This arises from the influence of the sand in extending the surface to be acted upon by the water ; for, if the marc of the pressed opium and the sand be well rubbed together, it is evident that the water in percolating the mass must be applied to every side of each minute particle of opium ; and, consequently, it will act upon the soluble matter in the most efficient manner.

By employing water at 60° for the maceration and the percolation of the marc, the *narcotina*, a considerable portion of the *extractive*, much of the *resin*, the whole of the *fatty matter*, the *caoutchouc*, the *bassorine*, and the *ligneous* *fiibre* remain in union with the sand and constitute the ultimate marc. The solution contains the *bimeconate,* and a minute portion of sulphate of morphia, which is more or less present in every specimen of good opium.

2. The next step of the process is the separation of the morphia in the solution, and its conversion into the hydrochlorate; to effect which the following means have answered better than any other which I have employed.

a. The solution is first concentrated to the consistence of a thin syrup, and then precipitated by the *diacetate of lead,* which decomposing the bimeconate and the sulphate of morphia, forms an insoluble meconate and a sulphate of lead, and a soluble acetate of morphia. As the precipitate falls slowly, owing to the viscid nature of the solution, distilled water, equal to twice the bulk of the solution, is added to it, and the whole left at rest for twenty-four hours.

On decanting the supernatant fluid, the precipitate is to be well washed with tepid distilled water; the washings added to the solution of the acetate of morphia, and the whole evaporated to one-half.

b. The diacetate of lead is used in this step of the process instead of the chloride, because it throws down the whole of the gummy matter with which much of the brown acid extractive is combined; and thus frees the operation from two of the most troublesome substances which interfere with the purification of the hydrochlorate. It is obvious, however, that some acetate of lead may remain in the solution; to free it from which, diluted sulphuric acid is added to it, in slight excess; an insoluble sulphate of lead, if any of the acetate be present, is thrown down, and the acetate is converted into the sulphate of morphia. The supernatant fluid is next decanted, the precipitate washed with tepid distilled water, and the washings being added to the solution, the whole is to be boiled for some minutes to drive off the acetic acid which has been set free.

The last step of this stage of the process is the conversion of the sulphate into the hydrochlorate of morphia; a change which is immediately effected by adding to the solution of sulphate of morphia a saturated solution of chloride of barium, as long as any precipitate is formed. In this case a decomposition of water takes place; the oxygen of which converts the barium into baryta, which unites with the sulphuric acid, whilst the hydrogen, uniting with the chlorine, forms hydrochloric acid, to unite with the morphia. An insoluble sulphate of baryta is thrown down, and the soluble hydrochlorate of morphia remains in solution, which, with the addition of the washings of the precipitate, is evaporated to crystallization in a water-bath; and affords, by pressure, a brown crystallized mass. The expressed fluid, diluted with an equal quantity of distilled water is again, and a second time, submitted to evaporation and expression, until it ceases to afford more crystals.

3. The whole of the crystals are next to be re-dissolved, and digested with animal charcoal; then strained in conjunction with the washings of the charcoal, and the liquors evaporated to crystallization. The crystals obtained by this second crystallization are sufficiently pure for medicinal use: but in order to obtain them in the highest state of purity, they should be again re-dissolved, and the crystals then procured should be only slightly pressed.

The hydrochlorate of morphia, obtained by this process, is in silky, plumose, acicular, snow-white crystals, forming a colorless limpid solution, with distilled water, at 60°; and a saturated solution in water, at 212°, congeals into a crystalline mass in cooling.

Ibid.

ART. XXIX.—ON THE FORMATION OF FULMINATING SILVER IN MARKING INKS. By MR. ALFRED BURGESS.

IN the use of marking inks, the inconvenience attendant upon the application of the pounce or preparation has always been felt to be so great, that those inks which do not require such a process, have very reasonably acquired a large measure of popular favor ; and if the latter can be proved to possess an equal degree of permanence and indelibility, and at the same time to be unattended by any other objection, there seems to be no reason why the older description should not speedily be numbered among the things which have been.

The question of the comparative indelibility of the two it is not my intention to discuss, further than to observe, that the term "indelible" is equally inapplicable to both. The marks of either can be removed by treating them with ammonia and chloride of lime, or with iodide of potassium and dilute hydro-chloric acid; and a method, which, I believe, has been till now unknown, and which I discovered while conducting experiments connected with the subject of this paper, is the application of cyanide of potassium, which removes the mark as easily as the compound called salt of lemons will obliterate that of common writing ink.

The subject to which I wish particularly to call your attention is, the manufacture of marking inks which require no preparation, and to the probable existence in some of them of a fulminating substance.

A year or so since, I was about to make for sale a marking ink of this description, from a form which I had long had by me, the following—

Take a saturated solution of nitrate of silver, and add thereto a saturated solution of carbonate of ammonia until the precipitate first formed is re-dissolved. To every ounce of the solution so prepared add two drachms of gum arabic and one scruple of indigo. I will not say that this makes a very good ink, because I have seen better, but it is one which has been much sold, and is, I believe, much better than a great deal which is to be met with. It is necessary to observe that, add What quantity of ammonia I would, there would always remain an insoluble grayish precipitate, which led me to think I had been making *fulminating silver*, and which insoluble powder I considered to be the detonating substance. In subsequently making a quantity of the ink therefore, I carefully decanted the clear liquid and rejected that portion which I looked upon as dangerous, treating the solution as before, with gum and indigo.

About, or soon after this time, Mr. Smee's work on Electro-metallurgy came into my hands, and I there learn, on his authority, that not only is the gray insoluble precipitate to be regarded as so much to be avoided, but that the salt itself, contained in the solution (the triple salt of silver,) is equally fraught with danger. Mr. Smee says (page 77,) "The ammonio-nitrate and ammonio-chloride of silver are very soluble, but do not offer any particular advantages for the purposes of metallic precipitation. Great care is required in the use of these salts; for if the solution, by being kept for some time, be allowed to evaporate, so as to leave dried portions adhering to the sides of the vessel, it can no longer be even touched with safety, for a fulminating salt is thus formed, which, if merely touched with the finger in order to remove it from the sides of the vessel, will explode with mischievous and awful violence." He adds, "I take particular notice of this fact, as I nearly lost my right eye in learning it."

The correctness of these observations is confirmed by Mr. Charles Walker, secretary of the Electrical Society, who states in his work on Electro-Plating and Gilding, that for those purposes the ammonio-carbonates and the cyanurets of the respective metals are best adapted. "With regard to the first," he says, however, "there is one great objection to be urged against them—namely, that they are highly fulminating; if any of the crystals dry on the surface of the vessel, a slight touch will produce an explosion!"

Mr. Smee's very alarming statement made me determine no longer either to make or sell my ink; and I am now, and have been ever since, selling an article made by another party, with whose mode of preparation I am unacquainted.

The foregoing remarks, of course, apply to only such inks as are composed of the triple salts of silver with ammonia. I do not deny the possibility of some of them being otherwise constituted, but in every sample which has come under my notice, ammonia is palpably perceptible by its odor, and I cannot conceive any thing which would answer the purpose of a marking ink, and which should contain ammonia, unless it be one of the triple salts of silver, gold, or platinum. The two latter metals, from their great expense, would hardly be employed I should imagine, and would be open also to the same objections, on the score of their dangerous tendency, as the salts of silver. My impression that this is the constitution of most of these inks is heightened by the fact that I had, some time back, an assistant who had previously lived with a druggist, who not only retailed but supplied many members of the trade with marking ink. His mode of preparation was to precipitate the chloride of silver by the addition of a solution of chloride of sodium to a solution of nitrate of silver; to dissolve the chloride in liquor ammoniæ and add gum and lamp black. Further also, by my having seen the following formula given in the *Chemist*, by a correspondent subscribing himself "A Retail Chemist:"—Take ʒj. of nitrate of silver, which dissolve in ʒvj. of water; add to this solution as much liquid ammonia as will dissolve the precipitated oxide, with sap green to color it, and mucilage to make the quantity amount to one ounce.

It is evident that this retail Chemist thus prepares a marking ink for sale, and doubtless the publication of the form, under the sanction of the Messrs Watts, would induce many others to do likewise.

It appears to be difficult to state what is, properly speaking, "fulminating silver;" but there can be no doubt that many of the combinations of that metal are highly dangerous, and should be used with the greatest caution. The fulminating silver of Brugnatelli and Howard, as also that of Liebig, is a cyanate of silver—the cyanogen, for the production of the cyanic acid, being derived from the carbon of the alcohol employed, and the nitrogen of the nitric acid; but the fulminating silver of Berthollet is a different substance altogether; no alcohol is used in its preparation, and nothing from which the carbon, for the production of cyanogen, could be derived, because Berthollet lays particular stress upon the necessity of employing ammonia which is quite free from carbonic acid. The detonating substance from the chloride of silver differs again, and contains neither oxygen nor carbon. We have here then three detonating compounds from silver, one containing Silver, Oxygen, Carbon, and Nitrogen; another, Silver, Oxygen, Hydrogen, and Nitrogen; and one of Silver, Chlorine, Hydrogen, and Nitrogen.

Probably, there are several other fulminating salts of silver differently constituted. Thomson states, that "fulminating silver was discovered by Berthollet in 1788. It may be formed by dissolving very pure silver in nitric acid, and then precipitating it by lime water; the precipitate is put upon filtering paper, which absorbs the water and the nitrate of lime with which it was mixed, then pure liquid ammonia is poured upon it, and allowed to remain for twelve hours; it is then decanted off, and the black powder, on which it stood, is placed cautiously, and in very small portions, upon bits of filtering paper. This powder is fulminating silver. Even while moist it explodes with violence when struck by a hard body; when dry, the slightest touch is sufficient to cause it to fulminate. When the liquor decanted off this powder is heated in a glass retort, an effervescence takes place, azotic gas is emitted, and small crystals make their appearance, which are opaque and have a metallic brilliancy. These fulminate when touched, even though covered by the liquid, and often break in pieces the vessels in which they are kept." The crystals of which Thomson, or rather Berthollet, here speaks, are probably the same as those referred to by Messrs. Smee and Walker, and are clearly different from the black insoluble powder.

Turner again says, "When oxide of silver, recently precipitated by barytes or lime water, and separated from adhering moisture, by bibulous paper, is left in contact for ten or twelve hours with a strong solution of ammonia, the greater part of it is dissolved; but a black powder remains which detonates violently from heat or percussion."

Brande gives the following form in which the use of ammonia is dispensed with: "One hundred grains of fused and finely powdered nitrate of silver are added to an ounce of warm alcohol, and the mixture stirred in a sufficiently large glass basin; an ounce of fuming nitric acid is then added, and presently a violent effervescence ensues, a powder falls; as soon as this appears white, cold water is added, and the powder is immediately to be collected upon a filter, washed, and dried at a temperature of 212°. In collecting and handling this powder, the utmost caution is requisite; it should be made in small quantities only, and touched with nothing hard, for it has sometimes exploded upon the contact of a glass rod, even under water; the feather of a common quill serves to collect it, and it should be kept in a wide-mouthed vessel covered by paper, and by no means in a stoppered or even a corked phial, as many serious accidents have arisen from its sudden and unexpected explosion."

Mr. Brande also observes, in the article "Ammoniuret of Silver," "oxide of silver readily dissolves in ammonia, and by particular management a fulminating silver composed of the oxide with ammonia, may be obtained." He adds that "the oxide of silver should be perfectly pure and thoroughly edulcorated, and the *ammonia quite free from carbonic acid.*" And further, "chloride of silver is very soluble in ammonia, a circumstance by which it is easily distinguished from some other chlorides, which like it are white and formed by precipitation. We should be cautious in applying heat to the ammoniacal solution, as it sometimes forms a precipitate of fulminating silver."

Now it appears to be an indisputable fact, that in precipitating the oxide of silver with excess of ammonia, or in digesting its oxide, chloride, or carbonate, in ammonia, a portion of a fulminating substance is an extremely likely if not a necessary result. The same would be the case were either platinum or gold similarly treated. The testimony of, I believe, all our Professors of Chemistry will bear out this statement. The evidence of Mr. Smee and of Mr. Walker also shows us that the soluble triple salts are equally dangerous; and without wishing to pry into the legitimate secrets of our brethren it certainly behoves us to inquire, *whether it be possible to make an ink which shall contain ammonia, and neither of those metals to which I have adverted. Also, whether it be possible to have any preparation of those metals, in which ammonia shall be employed, without the production of a detonating substance.*

Or to put the question in another way: *Is the formation of these dangerous compounds an invariable, or only an occasional or accidental consequence of the combination of those metals with ammonia?* If the latter, *is it not desirable to be made acquainted with the circumstances which may thus accidentally give rise to the formation of the fulminates,* so as to be able to avoid them in the preparation of marking inks?

It may be urged, that I am needlessly alarmed, that such accidents as I apprehend from the use of these inks have not been known to happen; and, moreover, that the presence of moisture in the ink is a sufficient preventive of danger. I cannot help thinking otherwise. I have not unfrequently had bottles of the old marking ink brought to me by persons who complain of its having "dried up," and who have been surprised to learn that such has been a natural consequence of leaving the bottle partially or entirely uncorked, and that the evil can soon be remedied by their stirring up the dried substance with a little water. Imagine the same to take place with an ink composed of one of the fulminating salts of silver, gold, or platinum. The unfortunate possessor of the article might, without the least presentment of danger, proceed to scrape the dried ink from the sides of the bottle, and would be not a little horrified at having this apparently harmless proceeding followed by an explosion which might be attended with the most serious consequences.

Ibid.

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

A STATED meeting of the Philadelphia College of Pharmacy was held Ninth mo. (September) 27, 1841.

HENRY TROTH, Vice President, in the Chair.

The minutes of the College and the Board of Trustees were read and adopted. From the latter the College is informed that the degree of "Graduate in Pharmacy" has been conferred upon CALEB H. NEEDLES and J. CRAWFORD DAWES, who having served an apprenticeship to the Drug and Apothecary business, attended the requisite instruction in the school of Pharmacy, and having produced written Theses, the former upon "Juniperus Sabina," and the latter upon "Processes for obtaining Morphia," were recommended by the Professors and Committee of Examination, as qualified for receiving the diploma of the College. The College also learns that Dr. FRANKLIN BACHE has resigned the Professorship of Chemistry in this Institution, and that Dr. WM. R. FISHER, a graduate of this College, has been elected to fill the vacancy.

A resignation of membership from BENJAMIN C. HORNER was accepted. Professor SAMUEL JACKSON, owing to his numerous professional duties, having offered a resignation of his resident membership, was proposed as an honorary member of the College, by Henry Troth, Charles Ellis, Warder Morris, and Joseph C. Turnpenny.

The following persons cease to be members of the College, agreeably to the provisions of Section 8th, of Law 5th, viz.: Robert Milnor, William Dick, M. L. Gordon, Daniel Laws, Aaron S. Martin, Christopher Graff, J. W. Flickwir, Robeson Moore, Peter Thompson, Jr., C. Ash, Richard Jordon, Lewis Krumbhaar, William F. Krumbhaar, Isaac J. Smith, Edwin A. Hoskins.

The committee appointed to procure a copy of the U. S.

Pharmacopœia, as revised and amended by this College, through its Committee appointed for that purpose, and to have the same neatly bound and placed in the Library, report that they have attended to that duty; whereupon they were discharged, and the following resolution adopted.

Resolved, That the sum of fifty dollars be appropriated to meet the expenses incurred by the Committee appointed for revising the U. S. Pharmacopœia, and that the Board of Trustees be authorised to draw an order for that amount.

This being the semi-annual election for Trustees, the following gentlemen were chosen.

For One Year.

Wm. W. Moore,
Dr. Robert Bridges,
A. Duhamel,
J. C. Allen,
Peter Lehman,
Ambrose Smith,
H. W. Worthington,
Dr. W. R. Fisher.

For Six Months.

Warder Morris,
Dr. Joseph Carson,
Dillwyn Parrish,
Jacob Bigonet,
Edward Roberts,
Joseph C. Turnpenny,
Thomas H. Powers,
W. Procter, jr.

Stated meeting held Twelfth month (December) 27, 1841. Henry Troth, first Vice President, being absent, from sickness, Wm. W. Moore was appointed Chairman for the evening.

The minutes of the College and the Board of Trustees were read and approved.

Dr. Wm. R. Fisher, and James L. Elliott, were elected resident members.

The following communication was read, and directed to be entered on the minutes.

"*To the President and Members of the Philadelphia College of Pharmacy.*

GENTLEMEN,—Believing that the object of our Institution is the promotion of enlightened Pharmacy in this country, and particularly in this city, and that the officers of the College hold it their duty as well as pleasure to contribute to that end in their exertions in behalf of the Institution, we, the undersigned, some of its members, respectfully solicit your attention to the following remarks and accompanying proposition, the granting of which we believe will conduce much to the welfare of the abstract interests of the College, and be the germ of a new era in its annals. In taking a cursory view of the minutes of the Society of Pharmacy at Paris, as published in their Journal, we find their meetings occupied, independently of the more ordinary concerns of the Society, with discussions on subjects of science and the arts, connected with their profession, and which constitute the most interesting portion of their sessions. At these meetings the improvements which are daily taking place in Pharmaceutic Science are first brought forward, the interests of the profession discussed, and a general friendly feeling cultivated among the members of the Society.

In the new Pharmaceutic Society of Great Britain, instituted only a few months since, the proceedings of the Pharmaceutic meetings, which are held monthly, for the discussion of scientific subjects connected with Pharmacy, form already a prominent feature of the institution, and the papers which are read at those meetings, are the most interesting portion of the Pharmaceutical Transactions published under its auspices.

We call your attention to these facts more from the evidence they afford of the activity of Pharmaceutists in Europe, than to draw a comparison unfavorable to ourselves; because from the youth of our Institution and the want of legislation in its favor, such striking evidence could not be expected. Yet we believe that it is by no means impossible or difficult for a similar evidence to be given by our own members, in time, if proper measures be taken.

It cannot be expected that the meetings of the Board of Trustees are the proper occasions for such scientific discussions, because in that case all the benefits arising from them would be confined to their members: and, on the other hand, the general quarterly meetings of the College occur too seldom to be of much service. Therefore, to neither of these occasions can we look for the accomplishment of our objects.

It is, therefore, proposed that you grant the use of the Hall and Library of the College to such of its members as shall associate themselves together for the purposes of scientific inquiry, on the subjects connected with Pharmacy; that such assemblages receive your sanction under the title of the 'Pharmaceutic Meetings of the Philadelphia College of Pharmacy,' and that they be looked upon as a legitimate branch of the operations of the Institution, viz.: Its *scientific meetings* in contradistinction from its *business meetings*. It is further proposed that the members constituting these meetings be empowered to organize themselves and to enact by-laws for their own government, always holding in view the interests of the College.

That all collections of books, specimens, &c., becoming the property of these meetings, be considered the property of the College; and finally, that graduates be allowed the privilege of attending the meetings, although they may not be members.

Signed
Wm. R. Fisher,
Charles Ellis,
Wm. Procter, Jr.
Samuel F. Troth,
Joseph C. Turnpenny,
Ambrose Smith,
John H. Ecky.

December 27, 1842."

Whereupon the following resolution was adopted, viz.:

Resolved, That the use of the Hall and Library of this College be granted to such of its members as shall associate themselves together periodically for the cultivation of scientific Pharmacy. That this College sanction such associations under the title of the "Pharmaceutic Meetings of the Philadelphia College of Pharmacy;" they being considered a legitimate branch of the Institution.

A resignation from Thomas Evans was accepted. The proposition laid on the table at last meeting being next in order, Professor SAMUEL JACKSON was duly elected an honorary member of this College, and the Secretary directed to inform him of the same. On motion, adjourned.

Stated meeting held Third month (March) 28, 1842.

Dr. ROBERT BRIDGES was appointed Chairman, pro tem. The Secretary being absent, WILLIAM PROCTER, jr. was appointed Secretary for the evening.

The minutes of the former meetings of the College were read and approved.

Dr. WM. ZOLLICKOFFER, of Middleburg, Md., was proposed for honorary membership in the College, by Wm. W. Moore, Samuel F. Troth, Joseph C. Turnpenny, and William Procter, jr.

This being the annual meeting for electing Officers, Trustees, &c., J. C. Turnpenny and Dr. Carson were appointed Tellers, and the following gentlemen were declared as duly elected, viz.:

President,—DANIEL B. SMITH.
1*st Vice President*,—HENRY TROTH.
2*d Vice President*,—Dr. GEORGE B. WOOD.
Secretary,—CHARLES ELLIS.
Treasurer,—SAMUEL F. TROTH.
Corresponding Secretary,—ELIAS DURAND.

Trustees.

WARDER MORRIS,	EDWARD ROBERTS.
Dr. JOSEPH CARSON,	JOSEPH C. TURNPENNY.
DILLWYN PARRISH,	THOMAS H. POWERS,
JOHN H. ECKY,	WM. PROCTER, jr.

Publishing Committee.

Dr. Carson,
Dr. Bridges,
C. Ellis,
W. Procter, jr.,
Dr. F. Bache,
Dr. George B. Wood.
E. Durand,
Ambrose Smith,
A. Duhamel,
Dr. W. R. Fisher.

Dr. Wm. R. Fisher, as Chairman of the Pharmaceutical Meetings, made a verbal report on the progress of that branch of the operations of the College. He stated that the meetings had been regularly held, and at the first of them a short set of rules, or by-laws, were adopted for their government; several interesting original communications had been read and referred to committees, and that altogether the meetings were in a favorable state of progress. Dr. Carson gave notice that at the next stated meeting of the College, he would bring forward certain resolutions in regard to the Pharmaceutical meetings.

On motion adjourned.

W. Procter, jr., Sec. *pro tem.*

Stated meeting, Sixth month (June) 27, 1842.

In the absence of the President and Vice Presidents, Dr. Robert Bridges was called to the chair.

The minutes of the last meeting were read, amended, and approved.

The minutes of the Board of Trustees, for the last six months, were read, detailing the various subjects of interest which came before them during that period.

On the 29th of Third month last, a public commencement was held, by direction of the Board, and the degree of "Graduate in Pharmacy" was conferred upon the following gentlemen, who had previously undergone an examination before a committee of the Board and the Professors in the school of Pharmacy, and who were pronounced qualified to receive the Diploma of the College, viz.:

Benjamin J. Ritter,	Thesis, on	Cucumis Citrullus.
Albert S. Letchwort,	"	Protiodide of Mercury.
John W. Douglass,	"	Frasera Walteri.
William H. Corse,	"	Arrow Root.
Caleb H. Needles,	"	Juniperus Sabina.
J. Crawford Dawes,	"	Preparation of Morphia.
Wm. J. Jenks,	"	Juniperus Virginiana.
Wm. H. Schively,	"	Chia Seed.
Edward Parrish,	"	Statice Caroliniana.
Wm. J. Carter,	"	Ung. Hydr. Nitrat.
Lawrence Turnbull,	"	Populus Tremuloides.
Peter Babb,	"	Sabattia Angularis.
Samuel Wetherill,	"	Juglans Cinerea.
P. Adolphe Grotjan,	"	Podophyllum Peltatum.
Wm. G. Baker,	"	Cornus Florida.

The valedictory address was delivered by Dr. William R. Fisher.

Dr. Fisher having resigned his situation as Professor of Chemistry, to which he was elected last year, the Board proceeded to supply the vacancy ; whereupon, Dr. Robert Bridges was unanimously elected Professor of Chemistry in the Philadelphia College of Pharmacy.

Edwin Meredith was ballotted for, and duly elected a resident member of this College.

The resolution laid on the table some months back, to hold the meetings of the College semi-annually instead of quarterly, and to alter the evening on which they are held, was postponed for future action.

The College learns from the minutes of the Board, that Edward Macpherson, a resident Druggist and Apothecary of New Orleans, was duly elected an associate member of this College.

Proposed amendments to the by-laws, agreeably to notice given last meeting, were read and laid on the table until next stated meeting.

A letter from Samuel F. Troth, resigning his situation as Treasurer, owing to his numerous engagements, was read and accepted, and H. W. Worthington and W. W.Moore, were appointed a committee to audit his accounts.

On motion, it was

Resolved, That a vote of thanks be tendered to him for his faithful and efficient discharge of his duties.

The following preamble and resolutions were read, and unanimously adopted.

It is with feelings of deep regret that we announce to the College the decease of our late estimable Vice President, HENRY TROTH.

Previous to the existence of the Philadelphia College of Pharmacy, he was impressed with the many advantages that would result from the Druggists and Apothecaries of this city co-operating in the establishment of such an Institution; his zealous labors attest the leading part which he took, as one of its founders, and the untiring energy of his mind was devoted to its interests until removed by death from the station of honor and usefulness he held among us.

For thirteen years Henry Troth presided over our meetings as Vice President, seldom, if ever, known to be absent, except from sickness, or absence from the city. The deep interest he felt for the prosperity of the College, was manifested by the faithful discharge of all his duties as an officer and member.

Resolved, That his high moral worth, his many estimable traits of character, and his kindness and courtesy of manner, secured for him the warm personal friendship and respect of the members individually.

Resolved, That we record this short notice on our minutes as a slight tribute of affectionate regard to his memory.

Resolved, That the Secretary be directed to forward a copy of the same to his bereaved family, accompanied by the resolutions passed at a late meeting of the Board of Trustees.

On motion, the College resolved to proceed to an election, to supply the vacancy occasioned by the decease of our First Vice President, Henry Troth, also to supply the office of Treasurer, occasioned by the resignation of Samuel F. Troth whereupon, Henry W. Worthington, and A. Duhamel being appointed tellers, the following was reported as the result of the election.

For 1st *Vice President.*—Charles Ellis.

Treasurer.—Joseph C. Turnpenny.

There being now a vacancy in the office of Secretary, the College proceeded to an election, and Dillwyn Parrish was declared to be duly elected Secretary of the Philadelphia College of Pharmacy.

On motion,

Resolved, That a vote of thanks be tendered to Charles Ellis, for his faithful performance of the duties of Secretary, for a period of fourteen years.

On motion, adjourned.

Charles Ellis,
Secretary of the Philadelphia College of Pharmacy.

MISCELLANY.

Decomposition of Sulphate of Quinine by infusion of Roses. By Charles Ramsay.—A common mode of prescribing sulphate of quinine, is in combination with compound infusion of roses, which, to say the least of it, forms a very elegant mixture. As will be known to most of your readers, the quinine, instead of being dissolved, is thrown down in flocculi, which you, in the Notices to Correspondents in the November number of the Pharmaceutical Journal, say, may be re-dissolved by excess of sulphuric acid. In dispensing the mixture, I have tried the effect of adding a little sulphuric acid to it, and I have found that m. 20 of the dilute acid may be added to a mixture containing six grains of the sulphate, without altering or at least bettering its appearance.

Professor Donovan, in a paper which originally appeared in the *Dublin Medical Press*, treats the subject in question in his usual able and lucid manner. After stating that the infusion of roses and sulphate of quinine are generally supposed to form an elegant, efficacious, and compatible mixture, he says,

"I believe that this supposition is ill-founded; the mixture is not elegant, for it is no longer red and transparent, but becomes muddy and disagreeable in appearance; it is not efficacious, for much of the quinine is withdrawn in an insoluble state; and it is not compatible, for there are two sources of decomposition. Rose leaves contain both gallic and tannic acids, hence gallate and tannate of quinine will be formed, both are insoluble in cold water, and they will remain floating on the liquid, notwithstanding the presence of sulphuric acid, which, so far as these salts are concerned, effects no good purpose, as it does not dissolve the new salts formed. It might be supposed that it is little matter in what state the quinine is administered, whether as a sulphate, gallate, or tannate; but if the sulphate require the addition of sulphuric acid to hold it in solution, and if the state of solution be necessary to the exertion of its full medical efficacy, it must be improper to conjoin with it any agent which eliminates it in the solid form: besides it has never been proved that the tannate or gallate of quinine possess medical properties."

Mr. Donovan proceeds to state, that it is better to prescribe sulphate of quinine simply dissolved in water or camphor mixture, by the aid of a little sulphuric acid, and gives us his opinion that adjuvants should not be used at all, or if used, should be given some considerable time after the quinine. He states that tincture of cinchona bark, which is frequently given in combination with sulphate of quinine, produces a very copious precipitate of quinine, and that compound infusion of orange peel is liable to the same objection.

Pharmaceutical Journal and Transactions, April, 1842.

On the Tinctura Opii Ammoniata of the Edinburgh Pharmacopœia. By MR. J. H. GILBERT, Nottingham.—Being a student in the laboratory of the Glasgow Royal Infirmary during the summer of 1839, it was occasionally my duty to dispense the tinctura opii ammoniata—a preparation, the apparently unchemical composition of which led me to suspect, that, as far as the opium employed is concerned, it could be of no utility; it being well known that ammonia acts as a precipitant to morphia. It is true, that a great excess of that alkali will, in some solutions of the salts of morphia, either prevent its precipitation, or redissolve it when precipitated. In order, therefore, to ascertain the fact in the present instance, I submitted several separate portions of the tincture to examination at Dr. Thomson's laboratory, where also I was a student.

Two ounces were first boiled in a flask; the magnesian precipitate collected and boiled with alcohol; the alcoholic solution filtered while hot, and set aside in a warm situation to evaporate slowly: no crystals were deposited, and the residual matter, when tested, was found to contain no morphia.

Four ounces were next treated in a manner varying from the above. The liquid, previous to further treatment, was saturated with dilute acid; for when, as before stated, morphia has been held in solution by an excess of ammonia, I have found, that after expelling the greater part of that excess by gentle heat, and then saturating with dilute acid, a salt may be obtained, from the solution of which the morphia may be separated by the usual means. In the present case, however, no morphia was detected.

Having thus failed to detect that principle in the filtered tincture, the dregs of a known quantity were macerated for some time in water acidulated with muriatic acid; the filtered liquid, after being digested with animal charcoal, was sufficiently concentrated on a water-bath, and set aside, when a large quantity of crystals of muriate of morphia was deposited. A part of these were treated with ammonia, and the morphia tested in a separate state with a neutral solution of perchloride of iron; and part, while in the state of muriate, was tested with iodic acid in the usual manner. As the dregs employed were not exhausted, nor the mother-liquor treated with ammonia, an accurate quantitative result could not be obtained ; but the amount of muriate of morphia was so great, that it could not fall much short of the average produce of such a quantity of opium.

These experiments I had considered as conclusive; but finding the new Edinburgh Pharmacopœia retained the old formula, and that the remarks made on the tincture by various writers on Materia Medica and Pharmacy seemed to indicate previous experiment, I feared that either too small a quantity had been experimented upon, or that some source of error had been overlooked. To obviate any such mistake, several portions, each of twelve ounces, were successively examined ; in none, however, was morphia detected. As a check to the processes, several portions also of tincture of opium (each of which would contain, by estimate, a quantity of opium equivalent to that in twelve ounces of the ammoniated tincture,) were treated in precisely the same modes as the ammoniated tincture had been. In these cases morphia was separated without difficulty, thus proving the efficacy of the processes.

It may be observed, that before any of the tinctures were boiled with magnesia, the greater part of the ammonia and alcohol in the one, and of alcohol in the other, was expelled by gentle heat on the water-bath ; as, in some cases, the alcohol in the liquid would be sufficient to take up the morphia after the decomposition of its salts by magnesia. The loss of ammonia caused no deposition of morphia.

These facts seem to show that if, as I believe is universally admitted, the medicinal effects of opium are attributable chiefly, if not entirely, to the morphia which it contains, the opium employed in this tincture might with advantage be omitted.

Edinburgh Medical and Surgical Journal.

THE

AMERICAN JOURNAL

OF

PHARMACY.

OCTOBER, 1842.

ART. XXX.—REMARKS ON THE BRITISH AND UNITED STATES PHARMACOPŒIAS.

The latest editions of these Pharmacopœias are the Dublin Pharmacopœia of 1826, the London, of 1836, the Edinburgh, of 1841, and the United States, of 1842. The Edinburgh Pharmacopœia of 1841 is the second edition, with corrections, of the recently revised work; the first edition having appeared in 1839. The revised work presents one striking and judicious change, namely, its publication in the English language; the Latin being retained only for the officinal names. The United States Pharmacopœia was first published in 1820, and the edition of 1842 is the result of the second decennial revision. As originally printed, it was in Latin, with an English translation on the opposite page. But upon the recent revision, it was deemed advisable to follow the example of the Edinburgh College, and print every part in the English language, except the officinal names.

Having originally derived the greater part of our Pharmacy from the British Islands, we are necessarily much interested in the progress of Pharmacology in the British Dominions. Our first Pharmacopœia was chiefly made up of selections of formulæ from the British Pharmacopœias, and our successive revisions have been much aided by a careful study of the progressive improvements made in these works. So, also, there is reason to believe that aid has been afforded to our British brethren in return, Thus it is that the Pharmacy of the two countries is so linked together, that we, on this side of the water, feel the importance of studying the changes made in the Pharmacopœias of the British Empire.

From the length of time that has elapsed since the last revision of the Dublin Pharmacopœia, now sixteen years, it is to be hoped that a revised edition of that work will shortly appear, in which advantage will be taken of the great improvements which have been made in the interim, and every reasonable concession in nomenclature be made in favor of the important principle of uniformity of officinal names. As yet the three British Colleges have not been able to agree upon one Pharmacopœia for the British Empire, a result which, if ever accomplished, will not only be an important benefit to the British nation, but an influential step in the progress of Pharmacy, wherever the English language is spoken. The present Edinburgh Pharmacopœia is the result of a revision after an interval of twenty-two years, and the present London work, after the lapse of twelve years.

The subject of nomenclature, though secondary to the paramount object of the proper preparation of medicines, is confessedly very important. A number of synonymes creates confusion, obstructs the advancement of the medical and pharmaceutical student, and leads to serious mistakes. Admitting these positions, it is highly gratifying to observe that the discrepancies in nomenclature are becoming less and less with every revision of the British Pharmacopœias.

One great step in the simplification of nomenclature was made in 1820, in the first U. S. Pharmacopœia. In the preface to that work it is stated, that "a single word is always used for the officinal name of the medicine, wherever such a word is expressive, and without ambiguity. For example, the name *Jalapa* is used instead of *Convolvulus Jalapa*, of the Edinburgh Pharmacopœia, and *Jalapæ Radix*, of the London; Colocynthis, instead of *Cucumis Colocynthis*, and *Colocynthidis Pulpa*, &c. The advantages of this mode are, that the name stands in the nominative case; that it expresses the medicine, and nothing else; that it is short and explicit, and does not require to be mutilated in practical use, as long names will inevitably be." The principle of nomenclature, here laid down, was happily applied in a great number of cases, and has since been successively adopted in the London and Edinburgh Pharmacopœias. The extent of this reform in nomenclature, and the influence its adoption has had in diminishing synonymes, are shown by the following table.

Pharm. Edinburgh, 1817.	*Pharm. London,* 1824.	*Pharm. U.S.* 1820. *L.*1836 *&* *E.*1841.
Allii Sativi Radix.	Allii Radix.	Allium.
Aloes Extractum.	Alöes spicatæ Extractum.	Aloe.*
Pimpinellæ Anisi Semina.	Anisi Semina.	Anisum.
Anthemidis Nobilis Flores.	Anthemidis Flores.	Anthemis.
Cochleariæ Armoraciæ Radix.	Armoraciæ Radix.	Armoracia.
Ferulæ AssæfœtidæGummi-resina.	Assafœtidæ Gummi-resina.	Assafœtida.
Atropæ Belladonnæ Folia.	Belladonnæ Folia.	Belladonna.
Canellæ Albæ Cortex.	Canellæ Cortex.	Canella.
Capsici Annui Fructus.	Capsici Baccæ.	Capsicum.
Amomi Repentis Semina.	Cardamomi Semina.	Cardamomum.
Crotonis Eleutheriæ Cortex.	Cascarillæ Cortex.	Cascarilla.
Acaciæ Catechu Extractum.	Catechu Extractum.	Catechu.
Lauri Cinnamomi Cortex.	Cinnamomi Cortex.	Cinnamomum.
Cucumeris Colocynthidis Pulpa.	Colocynthidis Pulpa.	Colocynthis.
Coriandri Sativi Semina.	Coriandri Semina.	Coriandrum.
Croci Sativi Stigmata.	Croci Stigmata.	Crocus.
Solani Dulcamaræ Caules.	Dulcamaræ Caulis.	Dulcamara.
Anethi Fœniculi Semina.	Fœniculi Semina.	Fœniculum.
Bubonis Galbani Gummi-Resina.	Galbani Gummi-resina.	Galbanum.
Gentianæ Luteæ Radix.	Gentianæ Radix.	Gentiana.
Hæmatoxyli Campechiani Lignum.	Hæmatoxyli Lignum.	Hæmatoxylon, U.S.,E. Hæmatoxylum, L.
Hordei Distichi Semina.	Hordei Semina.	Hordeum.
Ipecacuanhæ Radix.	Ipecacuanhæ Radix.	Ipecacuanha.
Convolvuli Jalapæ Radix.	Jalapæ Radix.	Jalapa.
Lavandulæ Spicæ Flores.	Lavandulæ Flores.	Lavandula.
Myristicæ Moschatæ Nucleus.	Myristicæ Nuclei.	Myristica.
Myrti Pimentæ Fructus.	Pimentæ Baccæ.	Pimenta.
Quassiæ Excelsæ Lignum.	Quassiæ Lignum.	Quassia.
Rhei Radix.	Rhei Radix.	Rheum.
Rorismarini Officinalis Cacumina.	Rosmarini Cacumina.	Rosmarinus.

*In the Ed. Pharmacopœia, in three subdivisions, *Aloe Barbadensis*, *Indica*, and *Socotorina*.

Pharm. Edinburgh, 1817.	*Pharm. London,* 1824.	*Pharm. U.S.* 1820, *L.*1836 & *E.*1841.
Juniperi Sabinæ Folia.	Sabinæ Folia.	Sabina.
Convolvuli Scammoniæ Gummi-Resina.	Scammoneæ Gummi-resina.	Scammonium.
Scillæ Maritimæ Radix.	Scillæ Radix.	Scilla.
Polygalæ Senegæ Radix.	Senegæ Radix.	Senega.
Cassiæ Sennæ Folia.	Sennæ Folia.	Senna.*
Aristolochiæ Serpentariæ Radix.	Serpentariæ Radix.	Serpentaria.
Sinapis Albæ Semina.	Sinapis Semina.	Sinapis, U.S.,L. Sinapi, E.
Spigeliæ Marilandicæ Radix.	Spigeliæ Radix.	Spigelia.
Nicotiani Tabaci Folia.	Tabaci Folia.	Tabacum.
Tamarindi Indicæ Fructus.	Tamarindi Pulpa.	Tamarindus.
Tormentillæ Erectæ Radix.	Tormentillæ Radix.	Tormentilla.
Rhois Toxicodendri Folia.	Toxicodendri Folia.	Toxicodendron.†
Arbuti Uvæ Ursi Folia.	Uvæ Ursi Folia.	Uva ursi.
Valerianæ Officinalis Radix.	Valerianæ Radix.	Valeriana.
Amomi Zingiberis Radix.	Zingiberis Radix.	Zingiber.

By the foregoing list it appears that in a number of cases the Edinburgh and London Pharmacopœias have adopted the nomenclature of the U. S. Pharmacopœia of 1820. In the case of the London Pharmacopœia this was not done in 1824, the year in which the first revision of that work took place after the reform introduced by our first Pharmacopœia, but was postponed until the revision of 1836. This is distinctly shown by the table.

In the following names the U. S. Pharmacopœia of 1830 has been followed.

Pharm. Edinburgh, 1817.	*Pharm. London,* 1824.	*Pharm. U.S.* 1830, *L.*1836 & *E.*1841.
Eugeniæ Caryophyllatæ Flores.	Caryophylli.	Caryophyllus.
	Krameriæ Radix.	Krameria.
Daphnes Mezerei Cortex.	Mezerei Cortex.	Mezereum, U.S.,L.‡ Mezereon, E.
Rosæ Centifoliæ Petala.	Rosæ centifoliæ Petala.	Rosa Centifolia.
Rosæ Gallicæ Petala.	Rosæ Gallicæ Petala.	Rosa Gallica.
Quassiæ Simarubæ Cortex.	Simaroubæ Cortex.	Simaruba.§
Styracis Officinalis Balsamum.	Styracis Balsamum.	Styrax.
Leontodi Taraxaci Radix.	Taraxaci Radix.	Taraxacum.

---

* In the Ed. Pharmacopœia, in two subdivisions,—*Senna Alexandrina* and *Indica*.

† Except the Ed. Pharmacopœia, from which this medicine is now dismissed.

‡ Mezereon in the U. S. Pharmacopœia of 1820.

§ Simarouba in the U. S. Pharmacopœia of 1820.

In the instances, given in these tables, not only the principle of nomenclature, but the exact name of the U. S. Pharmacopœia has been adopted. In many other cases, the principle has been adopted, but the medicine is either not included in the U. S. Pharmacopœia list, or is recognised under a different name. The following list presents a view of a majority of these cases.

Pharm. Edinburgh, 1817.	*Pharm. London,* 1824.	*Pharm. U.S.* 1820, *L.*1836 & *E.*1841.
Acori Calami Radix.	Calami Radix.	Calamus, U.S. Acorus, L. Calamus aromaticus, E.
	Anethi Semina.	Anethum, L.,E.
	Asari Folia.	Asarum, L.
Aspidii Filicis Maris Radix.	Filicis Radix.	Filix Mas, U.S. 1830. Aspidium, L. Filix, E.
	Aurantii Baccæ.	Aurantium, L.
Avenæ Sativæ Semina.	Avenæ Semina.	Avena, L.,E.
Colombæ Radix.	Calumba.	Colomba, U.S. Calumba, L.,E.
	Cardamines Flores.	Cardamine, L.
Cari Carui Semina.	Carui Semina.	Carum, U.S. Carui, L.,E.
Cassiæ Fistulæ Fructus.	Cassiæ Pulpa.	Cassia fistula, U.S. Cassia, L. Cassiae pulpa, E.
Chironiæ Centaurii Summitates.	Centaurii Cacumina.	Centaurium, L.,E.
Menispermi Cocculi Baccæ.		Cocculus, E.
Lichen Islandicus.	Lichen.	Lichen, U.S.* Cetraria, L.,E.
	Contrajervæ Radix.	Contrayerva, U.S. Contrajerva, L.
Bonplandiæ Trifoliatæ Cortex,	Cuspariæ Cortex.	Angustura, U.S. Cusparia, L.,E.
	Cydoniæ Semina.	Cydonia, L.
	Cumini Semina.	Cyminum, L. Cuminum, E.
	Elaterii Pepones.	Elaterium, L.
	Euphorbiæ Gummi-resina.	Euphorbium, L.,E.
Fici Caricæ Fructus.	Caricæ Fructus.	Ficus, U.S. 1830. Fici, L. E.
Hellebori Nigri Radix.	Hellebori nigri Radix.	Helleborus niger,U.S.† Helleborus, L.,E.

* Cetraria is adopted as the name in the U. S. Pharmacopœia of 1842.

† Helleborus in the U. S. Pharmacopœia of 1842.

Pharm. Edinburgh, 1817.	*Pharm. London,* 1824.	*Pharm. U.S.* 1820, *L.*1836 *& E.*1841.
Humuli Lupuli Strobili.	Humuli Strobili.	Humulus, U.S. Lupulus, L.,E.
	Mori Baccæ.	Mora, L.
Dolichi Prurientis Pubes.	Dolichi Pubes.	Dolichos, U.S.* Mucuna, L.,E.
	Opopanacis Gummi-resina.	Opopanax, L.
Papaveris Somniferi Capsulæ.	Papaveris Capsulæ.	Papaver, L.,E.†
	Cubeba.	Cubeba, U.S. Piper Cubeba, L.‡ Cubebae, E.
	Porri Radix.	Porrum, L.
Pterocarpi Santalini Lignum.	Pterocarpi Lignum.	Santalum, U.S. Pterocarpus, L.,E.
Anthemidis Pyrethri Radix.	Pyrethri Radix.	Pyrethrum, L.,E.†
	Quercûs Cortex.	Quercus, L.
	Rhamni Baccæ.	Rhamnus, L.
	Rhœados Petala.	Rhœas, L.,E.
Rosæ Caninæ Fructus.	Rosæ caninæ Pulpa.	Rosa canina, L. Rosae fructus, E.
	Acetosæ Folia.	Rumex, L.
Rutæ Graveolentis Herba.	Rutæ Folia.	Ruta, L.,E.†
Sambuci Nigræ Flores.	Sambuci Flores.	Sambucus, L.,E.†
Smilacis Sarsaparillæ Radix.	Sarsaparillæ Radix.	Sarsaparilla, U.S. Sarza, L.,E.
Spartii Scoparii Summitates.	Spartii Cacumina.	Spartium, U.S. 1830. Scoparius, L. Scoparium, E.
Delphinii Staphisagriæ Semina.	Staphisagriæ Semina.	Staphisagria, L.,E.
Veratri Albi Radix.	Veratri Radix.	Veratrum album, U.S. Veratrum, L.,E.
	Ulmi Cortex.	Ulmus, L.

The want of agreement in the names in the third column of the above table, arises, in several instances, from the generic and specific names of the plants, being, in different cases, selected to express the medicine. In some cases, the name of the U.S. Pharmacopœia, being less concise than that of the last L. and E. Pharmacopœias, seems to be a departure from the principle of nomenclature, recognised from the beginning in our na-

---

* Mucuna is adopted as the name of this medicine in the U. S. Pharmacopœia of 1842.

† Made officinal under this name in the U. S. Pharmacopœia of 1842.

‡ Here, unfortunately, the London College have deserted their name of 1824.

tional work; as in the instances of Helleborus niger for Helleborus, and Veratrum album for Veratrum. But these longer names were necessary in the U.S. Pharmacopœia, from the fact that two hellebores, and two veratrums were originally recognised as officinal in that work. Two veratrums are still retained; but as Helleborus fœtidus has been dismissed upon the recent revision, the single word *Helleborus,* as in the L. and E. Pharmacopœias, now expresses the medicine, formerly called *Helleborus niger.*

The system of concise names for vegetable medicines has generally been followed out by the L. and E. Pharmacopœias, in the nomenclature of the new articles introduced into those works. In proof of this, we subjoin a list of new L. and E. officinals from the vegetable kingdom; the names printed in italics having been previously adopted for the medicines they represent in the U. S. Pharmacopœia:—Anethum, E., Canna (Tous-les-mois) E., *Chimaphila*, L. (Pyrola, E.), Chiretta, E., Cubebae, E., Cuminum, E., *Curcuma*, L.,E., Diosma, L. (Bucku, E.), Elemi, E., Ergota, L.,E., Euphorbium, E., Gossypium (raw cotton) E., *Krameria*, E., Lacmus, L.,E., *Lactucarium*, L., *Lobelia*, L.,E., *Maranta*, L.,E., *Nux Vomica*, L.,E., *Origanum*, E., Pareira, L.,E., Rhoeas, E., Sabadilla, L.,E., *Sago*, L.,E., *Tapioca*, E. In the U. S. Pharmacopœia, cubebs have been officinal, since 1820, under the name, which they still retain, of Cubeba, and ergot, since 1830, first under the name of Secale Cornutum, and on the last revision (1842) under the changed name of Ergota, to make it conform with the name under which it has been recently admitted into the officinal list of the L. and E. Colleges. Cubebs, when first introduced by the London College, (1824.) were called Cubeba, but subsequently (in 1836) was denominated Piper Cubeba. This was an injudicious change; for it violated the plan of brief names for vegetable medicines, irrespective of botanical titles, which was adopted for the first time in the London Pharmacopœia of 1836.

In the additions which have been made to the vegetable Materia Medica of the U. S. Pharmacopœia of 1842, the same principle of brevity in nomenclature, enforced and adopted in 1820, in our first Pharmacopœia, and carried out in 1830, has been still adhered to. This is shown by the following list of newly introduced names, those in italics having been previously adopted in one or more of the British Pharmacopœias: *Absinthium*, Althæa, Cataria, Chondrus, *Diosma*, Matricaria, *Melissa*, Panax, *Papaver*, *Pareira*, *Pyrethrum*, *Ruta*, *Sabadilla*, Salvia, and *Sambucus*.

Thus then it appears that the principle of brief names for vegetable medicines, independent of botanical titles and changes, has become more and more extended in its application with the appearance of every revised edition of the British and United States Pharmacopœias. This remark does not apply to the Dublin Pharmacopœia, which has not been published since 1826; but it is hoped that a revision of that work, after the lapse of sixteen years, will shortly be made, and that the principle of reform in nomenclature, here advocated, will be adopted and applied as extensively as possible. If this be done, a great advance will be made towards uniformity of names, and the desirable result of one Pharmacopœia for the British Empire.

Our Pharmacy is so connected with that of Great Britain, that we cannot be insensible to the benefits which would accrue from the substitution of one for three British Pharmacopœias. If the three British Colleges could agree upon a common nomenclature, and the discrepancies, in this respect, are every day disappearing, the only remaining task would be to make the equivalent preparations of the three Colleges identical. The common basis of the three Pharmacopœias, having thus the same nomenclature and the same preparations, nothing would remain but to add the medicines and preparations, peculiar to any one, or any two of the works. These additions might be surplusage, in relation to the wants of certain sections of the British Empire; but they would do no harm, so long as every thing that might be wanted by any one section, could be found in the joint work.

With the preceding remarks on the nomenclature of vegetable medicines, showing the progress of the plan of brief names to designate them, in the adoption of which the framers of the U. S. Pharmacopœia preceded the British Colleges, we dismiss this division of pharmaceutical nomenclature. But the names of the mineral medicines have undergone, at the same time, a favorable change, with the result of lessening the number of synonymes. In proof of this we subjoin some names adopted by two or more of the Pharmacopœias noticed in these remarks; the order of their adoption in the different works being indicated by the order of the initials.

Acidum Arseniosum, U.S.,L.; Calcii Chloridum, U.S.,L.; Potassæ Bitartras, D.,L.,E.,U.S.; Sodæ Carbonas, D.,U.S., L.,E.; Sodæ Bicarbonas, D.,U.S.,E.;* Sodii Chloridum, U.S., L.; Ammoniæ Carbonas, D.,U.S.,E.;† Liquor Potassæ Arsenitis, U.S.,L.; Barii Chloridum, L.,U.S.; Liquor Calcii Chloridi, L.,U.S.; Magnesia, L.,E.,U.S.,D.; Potassæ Carbonas, D.,U.S.,L.,E.; Potassæ Bicarbonas, D.,U.S.,L.,E.; Potassii Sulphuretum, L.,U.S.

As the Dublin Pharmacopœia was reviewed in the third volume, First Series, of this journal, we shall not further speak of it than to say that the nomenclature of the vegetable Materia Medica is sadly in want of reform. From the work as printed, it is almost impossible to tell what name was intended for the vegetable medicines. Thus, for example, we have "Fœniculum," with the addition, *Vide* "Anethum." Turning to this we find "Anethum Foeniculum. *Semina.*" This last phrase is a definition, not a pharmaceutical name; and if we assume "Fœniculum" to be the name of the medicine, then we are met with the difficulty that it is called "Semina Anethi Fœniculi" at pages 102 and 205, and "Semina Fœniculi," at pages 113 and 144. A similar haphazard nomenclature is adopted for nearly all the vegetable medicines, producing the greatest confusion. The framers of a Pharmacopœia should indicate the name which they prefer for a medicine or preparation, and adhere to it throughout the

---

* Sodæ Sesquicarbonas, L.

† Ammoniæ Sesquicarbonas, L.

work. No alternative of names should be presented in the Materia Medica; and no variation from the fixed name is admissible, when the substance which it represents is recited as an ingredient in a preparation.

The London Pharmacopœia of 1836, the last which has been published, far exceeds, in neatness and the consistency of its different parts, those of Dublin and Edinburgh. The Materia Medica contains 267 articles, of which 37 are new. Of the remaining 230 articles, 133 have new names; so that only 97 substances remained with their names unchanged upon the last revision. This certainly was a very extensive reform in nomenclature, and, with few exceptions, for the better. We have discovered but few errors violating the unity of the work. No substances are employed in the preparations, which do not exist in the officinal catalogue, except the expressed oil of nutmeg, and lettuce (Lactuca), both of which have been inadvertently omitted; although the former is an ingredient in the *Emplastrum Picis*, and the latter is used to make the *Extractum Lactucæ.* In a few instances the officinal name in the Materia Medica list has not been exactly followed in the preparations. Thus we have *Catechu* in the Materia Medica, and *Catechu Extractum,* at page 100; *Cocci,* (Mat. Med.) and *Coccus*, pages 169 and 170; *Cornu,* (Mat. Med.) and *Cornua,* pages 63 and 113; *Elaterium,* (Mat. Med.,) and *Elaterii Pepones,* page 95; *Gallæ,* (Mat. Med.) and *Galla,* pages 172 and 184; *Nux vomica,* (Mat. Med.) and *Strychnos Nux Vomica,* page 60; *Piper Cubeba,* (Mat. Med.) and *Cubeba,* page 172; *Saccharum,* (Mat. Med.) and *Saccharum purificatum,* page 143; *Sambucus,* (Mat. Med.) and *Sambuci Flores,* page 66.

In the Materia Medica, the oils are expressed by Latin names, with the word *oleum* printed last,—in the titles of the preparations, with the same word printed first; and where an oil is recited as an ingredient of a preparation, some of them are printed, in different places, with the words in both orders. Thus *Cinnamomi Oleum* of the Materia Medica is twice printed thus in the preparations, and once, at page 65, *Oleum Cinnamomi;* and *Oleum Anisi, Oleum Carui, Oleum Lavandulæ, Oleum Menthæ Piperitæ, Oleum Rosmarini,* and *Oleum Succini,* the recognised titles of these oils as distinct preparations, are expressed, in the body of some of the formulæ, with the words in the reverse order. A similar slight discrepancy obtains in regard to solution of ammonia, which is recognised under the title of *Liquor Ammoniæ,* and recited in two formulæ, pages 55 and 61, as *Ammoniæ Liquor.* The error in regard to *galls* leads to a mistake in the title of two preparations; for if Gallæ, in the plural, is the name of the medicine, we should expect to have *Tinctura Gallarum,* and *Unguentum Gallarum Compositum,* instead of *Tinctura Gallæ,* and *Unguentum Gallæ Compositum.* Again, if *Piper Cubeba* is to be the name of cubebs, then the London College should call the tincture, *Tinctura Piperis Cubebæ,* instead of *Tinctura Cubebæ;* on the same principle that they have *Confectio Piperis Nigri.* Objection may be made to the title *Syrupus Aurantii,* for a syrup made with orange peel; for, as the College recognises the fruit and the rind of the fruit, under the names of *Aurantium* and *Aurantii Cortex,* "Syrupus Aurantii" would seem more appropriately to designate a syrup made from the juice of the fruit, than from the peel.

The errors here pointed out in the London Pharmacopœia, consist in a want of consistency of the work with itself. The nomenclature of the Materia Medica, and of the preparations must be assumed to have the preference of the College, and should have been carefully adhered to throughout the work. But the nomenclature, even if consistently carried out, still presents some defects, which we shall briefly point out.

The plan of having the names of the substances in the singular number, as had been previously done in the U. S. Pharmacopœia, is carried out to a considerable extent by the London College, in the last revision of their Pharmacopœia. In obedience to this plan they now have *Amygdala, Caryophyllus, Cornu,* and *Uva,* for *Amygdalæ, Caryophylli, Cornua,* and *Uvæ passæ*, of their former Pharmacopœia. But it may be asked, why have they not adopted *Coccus*, *Ficus*, *Galla*, *Limon*, *Morum*, *Prunum*, and *Testa*, for *Cocci*, *Fici*, *Gallæ*, *Limones*, *Mora*, *Pruna*, and *Testæ*. Coccus and Galla were probably intended to be used; for these names are always employed in the singular in the preparations, and Coccus was the name in the Pharmacopœia of 1824. If *Aurantium* be correctly applied by the College as the name for *orange*, surely *Limon* must be the correct name for *lemon*, *Ficus* for *figs*, *Morum* for *mulberry*, and *Prunum* for *prunes*. Indeed, "Morum" is the officinal title for mulberry, so far as it may be inferred from the name of one of the preparations, "Syrupus Mori." To be consistent with the title for mulberry in the Materia Medica, "Mora," the name of this preparation should have been *Syrupus Mororum*, like "Syrupus Limonum."

The London College have committed an error in calling the fruit of the Momordica Elaterium, by the name of *Elaterium*, and the medicine, which is universally called elaterium, by the title of *Extractum Elaterii*. The substance deposited from the juice of the wild cucumber is not, properly speaking, an *extract*. This attempt to give a new meaning to the word elaterium cannot succeed. The College, no doubt, felt it themselves to be a difficulty, when they begin the formula for their so-called extract of elaterium, with the words "Elaterii Pepones scinde," instead of "Elaterium scinde."

The London College have included Limonum Succus in the list of the Materia Medica. If this be right, then "Mororum Succus" and "Rhamni Succus," titles used in the preparations at page 161, should have been included also. The Materia Medica list would have been rendered more complete by the insertion of "Aqua," as is done in the U. S. Pharmacopœia, and recently in that of Edinburgh. The London College have committed an oversight in the formula for Ceratum Calaminæ, in which "Calamina" is used, instead of "Calamina Præparata." "Unguentum Zinci" is an injudicious name for an ointment, made of oxide of zinc and lard.

Unguentum Zinci Oxydi would have been a better title. In the "compound tincture of ammonia," two ounces, instead of two drachms, of mastich are ordered. This error has been corrected by Mr. Phillips, in his authorized translation of the London Pharmacopœia.

We have already mentioned that the Edinburgh Pharmacopœia was revised in 1839, and that a second edition of the revised work appeared in 1841. On this second edition we propose to make some remarks. The work is not well edited, and many small details, trifling individually, but important in the aggregate, have been but imperfectly attended to. The typography is not executed according to a consistent plan. The general plan is to print genitives with ae, instead of the diphthong æ; yet this rule is violated always in the Index, and frequently throughout the body of the work. In reciting the ingredients of preparations, the unit of weight or measure is expressed, indifferently, in two ways: as "a drachm," "one drachm;" "an ounce," "one ounce;" "a pint," "one pint," &c. Now neatness required the adoption of the first or second way exclusively, and good usage would have declared for the first.

The following misprints occur in the work:—page 42, *Terebintha Chia*, for *Terebinthina Chia*; page 56, *Spiritus Dilutior*, for *Spiritus Tenuior;* page 96, *Antimonii Tartarizatum*, for *Antimonium Tartarizatum;* page 98, *Compound Tincture of Lavender*, for *Compound Spirit of Lavender*; page 178, *Tincturae Senna Composita*, for *Tinctura Sennae Composita;* page 195, *Aqua Potassæ Effervescens* and *Aqua Sodæ Effervescens*, for *Potassae Aqua Effervescens* and *Sodae Aqua Effervescens;* page 196, *Citrus Medicæ Fructus*,* for *Citri Medicæ Fructus*,—*Convolvulus Scammonii Gummi-resina*, for *Convolvuli Scammoniæ Gummi-Resina*,—*Decoctum Althææ*, for *Decoctum Althææ Officinalis*,—*Decoctum Hordei*, *Comp.*, for *Decoctum*

---

*This is given in the column of *old names;* but lemons were not officinal in the last Ed. Pharmacopœia.

Hordei Distichi; p. 197, *Oxidum Hydrarg. Rubri per Acid. Nit.*, for *Oxidum Hydrarg. Rubrum per Acid. Nit.,—Oxidum Hydrargyri Rubri,* for *Hydrargyri Oxidum Rubrum,—Pini Balsamei Resina,* for *Pini Balsameæ Resina;* page 198, *Spartii Scoparii Cucumina,* for *Spartii Scoparii Summitates,—Submurias Hydrargyri,* for *Sub-Murias Hydrargyri Mitis,—Tinctura Cascarilla,* for *Tinctura Cascarillæ,—Unguentum Nit. Hydrarg.*, for *Unguentum Nit. Hydrarg. Fortius.* Besides, there are a number of misprints in the names and references of the Index.

The Latin nomenclature is, in many instances, inconsistent with itself. In support of this criticism, the following instances may be adduced: Spirit of Ammonia is *Ammoniæ Spiritus* in the Materia Medica, and *Spiritus Ammoniae* in the Preparations. The following are similar discrepancies:—*Aqua Ammoniæ* and *Aqua Ammoniae Fortior,* (Materia Medica), *Ammoniae Aqua* and *Ammoniae Aqua Fortior,* (Preparations); *Plumbi Diacetatis Aqua,* (Mat. Med.), *Plumbi Diacetatis Solutio,* (Prep.); *Aqua Ammoniæ Acetatis,* (Mat. Med.,) *Ammoniae Acetatis Aqua,* (Prep.); *Aqua Potassae,* (Mat. Med.), *Potassae Aqua,* (Prep.); *Copaibae Oleum,* (Mat. Med.), *Oleum Copaibæ,* (Prep.) Almonds are expressed by the Latin singular Amygdala, and yet, in the Preparations, the Edinburgh College have given us the titles of *Conserva Amygdalarum,* and *Mistura Amygdalarum,* instead of *Conserva Amygdalæ,* and *Mistura Amygdalæ.* Again, Gallae is the Ed. officinal name for galls ; but the name is in one instance not consistently carried out ; for we have as a preparation, *Unguentum Gallae et Opii.* In the case, however, of the tincture, the name is consistently given,—*Tinctura Gallarum.* The oil of cubebs is directed to be obtained according to a general formula, given under the head of "Volatile Oils." Its Latin officinal name, from the manner in which these oils are enumerated, is not distinctly indicated ; but as Cubebae is given as the name of cubebs, the oil should be called, to be consistent, *Oleum Cubebarum.* This name, however, is not recognised by Dr. Christison, who gives, in his

Dispensatory, *Oleum Cubebae,* as the Edinburgh officinal name. All these discrepancies would disappear by adopting either the singular or plural throughout the names ; but we should much prefer the use of the singular number.

The feculence of the juice of the fruit of Momordica Elaterium is judiciously called, in the Materia Medica, simply *Elaterium;* but when, under the preparations, directions are given for obtaining this feculence, the two names are given, *Extractum Elaterii* seu *Elaterium.* Now these are inconsistent names; for if *Elaterium* means the feculence, *Extractum Elaterii* must mean something drawn from the feculence. The name given to red precipitate is *Hydrargyri Oxidum Rubrum,* and to the ointment made from it with lard, *Unguentum Oxidi Hydrargyri.* This latter name, to make it correspond with other similar names, should have been *Unguentum Hydrargyri Oxidi.*

So much for the inconsistencies which are apparent in the Latin nomenclature of the Edinburgh Pharmacopœia; but there are other defects in the nomenclature, some of which we shall now proceed to indicate.

For the preparation of phosphate of soda and extract of stramonium, bone, and the seeds of stramonium are severally directed, but neither is enumerated as officinal. Hence it would be proper to introduce into the Materia Medica list, the titles, *Os* and *Stramonii Semen.* If the latter title were introduced, *Stramonium* would require to be changed to *Stramonii Folia.*

For expressing solution in water three words have been used in the Pharmacopœias,—*Aqua, Solutio,* and *Liquor.* The Edinburgh College do not seem to give a preference to any one of these words, but use them all in different cases. Thus they have *Aqua Ammoniæ, Aq. Ammoniae Fortior, Aq. Ammoniae Acetatis, Aq. Potassae, Aq. Calcis, Chlorinei Aq., Plumbi Diacetatis Aq., Ammoniae Carbonatis Aq., Ammoniae Acetatis Aq., Potassae Aq. Effervescens,* and *Sodae Aq. Effervescens.* Using "Solutio," they have *Solutio Barytae Muriatis, Sol. Argenti Nitratis* (test), *Sol. Argenti Ammoniati* (test), *Sol. Barytae Nitratis* (test), *Sol. Sodae Phosphatis* (test), *Morphiae Muriatis Sol., Calcis Muriatis Sol., Cupri Ammoniati Sol., Plumbi Diacetatis Sol.* Using "Liquor," they have *Liquor Arsenicalis* and *Iodinei Liquor Compositus.* Certainly, in a work intended as a standard of Pharmacy for Scotland, greater uniformity was to be expected. One mode of expression in these cases should have been selected, and uniformly employed. As "Aqua" is now universally applied to the "distilled waters," and as "Solutio" is not good Latin for "solution," the Edinburgh College would have acted wisely, if in their late revision they had followed the example of the London College, in invariably using the word "Liquor."

In the titles of two preparations, dried alum and dried sulphate of iron, "*exsiccatum*" is used to signify "dried;" in the title of a third, dried carbonate of soda, "*siccatum*" is employed. The nomenclature would have been neater, if "exsiccatum" had been employed here also.

To express the vegetable medicines, the general principle, adopted successively by the U. S. and London Pharmacopœias, of using a single name where one part only of a plant, or one species of a genus is used medicinally, is usually acted upon by the Edinburgh College, but violated in a few instances. Thus we find in the Materia Medica list, *Calamus aromaticus* for *Calamus; Cassiae cortex* for *Cassia; Cassiae pulpa* for *Cassia Fistula; Dauci radix* for *Carota; Glycyrrhizae radix* for *Glycyrrhiza; Gummi acaciae* for *Acacia; Quercus cortex* for *Quercus; Rhamni baccae* for *Rhamnus; Rosae fructus* for *Rosa Canina; Salicis cortex* for *Salix.*

To the chemical nomenclature of the Edinburgh Pharmacopœia many exceptions may be justly taken. For its defects a sort of apology is made in the Preface, consisting in the allegation that it is impossible to follow the nomenclature of the chemist, without too frequent and violent changes. Indeed the opinion is expressed, that a great error was committed when chemical terms were first introduced into pharmaceutical nomenclature. We are willing for the moment to admit these positions, and to judge the labours of the College by the manner in which they have carried out their own peculiar opinions.

The views, then, of the Edinburgh College are that changes of nomenclature are to be avoided, and that a chemical nomenclature is not a good one, because it is liable to frequent changes. With these views, the College had to decide, 1st. What should be done with the chemical names heretofore adopted? 2d. What names should be given to chemical substances newly introduced? The natural decision under the first question was to leave the existing chemical names unchanged; or, if they had become absurd, or inadmissible from whatever cause, to fall back upon non-chemical names, but never to substitute one chemical name for another. The College have left very few of their old chemical names unchanged, even if we consider the titles of the salts to have undergone no essential change by having the base in Latin expressed first instead of last. In a few cases, the changes have been from chemical to non-chemical names, of which the following are examples:—Arsenicum album, Aerugo, Borax, Calamina præparata, Calomelas, Cinnabaris, Creta, Lithargyrum, Sublimatus corrosivus; but in the majority of instances, where changes have been made, a new chemical name has been substituted for the old one, contrary to the principles which appear to have guided the College. Thus they have substituted *Ammoniae carbonas* for *Sub-Carbonas Ammoniæ; Potassae bicarbonas* for *Carbonas Potassæ; Potassae bitartras* for *Super-Tartras Potassæ; Potassae carbonas* for *Sub-Carbonas Potassæ; Sodae bicarbonas* for *Carbonas Sodæ; Sodae carbonas* for *Sub-Carbonas Sodæ; Spiritus aetheris nitrici* for *Spiritus Ætheris Nitrosi*, &c. We approve of these changes; but are they consistent with the objections of the College to chemical nomenclature, founded on its instability? The old names might have been retained, or, if inadmissible, names inexpressive of composition might have been employed. For consistency sake the College should have restored such terms as *Sal Volatilis*, *Cremor Tartari*, *Sal Tartari*, *Natron Præparatum*, *Spiritus Nitri Dulcis*, &c.

The names given to chemical substances, newly introduced, are sometimes chemical and sometimes arbitrary. Examples of the former are, *Acidum Hydrocyanicum*, *Antimonii oxidum*, *Calcis murias*, *Ferri carbonas saccharatum*, *Ferri iodidum*, *Hydrargyri biniodidum*, *Manganesii oxidum*, *Morphiae acetas*, *Morphiae murias*, *Plumbi diacetatis aqua*, *Plumbi iodidum*, *Plumbi nitras*, *Potassae bisulphas*, *Potassii ferrocyanidum*, *Potassii iodidum* and *Quinae sulphas*. Instances of arbitrary names are, *Bismuthum album*, *Calx chlorinata*, *Ferrugo*, *Hydrargyri pre[æ]cipitatum album, and Liquor arsenicalis.* Here it is perceived that the chemical substances newly introduced have, in a majority of cases, chemical names, notwithstanding the objection of the College on account of their liability to change.

The true point of view in which to consider this subject, is that chemical nomenclature in Pharmacy is necessary, and can neither be laid aside as applied to old chemical substances, nor avoided upon the introduction of new ones into the Materia Medica. Good sense, however, forbids the adoption of every change and every little nicety of chemical nomenclature. Pharmaceutical convenience must be allowed to modify the strictly scientific nomenclature; and this necessity has been repeatedly felt and acted upon.

We do not object, therefore, to the nomenclature of the Edinburgh Pharmacopœia in regard to chemicals, because it is not strictly scientific; but because it is not carried out on any consistent plan. It is, indeed, what the framers of it have themselves characterized it to be in their Preface, "a patchwork of which they cannot boast." Its want of unity is, doubtless, the effect, not of design, but rather of inattention to the demands of the work as a whole, while the revisers were occupied with the details of its parts.

When it is borne in mind that a number of the old chemical names are changed for new chemical names, and that chemical titles are given to nearly all the chemical substances, newly introduced; it was to be expected that the nomenclature, so far as employed, would be consistent with itself, and that chemical names would not be rejected on slight grounds. Yet this reasonable expectation has not been realized in the nomenclature of the College. As they had newly adopted the names, Ferri iodidum, Hydrargyri biniodidum, Plumbi iodidum, Potassii ferrocyanidum and Potassii iodidum, they would only have proceeded somewhat further in the same path, if they had adopted *Barii Chloridum* for *Barytæ murias*, *Calcii Chloridum* for *Calcis murias*, *Ferri Chloridi Tinctura* for *Ferri muriatis tinctura*, and *Sodii Chloridum* for *Sodæ murias*. In relation to arbitrary names, we are willing to admit that their use is expedient for chemical substances of doubtful composition, or having long scientific names; but the Edinburgh College have employed them in other cases. If "Oxidum Arsenici" must be changed, as we admit it should be, it does not follow that "Arsenicum album" is a good substitute. The College recognise a class of officinal acids, and, on the occasion of the recent revision, introduced a new one, "hydrocyanic acid."* Under these circumstances, it was natural to expect that the substance in question would have been named *Acidum Arseniosum*, more especially as its chemical name is not a matter of dispute, and as this is the name adopted in the U. S. and London Pharmacopœias. Again, "Cinnabaris" is adopted for the red sulphuret of mercury; but surely, if the College are willing to have a red oxide of mercury (Hydrargyri oxidum rubrum), they might have admitted a red sulphuret of

---

* They also introduced the impure acetic acid, obtained by the destructive distillation of wood, under the very exceptionable title of "Acidum Pyroligneum, *pyroligneous acid*." Strictly speaking, there is no such acid, and the construction of its name would lead to the supposition that there existed a *pyrolignic acid*. Besides, *Pyroligneosum* is the proper Latin translation of *pyroligneous*.

mercury under the name of *Hydrargyri Sulphuretum Rubrum.*[*] "Bismuthum album" is a very objectionable name, especially as "Bismuthum" is recognised as the name of the metal itself. Under the doubt which was probably felt, as to the proper designation for this substance, now first introduced into the Ed. Pharmacopœia, it would have been judicious to adopt the name of the London Pharmacopœia, and thus secure the advantage, so far as it goes, of uniformity of nomenclature. Similar views should have induced the Edinburgh College to adopt the London name for Fowler's solution, *Liquor Potassæ Arsenitis.*[†] The name "Sublimatus corrosivus," even as an arbitrary name, seems deficient in precision, and requires the prefix *Hydrargyri* at least as much as the name of *white precipitate,* which is called by the Edinburgh College "Hydrargyri precipitatum album." If there are more than one "white precipitate," so also there are more than one "corrosive sublimate;" and the prefix, "Hydrargyri," is not less necessary to the one name than to the other.

We have already mentioned that the recent edition of the Edinburgh Pharmacopœia is the first that has been printed in the English language. This reform was half adopted, so to speak, in the first and second U. S. Pharmacopœias, which were printed with Latin and English on opposite pages; and has been fully carried out in the third, recently published, in conformity with the example of the Edinburgh Pharmacopœia. This change has very properly not been extended to the Latin nomenclature, which is preserved; but the details of the several processes are given in English. As the various processes necessarily contain an enumeration of the different officinal substances and preparations which are essential either as ingredients or agents, and as the names of these must be given in English, as well as the mere directions of

---

[*] This was the name of the Ed. College, in their first revised edition, (1839.)

[†] This name was first adopted in the U.S. Pharmacopœia of 1830, and in the London Pharmacopœia of 1836. By a misprint, this solution was called "Liquor Potassæ Arseniatis" in the U. S. Pharm. of 1820.

the mode of proceeding; the necessity is obvious for the translation into English of all the Latin titles of substances, &c., thus enumerated. A large majority of the names of the medicinal substances being thus necessarily rendered into English in the body of the work, there seems to be an obvious propriety of rendering them all in the same language, and, at the same time, in a uniform manner. The framers of a Pharmacopœia printed in English, recognising the necessity of English names by their employment to a partial extent, might well adopt them universally; and doing so, the propriety would naturally present itself of selecting them according to a system, and adhering to them invariably. Such a system of names might be called the *English Officinal names,* as having the sanction of the authors of the Pharmacopœia.

Such being our views, we shall proceed to make a few remarks on the Edinburgh Pharmacopœia, in relation to its use of English names. These names are used in the Materia Medica list, in the body of the different formulæ, and in the Index. The Latin titles of the different preparations are not given in English at the head of the formulæ, but are rendered into English in the Index, and whenever the preparations themselves happen to be placed in the Materia Medica list, or enumerated in the various formulæ. In this way all the Latin names are translated, sometimes in the Index alone, sometimes in the Index and Materia Medica list, and at other times, in both these and the body of the formulæ also. It is certainly an unusual course that the Index should contain English names, referring to certain pages at which those names are not to be found, but only the Latin titles, of which they are the translations. But this defect might be overlooked, if the English names for the same substance were uniform. Unfortunately, this is not the case; for we have, in numerous instances, several English names to express the same article.

In proof of this we shall give a few examples:—Aloe barbadensis is called *Barbadoes aloes* in the Materia Medica, and *Hepatic Aloes* at p. 71; Althææ folia, *Marsh-mallow* in the Mat. Med., and *Marsh-Mallow Leaves* in the Index; Althææ radix, *Marsh-mallow* in the Mat. Med., and *Marsh-Mallow Root* in the Index; Anethum, *Dill* in the Mat. Med., and *Anethum seeds* at p. 75; Aqua ammoniae fortior, *Strong ammonia* in the Mat. Med., and *Stronger Solution of Ammonia* in the Index;* Arsenicum album, *Arsenious acid* in the Mat. Med., *White Arsenic* at p. 98, and *Arsenic* in the Index; Aurantii cortex, *Bitter orange rind* in the Mat. Med., *Bitter orange-peel* in the Preparations, and *Orange-peel* in the Index; Cardamomum, *Cardamoms* in the Mat. Med., *Cardamom seeds* in numerous places in the Preparations, *seeds of Cardamoms*, p. 166, and *Cardamom* in the Index; Digitalis, *Foxglove* in the Mat. Med., *leaves of Digitalis* at p. 81, and *Digitalis* at pp. 91, 139, and 171; Ferri muriatis tinctura, *Tincture of iron* in the Mat. Med., and *Tincture of Muriate of Iron* in the Index; Guaiaci lignum, *Lignum-vitæ* in the Mat. Med., and *Guaiac* at pp. 72 and 73; Hyoscyamus, *Henbane* in the Mat. Med., *leaves of Hyoscyamus* at p. 82, and *Hyoscyamus* at p. 172; Krameria, *Rhatany-root* in the Mat. Med., and *Krameria-root* at p. 83; Limonum oleum, *Oil of Lemons* in the Mat. Med., *Volatile oil of Lemon-peel* at p. 151, and *Volatile oil of Lemons* at p. 181; Myristicae adeps, *Concrete oil of nutmeg* in the Mat. Med. and Index, and *Oil of mace* at p. 146; Rosa gallica, *Red-rose* in the Mat. Med., *Rosa gallica* at p. 93, and *Red rose-petals* at p. 158; Saccharum purum, *White sugar* in the Mat. Med. and at pp. 68, 69, 70 and 103, *Pure sugar* in numerous places, and *Sugar* at pp. 124, 156 and 178; Spiritus aetheris nitrici, *Spirit of nitrous ether* in the Mat. Med., and *Spirit of Nitric Ether* in the Index; Tamarindus, *Tamarind-pulp* in the Mat. Med. and Index, and *Tamarinds* at p. 93; Cinnabaris, *Cinnabar* in the Mat. Med., and *Sulphuret of Mercury* in the Index; Mucilago, *Mucilage* at pp.

---

* At pages 104, 106, and 127, in the body of certain formulæ, it is called by the mongrel title of "Stronger Aqua Ammoniæ."

121, 123, and 124, and *Mucilage of Gum-arabic* in the Index; Pulvis ipecacuanhae compositus, *Powder of Ipecacuan and Opium* at p. 140, and *Compound Ipecacuanha Powder* in the Index; Syrupus simplex, *Syrup* at pp. 90, 123, and 156, and *Simple syrup* at p. 160. The minor discrepancies in English nomenclature are innumerable. It may be alleged, however, that these discrepancies were intended; various English names for the same thing having been given, either to identify the substances meant, or to render the Index more copious and useful. Now we have no objection to English synonymes in certain cases, printed in a subordinate type; but the framers of an English Pharmacopœia should adopt a system of English names, which should be printed in a uniform type, and which should always be adhered to, whenever it is intended to represent the same substance. The following extracts, printed as they appear in the Materia Medica list, show in what a slovenly manner it is drawn up.

"ARSENICUM ALBUM. Sesquioxide of arsenic; *Arsenious acid.*"

"BARYTAE MURIAS. *Chloride of barium.*"

"BISMUTHUM ALBUM. *Trisnitrate of bismuth.*"

"CALCIS MURIAS. [CRYSTALLIZATUM.] *Hydrochlorate of lime.*"

"HYDRARGYRI OXIDUM RUBRUM. Binoxide of mercury. *Red Precipitate.*"

"POTASSII IODIDUM. *Iodide of potassium: hydriodate of potash.*"

"POTASSII SULPHURETUM. A mixture of sulphate of potash with persulphuret of potassium. *Sulphuret of potash.*"

"SODAE MURIAS. Impure commercial chloride of sodium. *Salt.*"

"SODAE MURIAS PURUM. *Chloride of sodium.*"

"SUBLIMATUS CORROSIVUS. Bichloride of mercury. *Corrosive-sublimate.*"

The italics in a majority of cases very properly represent the English translation of the Latin names; but in the above examples this is not the case, except in two instances, in one of which the synonyme given is also in italics. For "Potassae sulphas cum sulphure," no translation is given except in the Index. The name of the preparation called "Spiritus ammoniae foetidus" is nowhere rendered in English except in the Index, and there it is called *Ammoniated spirit of Assafœtida*, the former name of the Pharmacopœia.

No definite nomenclature, either in Latin or English, is given for a majority of the volatile oils. Nearly the whole of them are enumerated under the head of "Volatile Oils," at pages 185, 186, and directed to be obtained from certain specified parts of the appropriate plants, designated by their *botanical* names, in the manner directed by a general formula which is given. Here we perceive a departure from the plan of nomenclature of the College, which designates the parts of plants medicinally used, whenever practicable, by a single word; as Anthemis for *Chamomile*, and so of the rest. Thus, instead of saying that by pursuing a general formula, a volatile oil may be obtained "from the flowers of Anthemis nobilis," the directions should have read "from Chamomile," which means the *flowers of Anthemis nobilis*. The same remark applies to all the volatile oils here enumerated. The Latin and English officinal names should have been inserted. The former are nowhere specially given, and the latter are only to be inferred from the names used in the body of the formulæ or in the Index; and the names, thus given, do not always agree.

The Edinburgh College have made a number of additions to their officinal catalogue. We subjoin a list of the most important of these additions, indicating, by initials, the substances which were previously included in the lists of the Dublin, London, and United States Pharmacopœias. The order of the initials shows the order of time in which the several articles were adopted in the works to which they refer. The absence of all initials of course indicates an article not included in these works. Acidum Pyroligneum,* U.S.† Acidum Tartaricum, L.,D.,U.S. Aqua Ammoniae Fortior, L.‡ Anethum, L. Aqua, U.S. Bergamotae Oleum, L. Bismuthum, U.S., L.,D. Canna. Carbo Animalis, U.S.,L. Dauci Radix, L. Pyrola, U.S.,L. Chiretta. Cassiae Oleum. Colchici Semina, L.,D., U.S. Creasotum, L.‡ Cubebae, U.S.,L.,D. Curcuma, U.S.,D.,L. Cuminum, L. Bucku, D.,L.‡ Elemi, L.,D. Euphorbium, L.,D. Gossypium (raw cotton). Granati Radix, D.‡ Iodineum, D., U.S.,L. Krameria, L.,D.,U.S. Lacmus, L.,D. Lobelia, U.S.,L. Manganesii Oxidum, L.,D. Maranta, U.S.,L. Nux-vomica, U.S.,L.,D. Copaibae Oleum. Myristicae Adeps, U.S.§ Rosae Oleum.‡ Crotonis Oleum, L.,D.,U.S. Origanum, L.,D.,U.S. Ovum, L. Pareira, L.‡ Pix Arida, L. Potassii Ferrocyanidum, L.‡ Lauro-cerasus, D. Rhoeas, L.,D. Sabadilla, L.‡ Sago, U.S.,L. Ergota, U.S.,L. Tapioca, U.S. Terebinthina Chia, L.,D. Acetum Cantharidis, L. Acetum Colchici, L.,D.,U.S. Acetum Opii, D.|| Acidum Hydrocyanicum, U.S.,D.,L. Aqua Anethi, L. Aurantii Aqua, L. Aqua Cassiae. Chlorinei Aqua, D. Aqua Foeniculi, L.,D.‡ Aqua Lauro-cerasi, D. Aqua Sambuci, L. Bismuthum Album, U.S.,L.,D. Calx Chlorinata, L.‡ Carbo Animalis Purificatus, L.‡ Conserva Amygdalarum, L.† Electuarium Aromaticum, L.,D.,U.S. Electuarium Piperis, L,D. Cupri. Ammoniati Solutio, L.,D. Decoctum Aloës, L.,D. Decoctum Dulcamarae, L.,U.S.,D. Decoctum Haematoxyli, U.S. Decoctum Papaveris, L.,D. Decoctum Sarzae Compositum, L.,D.,U.S. Decoctum Scoparii, L. Decoctum

---

* The names given are those of course of the Ed. Pharm., and the initials which follow indicate the Pharmacopœias in which the same substances were previously included, though not necessarily under the same name.

† Dismissed from the U. S. Pharm. of 1842.

‡ Made officinal in the U. S. Pharm. of 1842.

§ Dismissed from the U.S. Pharm. of 1842, and the volatile oil substituted.

|| Made officinal in the U.S. Pharm. of 1842, after having been dismissed from that of 1830.

Taraxaci, D.* Emplastrum Ammoniaci et Hydrargyri, L.,D. Emplastrum Belladonnae, D.,L.* Emplastrum Picis, L. Enema Catharticum, D. Enema Foetidum, D. Enema Opii, D.,L. Enema Tabaci, L.,U.S.,D. Enema Terebinthinae, D.,L. Extractum Aconiti [Alcoholicum*]. Extractum Colchici Aceticum, L. Extractum Colocynthidis, L.,D. Extractum Digitalis, L. Extractum Lupuli, L.,D. Extractum Krameriae.* Extractum Nucis-vomicae, D.* Extractum Opii, L.,D. Extractum Pareiræ, L. Extractum Quassiæ, U.S. Extractum Rhei, L.,D. Extractum Sarzae Fluidum, D. Extractum sive Resina Scammonii. Extractum Stramonii [Seminis], L.,D.* Extractum Styracis. Extractum Taraxaci, L., D.,U.S. Ferri Carbonas Saccharatum. Ferri Iodidum, L.* Ferrugo (hydrated sesquioxide of iron*). Ferri Iodidi Syrupus.† Hydrargyri Biniodidum, L.* Hydrargyri Precipitatum Album, L.,D.,U.S. Infusum Cuspariae, L.,U.S.,D. Infusum Aurantii, L.,D. Infusum Bucku. Infusum Calumbae. Infusum Caryophylli, L.,D.* Infusum Cascarillæ, L.,U.S.,D. Infusum Chirettae. Infusum Pareirae, L. Infusum Senegae. Infusum Serpentariae, U.S.,L. Infusum Simarubae L.,D. Iodinei Liquor Compositus, L.* Linimentum Ammoniae Compositum (Granville's lotion). Linimentum Terebinthinatum, L.,U.S.,D. Mistura Camphorae cum Magnesiâ, D. Mistura Creasoti. Mistura Ferri Composita, L.,D.,U.S. Mistura Guaiaci, L. Mistura Scammonii. Morphiae Acetas, U.S.,L. Morphiae Murias, L.* Rutae Oleum, D. Pilulae Aloës et Ferri. Pilulae Calomelanos et Opii. Pilulae Colocynthidis et Hyoscyami. Pilulae Digitalis et Scillae. Pilulae Ferri Carbonatis. Pilulae Ipecacuanhae et Opii. Pilulae Plumbi Opiatae. Pilulae Rhei.* Pilulae Rhei et Ferri. Pilulae Styracis, L.,D. Plumbi Iodidum, L. Plumbi Nitras. Potassae Bisulphas, L.,D. Potassii Iodidum, D.,U.S.,L. Pulveres Effervescentes. Pulvis Cretae Opiatus, L.,D. Pulvis Rhei Compositus. Pulvis

---

* Made officinal in the U.S. Pharm. of 1842.

† This has been substituted for the Ferri Iodidi Solutio (called Liquor in the Materia Medica list,) of the first edition of the revised Edinburgh Pharmacopœia, (1839.)

Tragacanthae Compositus, L. Quinae Sulphas, D.,U.S.,L. Sodae Carbonas Siccatum, L.,D.,U.S. Sodae Murias Purum. Spiritus Cassiae. Strychnia, L.* Syrupus Croci, L. Syrupus Ipecacuanhae.* Syrupus Rhamni, L.,D. Syrupus Rhoeados, L.,D. Tinctura Aurantii, L. Tinctura Bucku, D. Tinctura Capsici, L.,U.S.,D. Tinctura Cardamomi Composita, L.,D. Tinctura Cassiae. Tinctura Colchici [Seminis], D.,L.* Tinctura Iodinei, D.,U.S. Tinctura Lactucarii. Tinctura Lobeliae, U.S. Tinctura Lobeliae Aetherea. Tinctura Quassiae Composita. Tinctura Valerianae, L.,D.,U.S. Trochisci Lactucarii. Trochisci Morphiae. Trochisci Morphiae et Ipecacuanhae. Trochisci Sodae Bicarbonatis. Unguentum Cocculi. Unguentum Creasoti, L.* Unguentum Gallae et Opii, L. Unguentum Precipitati Albi, L.,D.,U.S. Unguentum Iodinei, D.* Unguentum Antimoniale, D.,L.* Veratria, L.* Vinum Colchici, U.S.,L.

Most of the substances in the above list are taken from other Pharmacopœias. The length of the list, though incomplete, shows how necessary the revision of the Ed. Pharmacopœia had become, after the lapse of twenty-two years. The articles derived from the works indicated by the initials, require no further notice; but a few of those which are not so derived may be briefly commented on.

CANNA. *Tous-les-mois.* This is the starch of the *Canna Coccinea*, a substitute for arrow-root, from which it is not easily distinguished, except by the large size of its globules under the microscope, and their glistening appearance to the naked eye. According to Dr. Christison, it makes a stiffer jelly than arrow-root.

CHIRETTA. INFUSUM CHIRETTAE. *Chiretta. Infusion of Chiretta.* The Chiretta was first described by Fleming in the Asiatic Researches, under the name of *Gentiana Chirayta.* It was afterwards separated from the gentians by Mr. Don, who formed it into a new genus under the name of *Agathotes Chirayta.* It grows in India, and is much es-

---

* Made officinal in the U.S. Pharm. of 1842.

teemed by the British practitioners in Bengal. It has the general properties of the gentians, being a pure bitter, and, medicinally, a tonic and stomachic. The trials made with it in Edinburgh are stated to have confirmed the favorable accounts received of its efficacy. The herb and root are the officinal parts. The infusion is made with four drachms of the medicine to twenty fluidounces of boiling water. Dose, from one to three fluidounces, taken half an hour before meals.

COPAIBAE OLEUM. *Oil of Copaiva.* This is best obtained by distilling copaiva with water. It is usually colourless, and has the pure odour of copaiva. Its density is .910. In composition it is a carbo-hydrogen, identical with pure oil of turpentine. The dose is from five to thirty drops. Its advantages over copaiva are its less offensiveness to the stomach, and its smaller dose.

EXTRACTUM *sive* RESINA SCAMMONII. MISTURA SCAMMONII. *Extract or Resin of Scammony. Scammony Mixture.* The scammony of commerce is very impure. This was proved by analyses made by Dr. Christison in 1835. It is no doubt to avoid the impurities that the Ed. College have introduced a process for obtaining the pure resin. It consists in boiling finely powdered scammony in successive portions of proof spirit, as long as it dissolves anything; then distilling the liquid until little else but water passes over; next decanting the watery solution, which contains gum, from the resin which has precipitated, and finally washing this with boiling water, and drying it at a temperature not exceeding 240°. The resin, when thus prepared, is nearly free from taste and smell. Its dose is from seven to fourteen grains. The scammony mixture is made with seven grains of this resin, triturated with three fluidounces of unskimmed milk. The resulting emulsion is uniform, and not distinguishable from milk by its colour, taste, or smell.

FERRI CARBONAS SACCHARATUM. *Saccharine Carbonate of Iron.* This is the carbonate of the protoxide of iron, protected from oxidation by saccharine matter, on the principle of Klauer and Vallet. The carbonate is obtained in the usual manner, by double decomposition between the sulphate of iron and carbonate of soda. The precipitate is immediately washed with cold water, and freed, by squeezing, from as much of the water as possible. The pulp that remains is triturated, without delay, with white sugar, previously in fine powder. The mixture is then dried at a temperature not much above 120°. This saccharine carbonate is employed to make a new officinal pill of the Ed. Pharmacopœia, consisting of four parts of the carbonate, and one of conserve of red roses. It is called *Pilulae ferri carbonatis*, the name given to Vallet's ferruginous mass in the U. S. Pharmacopœia of 1842.

FERRI IODIDI SYRUPUS. *Syrup of Iodide of Iron.* This preparation, as we have already stated, is substituted in the second edition of the revised Edinburgh Pharmacopœia for the aqueous solution of the first, which has been abandoned. Soon after the protective power of saccharine matter against the full oxidation of iron was noticed by Klauer and Vallet in the case of the carbonate, several experimenters were induced to try its effects in other cases, where the prevention of oxidation was desirable. Dr. Christison states in his Dispensatory, that M. Frederking, of Riga, tried the influence of sugar on a recent solution of iodide of iron, and found that it rendered it permanent; and, applying the observation, Dr. Thomson, of the University of London, published in the Pharmaceutic Transactions, a formula for a *syrup of iodide of iron*, which, slightly modified, is that adopted in the last edition of the Ed. Pharmacopœia. Shortly after the promulgation of Vallet's formula in this country, Mr. William Procter, Jr., of this city, applied honey to the protection of the tincture of protochloride of iron, (see vol. x, p. 272, January, 1839, of this journal); and afterwards in a paper which appeared in the twelfth volume, (April, 1840,) he made known his equally successful results for the preservation of the solution of iodide of iron by means of several saccharine substances. The formula which he gave in the latter paper was substantially adopted by the revising Committee of the

U.S. Pharmacopœia; and the preparation was introduced under the name of *Liquor Ferri Iodidi*, honey being the protecting substance selected. Thus, then, the *syrup* and *solution*, severally, of the two Pharmacopœias are equivalent preparations, rendered unchangeable, the one by sugar, the other by honey, and devised in distant countries as the result of independent researches.

LINIMENTUM AMMONIAE COMPOSITUM. *Compound Liniment of Ammonia.* This is evidently an imitation of Dr. Granville's counter-irritant lotion. The College have very improperly ordered it of two different strengths; because they allege it may be required weaker for some purposes. We object to this, as giving two different preparations the same name. Either the weakening of the stronger liniment must be left to extemporaneous prescription, or, if two strengths must be adopted, two names should be adopted also. Preparations are inserted in a Pharmacopœia to be prescribed by a given name, not as examples of prescriptions to be copied in detail.

MISTURA CREASOTI. *Creasote Mixture.* This is made by dissolving sixteen minims of creasote, by the aid of an equal quantity of acetic acid, in fourteen fluidounces of water, one of compound spirit of juniper, and one of syrup. It should have been left to extemporaneous prescription.

PLUMBI NITRAS. *Nitrate of Lead.* This is introduced for the purpose of preparing the *iodide of lead*, which is used to form an ointment by the London, but not the Edinburgh College. The London College forms the iodide by means of the acetate of lead.

PULVIS RHEI COMPOSITUS. *Compound Rhubarb Powder.* This consists of a pound of magnesia, two ounces of powdered ginger, and four of powdered rhubarb, mixed together.

UNGUENTUM COCCULI. *Cocculus Indicus Ointment.* The formula for this ointment is as follows:—"Take any convenient quantity of Cocculus Indicus, separate and preserve the kernels, beat them well in a mortar, first alone, and then with a little axunge; and then add axunge till it amounts altogether to five times the weight of the kernels." This ointment is said to be one of the best applications for ring-worm of the scalp.

The list we have given of the additions to the Ed. Pharmacopœia shows a goodly number of new pills. These are generally useful combinations; but the majority of them should have been left to extemporaneous prescription. Where substances are combined in various proportions by the best practitioners, it is hardly necessary to make one proportion officinal. In the second revised edition, all the ingredients of pills are given in parts by weight instead of fixed weights, a change which facilitates the operations of the apothecary. The weight of the pills into which the mass is to be divided, is generally indicated in the formula, but sometimes left to the discretion of the prescriber. The formulas for tinctures are also considerably altered in this edition. In both editions the improvement of making many of them by the method of displacement is adopted, though the alternative of the old method is given. This improvement is also adopted in the U.S. Pharmacopœia of 1842.

The new Ed. Pharmacopœia presents the improvement of short notes to many of the substances, included both in the Materia Medica and the preparations, detailing their qualities when genuine, and the tests by which they may be known to be so. This plan was adopted in 1836 by the London College, at the suggestion, as it appears, of the Edinburgh College, but is carried out more fully by the latter body. This good example has been followed in the U. S. Pharmacopœia of 1842. The notes of the Edinburgh College are generally satisfactory. They are all embraced within the pages of the Materia Medica list; so that when a "preparation" has a note, its name is inserted in this list with its note appended. This causes what is called the Materia Medica list to contain more than it professes to embrace, and leads to a needless repetition of officinal names. The arrangement would have been better if the notes to the preparations had been appended to their several formulas, but distinguished by a smaller type.

Though we have had occasion to object to the plan and execution of the new Edinburgh Pharmacopœia in many particulars, yet we are ready to admit its great superiority over its predecessor. Its English dress, the notes, the introduction of the method of displacement, are all important improvements. The nomenclature, faulty as it is, is an improvement on that of the previous Pharmacopœia.

ART. XXXI.—OBSERVATIONS ON THE VOLATILE OIL OF GAULTHERIA PROCUMBENS, PROVING IT TO BE A HYDRACID ANALOGOUS TO SALICULOUS ACID.

By William Procter, Jr.

Several years since the volatile oil of Spiræa ulmaria, (meadow sweet,) first obtained by Pagenstecher by distilling the flowers of that plant with water, was proved by Löwig to contain a hydracid, which possesses uncommon interest from the number of compounds it is capable of forming with other bodies. The discovery of hyduret of salicyle as a product of the decomposition of salicin, by Piria, and its identity with the hydracid in oil of Spiræa ulmaria, as since demonstrated by the exact analyses of Ettling,* have added much more interest to these proximate principles.

The hypothetical radical called *spiroil* by Löwig, and *salicyle* by Piria, Liebig denominates *salicule.* This radical, combined with an equivalent of hydrogen, forms *saliculous acid,* which, united with bases, constitutes *saliculites.* When saliculous acid is oxidized by the agency of potassa, water, and heat, *saliculic acid* is formed, and its compounds are called *saliculates.* When saliculous acid combines with chlorine, bromine, or iodine, an equivalent of hydrogen is replaced by an equivalent of those elements respectively, and *chlorosaliculic, bromosaliculic,* and *iodosaliculic* acids are produced.

For several years past it has been supposed† that the volatile oil of the Gaultheria procumbens, either from the analogy of their odor or specific gravity, possessed similar properties with the oil of Spiræa ulmaria, without any steps having been taken to ascertain the correctness of the supposition. The

---

* Liebig's Turner.

† Dr. Wood, U. S. Dispensatory.

observations which follow are intended to throw light on this subject. The chemical characteristics of oil of gaultheria have been found, in many instances, to accord with those described as peculiar to saliculous acid, yet several instances occur to the contrary. They have the same density, and the aqueous solution of each colors the persalts of iron purple. The compounds which potassa, soda, and oxide of copper form with oil of gaultheria, are very like the salts of saliculous acid with those bases.

The action of an excess of caustic potassa with heat produces a crystalline body, identical in all its reactions with saliculic acid, as described by Piria.

The compound of oil of gaultheria and potassa, when exposed to the combined influence of moisture and the atmosphere, undergoes a decomposition similar to that of saliculite of potassa.

The reactions of chlorine and bromine with oil of gaultheria yield compounds similar to those with saliculous acid; and nitric acid also produces results of an analogous character.

On the contrary, the boiling point of oil of gaultheria is many degrees higher than that of saliculous acid. Ammonia forms a compound with it which differs from saliculite of ammonia in not being decomposed by acids with the separation of the oil, nor by potassa with the separation of ammonia. All endeavors to form the body called *saliculimid* by Liebig, with the process he gives, were ineffectual. The compounds of baryta and lead with oil of gaultheria are *white,* while the saliculites of those bases are yellow. But the most striking difference between these substances is, that when oil of gaultheria is boiled with solution of potassa, it is not recoverable by means of an acid, as saliculous acid is. Under these circumstances a crystalline substance is precipitated, which is the same acid that results from heating the oil with an excess of potassa.

Oil of Gaultheria Procumbens.—This volatile oil is extensively used by the pharmaceutists of this country to flavor syrups, etc. Most of the oil used in this city is obtained from distillers residing in New Jersey, in which State the plant yielding it grows in great abundance. As usually found in the shops, it has a more or less intense red color, but when recently distilled it is colorless, or nearly so. Its density, as the result of several careful observations, is 1.173, and its boiling point 412°, Fahr.; the mercury remaining stationary at that point. Its taste is burning and aromatic; it is slightly soluble in water, to which it communicates its odor and taste; and it mixes with alcohol and ether in all proportions.

An aqueous solution of the oil is colored purple by the persalts of iron.

Dropped into a concentrated solution of potassa or soda, the oil is instantly solidified, becomes white, and separates from the alkaline solution while heat is disengaged.

Oil of gaultheria decomposes the carbonates of potassa and soda gradually without heat; but if gently warmed, the evolution of carbonic acid is evident.

Chlorine and bromine, when brought into contact with oil of gaultheria, combine with it; the mixture becomes very hot, and hydrochloric and hydrobromic acids are evolved. Iodine is dissolved by the oil forming a deep red solution, without combining with it, as heat dissipates the iodine without the production of any hydriodic acid.

Nitric acid of density 1.40, assisted by heat, converts oil of gaultheria into a crystalline substance having acid properties, whilst nitrous acid fumes are evolved. If fuming nitric acid be employed, the reaction is violent, without the assistance of heat, and a different product is obtained.

When oil of gaultheria is added to concentrated sulphuric acid the latter becomes slightly colored, and if heated, the odor of the oil is destroyed.

When oil of gaultheria is distilled with solution of potassa in excess, the distilled liquid has neither the odor nor taste of the oil, and consequently its constitution differs from that of the oil of Spiræa ulmaria, which, under the same circumstances, yields a volatile oil distinct from saliculous acid, that acid remaining combined with the potassa.

Oil of Gaultheria and Ammonia.—When oil of gaultheria is mixed with a concentrated solution of ammonia and agitated, it is gradually dissolved, and the solution acquires a brownish color. This solution, on being exposed to the air, deposits large brown colored crystals, as the excess of ammonia evaporates. When these crystals are dissolved in boiling alcohol, the solution suffered to cool, and the crystals thus obtained again dissolved and crystallized, the compound is obtained in four-sided prisms, with dihedral terminations.

This substance is slightly soluble in cold water, and more so in boiling water, which deposits it in tufts on cooling. Alco hol and ether dissolve it readily, but in solution of ammonia it is more soluble than in any other menstruum; from which it is precipitated by saturating the alkali with an acid. Solution of potassa dissolves it without separating ammonia, even when boiled. Sulphuric, nitric and hydrochloric acids have no effect on it when cold; hot sulphuric and hydrochloric acids dissolve it without decomposition, and when diluted the compound is precipitated; but hot nitric acid decomposes it, nitrous acid vapors being evolved. When heated to 265° Fahr. it fuses; and a few degrees higher it sublimes without residue, and condenses in crystalline scales with iridescent reflection, perfectly white and transparent, and possessing the same properties as before sublimation. When suddenly heated it boils, and is rapidly converted into vapor, without any separation of ammonia. It has no taste, and if pure, no odor; but in the form as first obtained, it has a weak aromatic smell.

A portion of this compound was kept moist in a close vessel for three weeks, without the slightest evidence of change. Neither acids nor alkalies, nor any other means which have been tried, will cause the isolation of the oil of gaultheria or ammonia from this substance.

Oil of Gaultheria and Potassa.—When oil of gaultheria is added to a concentrated solution of potassa instant combination takes place, and a crystalline substance results, which separates from the solution. Pressure between bibulous paper separates most of the adhering alkali; and by solution in a small quantity of hot alcohol it is deposited in six-sided tables by cooling. These crystals are transparent, nearly colorless, and are very soluble in water, and soluble in alcohol and ether.

When dry, this salt is not affected by the air, but if moisture be present it becomes dark colored, and finally black. The acids decompose it, setting the oil at liberty. It is precipitated white by the salts of baryta, lead, and zinc; yellow by nitrate of mercury; gray by the nitrate of silver; and bluish gray by protosulphate of iron.

When an excess of oil of gaultheria is employed in crystallizing it from alcohol, the salt is obtained in acicular crystals, which decompose by solution in water—a portion of oil being liberated.

Oil of Gaultheria and Soda.—The reactions of these two substances are similar to those with potassa. The soda salt is perfectly white, crystallizes in minute prisms, and is much less soluble in water and alcohol than the preceding salt.

Oil of Gaultheria with Baryta.—When chloride of barium is added to a solution of either of the two last salts, a white flocculent precipitate results. If to a transparent solution of baryta in cold water, oil of gaultheria be added, and the mixture agitated, a white flocculent precipitate is also obtained. This, when washed with alcohol and dried, is the salt of baryta. When it is mixed with water acids decompose it—the oil being liberated. It is soluble in boiling water.

Decomposition of the alkaline salts of oil of Gaultheria by heat.—If protosulphate of iron be added to a cold solution of either the potassa or soda salts of oil of gaultheria, a bluish gray precipitate is produced; but when the solution is boiled for some time and then tested, no precipitate ensues on the addition of the ferruginous salt, but a deep red transparent solution results. By boiling a hot solution of the baryta salt the same decomposition occurs. When an acid is added to either of the boiled solutions, a white crystalline precipitate is obtained, without a trace of the oil of gaultheria. This crystalline matter, when heated in a close vessel, sublimes without residue, and condenses in four-sided prisms, with obliquely truncated summits. When dissolved in hot water its solution yields the fine purple color with protosulphate of iron, so characteristic of the *acid* obtained by acting on oil of gaultheria with an excess of potassa and heat, as shown in the sequel, which has all the characters of saliculic acid.

Oil of Gaultheria and Oxide of Lead.—When an excess of this oil is agitated for some time with hydrated oxide of lead suspended in water, combination takes place. By subsequently washing with alcohol, the compound is obtained free from adhering oil. It may also be obtained by adding acetate of lead to a solution of the potassa salt of oil of gaultheria. It is a light white powder. When mixed with water and an acid is added, the oil separates, and floats on the surface of the liquid in minute globules.

Oil of Gaultheria and Oxide of Copper.—When hydrated oxide of copper is agitated with an aqueous solution of oil of gaultheria, the mixture, from a blue, is changed to a grass green color, and the odor of the oil ceases to be perceptible. An excess of oil should be present to combine with all the oxide, and the precipitate washed with alcohol and dried. This compound has the form of a light green powder. When heated it is decomposed, and if suspended in water, the contact of an acid causes the oil to separate.

Oil of Gaultheria and Oxygen.—When oil of gaultheria is heated with an excess of potassa, the same reaction occurs as when saliculous acid is treated in the same way; a gaseous matter (hydrogen) is evolved, and the whole becomes a crystalline mass on cooling, without a trace of the oil being perceptible. By dissolving this mass in water, and adding an excess of diluted hydrochloric acid, a white precipitate results, which consists of tufts of crystals resembling benzoic acid. By washing with cold, and dissolving in boiling water, the solution, on cooling, yields beautiful silky four-sided prisms, with obliquely truncated summits.

This substance possesses the properties of an acid; it is slightly soluble in cold water, to which it communicates an acid reaction, and much more soluble in boiling water, alcohol and ether. It fuses at 250° Fahr., and when further heated sublimes unchanged, condensing in long, very brilliant, four-sided needles, more regular than those obtained from water. The vapor of this acid excites coughing when inhaled; its taste is sweetish, like that of acetate of lead, and it irritates the fauces on swallowing. It decomposes the alkaline carbonates with effervescence, and forms with the salts of iron a fine purple solution. Nitric acid, sp. gr. 1.40, when cold, does not effect it; but if heat be applied, red fumes are evolved, and a yellow crystalline matter produced. Fuming nitric acid acts on this acid when cold.

When this acid is saturated with potassa, a white salt is obtained in feathery crystals, which is soluble in water, alcohol and ether. It is precipitated by the soluble salts of lead and tin; but those of baryta, zinc, copper, magnesia and iron, do not. The salt of soda is similar to that of potassa.

The ammoniacal salt crystallizes in needles. When heated to 260° Fahr., it fuses and sublimes in brilliant scales, having an iridescent reflection. Too much heat partially decomposes the salt, leaving a carbonaceous residue. It is soluble in water, and potassa added to its solution separates ammonia.

When protosulphate of iron is added to a solution of either of the above salts, a deep red color is produced. When the persulphate is employed, the solution is purple.

If to a boiling solution of this acid an excess of carbonate of lead be added, carbonic acid is liberated, and on filtering the hot solution, beautiful four-sided crystals of the lead salt are obtained.

With nitrate of silver the soluble salts of this acid yield a white precipitate.

Oil of Gaultheria and Chlorine.—When a current of chlorine is passed through oil of gaultheria it is rapidly absorbed, hydrochloric acid is evolved, the oil assumes a yellow color, and becomes very hot. If the chlorine is continued until the evolution of the hydrochloric acid ceases, the temperature of the oil decreases, and it becomes a crystalline mass. By dissolving this in boiling absolute alcohol, the compound is obtained on cooling, in transparent rhomboidal plates, slightly tinged with yellow. This substance is insoluble in water, but soluble in alcohol, ether, and solutions of the fixed alkalies. When the crystals are dropped into a concentrated solution of potassa they turn red, and on the application of heat are dissolved, forming a deep red solution. By adding an acid to this solution the compound is precipitated unchanged. When heated, it fuses at a temperature of 220° Fahr. into a colorless liquid, which readily crystallizes on cooling.

When heated in close vessels, it sublimes at a few degrees above its fusing point, and condenses in colorless rhomboidal crystals. Its vapor burns with a flame edged with green. Sulphuric acid dissolves it, from which it is precipitated by water. Its taste is peppery, and its odor peculiar. When the solution of this chlorine compound in potassa is evaporated, the salt is obtained in reddish colored crystals.

The solution of this compound of oil of gaultheria with chlorine, in potassa, without decomposition, together with its other characteristics, renders its identity with chlorosaliculic acid strongly probable.

Oil of Gaultheria and Bromine.—If an excess of bromine is added to oil of gaultheria, the mixture instantly becomes hot, and hydrobromic acid is evolved. When all the oil has combined, the whole becomes a crystalline mass. By the application of a gentle heat the excess of bromine and hydrobromic acid are driven off, and on cooling, the compound is obtained perfectly pure. Its solution in hot alcohol, on cooling, yields tufts of acicular crystals. It fuses at 140°, and commences subliming at 150° Fahr.; but does not recrystallize for some time after cooling. When heated in close vessels, its vapor condenses in minute drops, which become crystalline by standing. Its taste and odor are peculiar, and differ from the chlorine compound. Its solution in potassa is light yellow, from which it is precipitated perfectly white by an acid.

Oil of Gaultheria and Iodine.—Oil of gaultheria dissolves iodine readily, but does not combine directly with it, as the solution may be heated without the production of hydriodic acid. When, however, either of the preceding compounds is mixed intimately with iodide of potassium, the mixture acquires a brownish color; and when heated very gradually a red vapor arises, and condenses in a crystalline form on the sides of the tube. This substance is insoluble in water, soluble in alcohol and ether, and fuses readily.

Oil of Gaultheria and Cyanogen.—When either the chlorine or bromine compound of oil of gaultheria is intimately mixed with cyanuret of potassium or mercury, and heated in a tube, a white vapor rises, and condenses in the form of a yellow oil, which, by standing, becomes crystalline. Its odor is very peculiar; it crystallizes in needles, and is soluble in alcohol and ether.

Action of Ammonia on the compound of Chlorine and Oil of Gaultheria.—A portion of the chlorine compound, which had been fused several times to entirely deprive it of any hydrochloric acid, was placed in a long tube, and a current of dry ammonia passed over it for some time. The ammonia changed the color from white to light gray, and no moisture was condensed in the tube. When washed in water, this substance communicates a yellowish color to that fluid; on adding nitrate of silver a white precipitate is produced, which is soluble in ammonia. After being dried it was dissolved in hot alcohol, and was obtained in crystalline plates of a light yellow color by cooling. These were soluble in a hot solution of potassa, without the separation of ammonia, forming a yellow solution, from which a white precipitate is thrown down by an acid. This substance does not appear to have the characters of *chlorosaliculimide.*

Action of Nitric Acid on Oil of Gaultheria.—When oil of gaultheria is added to nitric acid, sp. gr. 1.40, no immediate action results; but if gently heated, copious fumes of nitrous acid are evolved, and the oil is converted into a yellow crystalline substance. By washing with water, and dissolving it in boiling alcohol, it is obtained in silky crystals, which have a pale yellow color, and acid properties. It is slightly soluble in water, to which, however, it communicates a yellow color; but alcohol and ether dissolve it more readily. When heated to 200° Fahr., the crystals fuse into a yellow liquid; more heat causes a partial sublimation, leaving a residue of charcoal. It changes litmus to yellow, without a trace of red; its solution colors the skin and nails deep yellow, and has little taste, but causes an irritation of the throat, which excites coughing.

This acid combines with potassa to form a deep yellow crystalline salt. Its ammonia salt crystallizes in bright yellow needles, which, when heated, fuses, and then sublimes in small yellow crystals unchanged. It does not detonate when heated, like the other salts of this acid.

A solution of either of these salts is precipitated yellow by acetate of lead, green by sulphate of copper, and yellow by nitrate of mercury. Sulphate of zinc and nitrate of silver are not changed. The addition of a strong acid decomposes these salts; their acid being precipitated in a crystalline form.

When the salts of potassa or lead are suddenly heated they fulminate, and leave a black carbonaceous residue. This feature characterises the salts of nitrosaliculic acid.

When oil of gaultheria is dropped into fuming nitric acid, a violent reaction takes place; the mixture becomes very hot, and much nitrous acid is given off. A deep orange colored substance is formed, with a resinous aspect, which is deposited in yellow scales, from its hot alcoholic solution by cooling. This substance has a very bitter disagreeable taste, and a peculiar odor. It dissolves in potassa, forming a yellow solution, but is not precipitated when the alkali is saturated with an acid.

In conclusion it may be observed, that the foregoing observations prove that the oil of Gaultheria procumbens is a hydracid, forming salts with bases, and compounds with chlorine, bromine, and iodine, like saliculous acid; but, at the same time, it exhibits differences in its reactions which render the identity of the two substances improbable. The only means of settling this question definitely is, to subject the oil and its compounds, to rigid ultimate analysis, which the want of accurate instruments has caused the author to defer to a future period.

ART. XXXII.—THE FERRUGINOUS WINES, AND SOME NOTICE OF THE MORE RECENT MARTIAL PREPARATIONS.

By Augustine Duhamel.

Of the wines of a chalybeate character, whether prepared from pure or oxidized iron, or combined with an organic acid, a variety may be found in the shops of the apothecary.

These will be found to differ in quality and strength, according to age, manner of preparation, and nature of the constituents. From the want of a fixed standard, they are prepared according to the judgment of the apothecary, and are selected agreeably to the caprice of the physician for whose individual practice they may be designed.

This great latitude must ensue where we have no officinal direction—which in this case is as much needed as with other preparations where pharmaceutic operations are guided by an authority we are pleased to recognise. One was originally given in the U. S. Pharmacopœia, 1st edition; but in the 2d and 3d editions the framers of the work thought proper to discard it, for what were deemed by them sufficient reasons, though its reintroduction was recommended by the pharmaceutic body.

The latter, in consideration of being obliged to prepare and keep it to meet the demands of such practitioners as incline favourably towards its tonic powers as a medicine, believe it should constitute one of the *Preparata* of the Pharmacopœia.

The rejection of a formula for a preparation not altogether obsolete, from the apothecary's guide-book, would seem to indicate that it becomes his duty to banish said preparation from his shop. It is unreasonable to suppose that this will be done, so long as there exists a demand for it.

The reason assigned for its rejection was its inequality of strength. As the quantity of iron dissolved is in proportion to the acid contained in the wine, and as it is difficult to obtain, at all times, a wine identical in its constituents, the chalybeates resulting from them must of course be possessed of different degrees of tonic effect.

Though of an inconstant character, there is a certain degree of confidence attached to their use, from the knowledge that they are not of a class to expose a patient to imminent danger in taking increased doses.

Under existing circumstances, it is desirable that physicians, in prescribing *Vinum Ferri*, would specify the formula they intend, in order to determine the quantity of active ingredient.

To a physician who would properly appreciate the medicinal value of these martial preparations, it is requisite to observe not only the composition of each formula, but also the chemical action resulting from the ingredients in contact with the wine.

The wines of the compounds of iron are not so liable to this objection. The later discovered combinations with citric acid are used to a considerable extent.

As the American Journal of Pharmacy presents the best medium of information to our apothecaries upon the subject of *formulæ*, when not given in the National Pharmacopœia, and supplies the place of a Vade Mecum, or Apothecaries' Manual, I have collated for the use of its readers, from the principal Pharmacopœias, a few formulas appertaining to the Wines of Iron, which, it is hoped, may prove useful as a reference.

First in order is the old formula of the U. S. and Dublin Pharmacopœias.

"Take of

Iron Wire, cut in pieces,	4 oz.
White Rhenish Wine,	4 pints.

Sprinkle the wire with some of the wine, and expose it to the air till covered with rust, then add the remainder of the wine; macerate for ten days (digest for 7 days, Dub.) with occasional agitation, and filter."

A slight disengagement of hydrogen gas takes place during the maceration, resulting from the decomposition of the water by the iron, which becomes oxidized, and combines with the bitartrate of potash of the wine. As there is, likewise, a little acetic or malic acid contained in the wine, the efficacy of this chalybeate is based upon a mixture of acetate or malate of iron with ferro-tartrate of potash.

Vinum Ferri.

Vin Martial ou Chalibé.—(Codex.)

Pure Iron Filings,	1 oz. or 32 parts.
White Wine, (genereux,)	2 lbs. = 1000 "

Macerate in a matrass for six days, stirring from time to time, then decant and filter.

This, as will be perceived, differs from the first mentioned formula in being prepared with only half the quantity of iron.

Other Pharmacopœias of Europe give the same process, differing only in a more or less prolonged maceration, except the London Pharmacopœia, which cannot with any propriety claim the name of a wine, being a spiritous solution of the double tartrates of iron and potassa with cream of tartar.

The wines of iron are subject to a change of color after long standing, becoming gradually blackened, consequent upon the action of the iron upon the astringent matter of the wine.

To obviate this, it has been recommended by Mr. Beral to shake the white wines with a little hydrated peroxide of iron, and after a few days a separation of the astringent matter ensues.

Wine of iron is much used in France as a domestic remedy in families, who prepare it for their own use by suspending a *boule de mars* (an impure tartrate of iron and potash made into a paste with a concentrated decoction of vulnerary herbs, and formed into boluses weighing one or two ounces when dried,) from the neck of a wide mouthed decanter, in which is contained a quart of white wine.

When water is substituted for the wine, as is sometimes the case, it forms what is called *Eau de Boule.*

In addition to these simple wines are others, containing bitter and aromatic substances, to produce a stimulant tonic effect. The following, published in Ellis' Formulary, has been used to some extent in this country, and is similar to a formula much recommended by the late Dr. Physick, under the name of Aromatic Wine of Iron.

Iron Filings,	1½ oz.
Gentian,	½ oz.
Bitter Orange Peel,	½ oz.
Red Wine,	2 pints.

Wine of Citrate of Iron.

(From Guibourt's Traité de Pharmacie.)

Citrate of Iron, dry,	1 part.
Malaga Wine,	96 parts.

The preparations of citrate of iron, though little used here, have commended themselves to the notice of London and Paris practitioners.

Citrate of Iron is said to have been first introduced to the medical profession by Mr. Beral, of Paris.

As it is not likely to be procured in our shops at present, it is deemed perfectly in place to give the manner of preparing this salt.

Citric Acid, crystallized,	3 oz. or parts.
Hydrated Peroxide of Iron, dry,	2 " "
Distilled Water,	12 " "

(If the moist hydrate be used, about 6 oz. are required; but as the degree of moisture is not always the same, it is well to add that the peroxide must be in excess.)

Boil together in a matrass until the whole of the peroxide is dissolved. Filter, and wash the filter with sufficient distilled water to obtain twelve parts of liquid. This forms what is kept in France under the name of *Liquid Citrate of Iron*, marking 24° B., and holds in solution one-third of its weight of *dry citrate of Iron.*

The dry may be easily obtained by exposing the liquid in shallow vessels, containing but a thin stratum, and dried in a heated stove. When dry it separates in the form of thin scales, very brilliant, and of a beautiful golden red color. This salt dissolves very slowly in water, but in the end is completely dissolved.

It dissolves readily in boiling water.

The combining proportions of this substance are forty parts of the oxide of iron to seventy parts of crystallized citric acid. It has an acid, not unpleasant taste, and of all the ferruginous salts is the least disagreeable to be taken.

Beral obtains his citrate by treating iron filings with citric acid, and exposing the product to the air to dry.

In the Hamburg Pharmacopœia is given a formula for a Citrated Aromatic Wine of Iron, as follows:

“Iron Filings,	1 oz.
Lemon Juice,	3 oz.

Let it macerate during a night, and add

Gentian,	½ oz.
Cinnamon,	2 drachms.
White Wine,	16 ounces.

Digest for twenty-four hours, then decant.”

This, or an analogous preparation, as I have been told, is used by physicians in Charleston, S. C.

“ *Wine of Acetate of Iron.*

(Traité de Pharmacie par Soubeiran.)

Acetate of Iron, (dry,)	32 grs.
White Wine,	1 lb.”

This is made from the acetate of the peroxide of iron, an extremely soluble salt.

To obtain it, you add to concentrated acetic acid *recently* precipitated hydrated peroxide of iron, until the latter ceases to dissolve any more; then add a slight excess of acid, to effect a perfect solution, and evaporate to dryness upon a water bath.

This combination takes place slowly. Some old hydrated peroxide, which I desired to convert into acetate, was very little, if at all, attacked by concentrated acetic acid.

Like most of the salts of iron the acetate is deliquescent, and requires to be kept in glass stopper bottles.

" *Wine of Hydriodate of Iron.*

De Dr. Pierquin.

Hydriodate of Iron,	4 drachms.
Bordeaux Wine,	1 lb.

A tablespoonful of this wine is given night and morning to adults."

The other chalybeates of the day, such as lactate and malate of iron, the double salts of ammonia and tartrate of iron, and ammonio-citrate of iron, have not yet, as far as I can ascertain, been essayed under cover of a vinous menstruum.

The ammoniacal citrate of iron may be prepared by adopting the method recommended for the ammonio-tartrate, vol. 6th, page 275, new series, of this Journal, merely substituting one acid for the other.

The lactate, from its little solubility, is not employed in a liquid state, but is made up into pills, tablettes, lozenges, and is incorporated with biscuits and chocolate.

It appears that the greater part of the lactate of iron used in France is obtained from the *lactate of lime*, an article of commerce, supplied from the residue proceeding from the manufacture of beet root sugar. According to Beral, to convert it into lactate of iron 500 grammes of lactate of lime are dissolved in two kilogrammes of boiling water. The lime is precipitated by oxalic acid, and the filtered liquid containing the lactic acid, heated in contact with iron filings for six or eight hours, when, upon cooling the filtered liquors, the lactate of iron is furnished.

The malate of the protoxide of iron, officinal in the Pharm. Pruss. under the name of *Extractum Ferri Pomatum*, is prepared by digesting one part of iron nails, or wire, together with four parts of the juice of apples, for some days, then evaporating the liquid to one-half, filtering, and concentrating to the thickness of an extract.

The inconstant nature of the class of ferruginous wines has not escaped the observation of medical writers. A long time ago a Mr. Parmentier suggested the propriety of substituting a wine of more definite character, to be made from a certain proportion of liquid tartrate of iron and potash, holding in solution a fixed quantity of the salt.

Reference is made to a preparation of this kind in nearly all the French works treating of Pharmacy, under the name of "*Teinture de mars tartarisée.*"

Virey directs one oz. of this tincture to be added to a pound of white wine.

A very valuable preparation of iron very little known here, though sometimes prescribed by foreign practitioners, is the *Bestucheff's Tincture*, much used and highly esteemed in Germany, and also in France, where it is sometimes known under the name of General Lamotte's Drops.

Its synonyms are—Guttæ Vervinæ, Etherial Tincture of Iron, Liquor Anodynus martialis, Elixir d'or.

Proto-hydrochlorate of Iron, deliquescent,	1 part.

(Made by treating iron filings with sufficient hydrochloric acid to dissolve the metal, evaporating to dryness, and leaving the chloride, thus obtained, fall into deliquescence.)

Sulphuric Ether,	2 parts.

Shake the mixture well together in a bottle until the ether assumes a golden yellow color, then decant this, and to it add—

Rectified Alcohol,	4 parts.

Mix.

Another etherial tincture of iron is made with the acetate as follows:

"To nine parts of concentrated vinegar, moist hydrated oxide of iron, well washed, is to be slowly added until a certain portion remains undissolved. To the filtered liquid one part of acetic ether and two parts of rectified spirit, having a specific gravity of 0.820, are to be put, in order to complete the tincture.—*(Pharm. Pruss.)*

These, so far mentioned, comprise the formulas taken from respectable authorities. There are an infinite variety of others, recommended by medical writers according to the particular notions they may have adopted from their own experience; but as they all derive their virtue from a similar basis, it is needless to detail their different associations, believing that a sufficient number of combinations have been given to determine a choice.

The preparations of iron, like many other remedies subject to the revolutions of Fashion, from a state of discredit into which they had been cast, are again restored to their wonted usefulness. They are now much in vogue; hence we see them recommended in the medical journals of the day under a multitude of forms, some of them entirely novel. Those combined with the organic acids are decidedly the most popular.

A supposed condition necessary to the success of martial preparations for medicinal use is, that the iron should be in a state of *protoxide*, or one easily convertible to it, that it may assimilate with, and become one of the elements of the blood, which, it is alleged, is not the case with the salts of the *peroxide*. The acid, combined with the protoxide, must, likewise, be either carbonic or an organic acid, easily changed by the action of the gastric juice, such as the lactate of the protoxide of iron. The citrate, malate, tartrate, and acetate of the protoxide of iron, fulfil equally the same conditions.

ART. XXXIII.—AN INAUGURAL DISSERTATION ON JUNIPERUS VIRGINIANA. By Wm. J. Jenks.

(Extract from an Inaugural Essay.)

Medical Properties.

Although the leaves of this tree are generally considered inferior to those of Savine, there can be no doubt but that their preparations, if rightly administered, are capable of producing beneficial results. Their effects upon the animal economy are gently stimulant, emmenagogue, diuretic, and, under favorable circumstances, diaphoretic. As a diuretic it is said they have been advantageously used in dropsy, and as a diaphoretic in rheumatism.

"An ointment made by boiling the leaves for a short time in twice their weight of lard, with the addition of a little wax," is peculiarly efficacious as an application to blisters, maintaining a constant purulent discharge.

The essential oil, when given internally, acts as an emmenagogue; applied externally it is an irritant and rubefacient. It is requisite in the administration of it that great care should be taken, as dangerous consequences have accrued from the improper use of it.

Chemical Investigation.

Although the red-cedar is a native of our own country, and its evergreen branches are conspicuous throughout all seasons, it does not appear to have elicited much attention from chemists. I have never seen any analysis of any part of it recorded. With a view, therefore, of ascertaining what are the chemical constituents of the leaves, I have been induced to perform a few experiments.

The leaves were gathered in the fall, when perfectly developed, and carefully separated from the twigs and all extraneous matter.

1. A decoction was made by boiling two ounces of the fresh leaves in a pint of water for fifteen minutes; when filtered, it was of a greenish-yellow color, and showed a slight acid reaction when dropped upon litmus paper.

To a portion of this decoction a few drops of the subacetate of lead in solution were added, when immediately a copious precipitate, of a dull white color, ensued; this precipitate was separated by filtration, and dried. It was readily soluble in nitric acid, which changed it to a dull red color, and formed a mucilage with water.

With other portions silicated potassa threw down a dull white precipitate, lime water a dark yellow, and alcohol a grayish one; thus proving the existence of *gum*.

Starch could not be detected in the decoction, by either the infusion of galls, or tincture of iodine.

2. To another portion of the decoction a small quantity of the tincture of muriate of iron was added; at first the liquid assumed a bluish color, but in a few minutes a dark brown substance precipitated. With another portion a solution of gelatin threw down a light yellow precipitate, showing the presence of *tannic acid*.

3. One ounce of the leaves was beaten in a mortar with six ounces of cold water, until the liquid assumed a pulpy consistence. When filtered it was of a light yellowish cast, and partook of but little of the taste or odor of the leaves. A portion of it yielded an ash-colored precipitate with a solution of corrosive sublimate. After the substance had ceased to precipitate, the liquid was well shaken and thrown upon a filter, on which the precipitate remained. When dry it was

put in a test glass, and a strong solution of carbonate of potassa poured upon it; this partially dissolved it, and changed its color brown; sulphuric acid was then added until effervescence ceased: when neutral, the solution was nearly transparent, but upon the addition of a slight excess of sulphuric acid, a precipitate was reproduced.

Another portion of the liquid was raised to the boiling point and set aside; while cooling, an ash-colored substance coagulated at the upper surface, but when it became cold, or of the same temperature of the room, which was about sixty degrees, it gradually precipitated in flaky masses. This precipitate was also soluble in a strong solution of carbonate of potassa, and was precipitated again by an excess of sulphuric acid, proving *vegetable albumen* a constituent.

4. An infusion was made by pouring a pint of boiling water upon two ounces of the fresh leaves, and macerating in a covered vessel for six hours. When filtered it was of a light greenish-yellow color, and partook of the taste of the leaves in a slight degree.

To a portion of this infusion a small quantity of a solution of nitrate of silver was added, when, upon standing, a copious precipitate of a dark brown color ensued. A solution of protochloride of tin also produced a flocculent precipitate, denoting *bitter extractive.*

5. A tincture was prepared by macerating half an ounce of the leaves in four ounces of absolute alcohol for a week. At the end of this time it assumed a bright green color, and partook strongly of the taste of the leaves. Upon the addition of water it instantly assumed a milky appearance, and in the course of half an hour a greenish substance was precipitated; this was collected upon a filter and dried; when heated, it melted, and disengaged fumes, which possessed but little, if any, of the odor of the leaves.

An extract prepared from this tincture was translucent, resinous, and of a bright green color; this also disengaged fumes when heated, leaving a brown powder, which was changed to green by the addition of aqua ammonia. This extract was undoubtedly composed of *resin* and *chlorophylle.*

6. An attempt was made to isolate chlorophylle by the process recommended by Dr. Turner, in his work upon Chemistry, 5 Am. edit., p. 573. The leaves were beaten to a pulpy consistence with water, the liquid strained, and to it was added an equal quantity of alcohol; after standing about two hours the alcohol was driven off by heat, but nothing was observed floating upon the surface of the remaining liquid. The experiment was then varied several times, but nothing satisfactory was the result.

7. Six ounces of the leaves were placed in a tubelated retort and covered with water, in which a small quantity of chloride of sodium was dissolved; a receiver was adapted and heat applied. During the distillation the liquid in the retort assumed a milky appearance, but that in the recipient was colourless, and possessed the taste and odor of the leaves in a high degree. The distillation was carried on for near an hour, when about two pints had been condensed in the receiver: this liquid was placed in a precipitating jar and set aside. Upon standing twenty-four hours there arose to the surface a small quantity of oil, which was carefully removed; it possessed the strong odor of the leaves, and a warm, pungent taste. When nitric acid was added to a portion of it fumes were disengaged, which were disagreeable, and did not possess any of the odor of the leaves. The remainder, when dropped upon paper, gave it a semitransparent appearance; and when the paper was exposed to the action of heat, the oil was volatilized, and the paper left unstained.

8. An etherial tincture was prepared by macerating an ounce of the leaves in eight ounces of sulphuric ether for ten days, when it was of a lively green color. This was filtered, and placed aside for spontaneous evaporation, which required about two weeks. There remained in the vessel about half a drachm of a greenish colored oil, about the consistence of thin syrup; it was unctuous to the touch, and when dropped upon paper left a permanent greasy stain. By the addition

of a saturated solution of carbonate of soda it was converted into a soapy substance, and changed to brown. A saturated solution of carbonate of potassa acted upon it in a similar manner. Aqua ammonia caused a brown color, but no appreciable change in the consistence.

9. One thousand grains of the leaves were incinerated in a crucible exposed to the atmosphere; but twenty-five grains of ashes were obtained, which were of a light gray color, possessing an alkaline taste; these were lixiviated with four ounces of water, with occasional agitation, for two days, at a temperature of about seventy-five degrees. The ley was then filtered; it had a sweetish alkaline taste, and a feint odor, peculiar to ordinary ley; it changed turmeric paper brown, but produced no acid reaction upon litmus. A solution of chloride of platinum was added to a portion; the liquid instantly assumed a bright yellow color, but remained transparent two weeks afterwards. Tartaric acid in solution was then added to another portion, and the liquid stirred with a glass rod, but no precipitate took place upon standing. Nitric acid was then added to a third portion, until the liquid was neutralized, and the solution evaporated to dryness; a white salt was obtained, which was deliquescent. It did not deflagrate to any extent when thrown upon fire, or exhibit any of the properties of nitrate of potassa;* but when dissolved in water

---

* Subsequent experiments have satisfactorily proved the existence of potassa, though in a very minute proportion. Upon evaporating the yellow colored liquid, formed by the addition of chloride of platinum, to dryness, a yellowish salt was obtained, which, when dissolved in a small quantity of cold water, was deposited in the form of small brilliant yellow crystals, the chloride of platinum and potassium.

But a more satisfactory result was obtained by treating the ley with an alcoholic solution of carbazotic acid. A few grains of carbazotic acid were dissolved in about half a dram of alcohol, and the solution added to half an ounce of the ley. Upon standing twelve hours, a number of bright yellow crystals of carbazotate of potassa, of an acicular form, were found at the bottom of the vessel, diverging in every direction. They were near a quarter of an inch in length, about the thickness of a hair, and ended in a very delicate point. When heated to redness in a platinum capsule they detonated, and gave off beautiful brilliant scintillations.

a few drops of the solution of oxalate of ammonia occasioned a dense white precipitate. Also, when oxalate of ammonia was added to the ley, immediately a dense white precipitate followed. A stream of carbonic acid also occasioned a whitish precipitate when passed through the ley, showing the presence of *lime* in large quantity, and in a free state.

To prove that the above formed precipitate was not a salt of magnesia or soda, sulphuric acid was added to another portion of the ley, when immediately a dense white precipitate was thrown down, which must have been sulphate of lime, since the sulphates of magnesia and soda are both soluble in water.

Ferrocyanuret of potassium produced no appreciable change in appearance when added to the ley, or the decoction made with water acidulated with hydrochloric acid.

10. Two ounces of the leaves were macerated in alcohol for a week, when the whole was thrown into a displacement filter, and the liquid displaced with alcohol until it passed through colourless. The leaves were then boiled in three successive portions of water, and finally with water acidulated with hydrochloric acid. When perfectly dry they weighed nine drachms, showing about fifty-six per cent. of *lignin.* They were tasteless and inodorous, broke with a short fracture, and were readily decomposed with sulphuric acid, forming with it a black viscid mass.

A number of other experiments were performed, but as nothing new was elicited, it was deemed inexpedient to record them.

From the foregoing experiments it is reasonable to conclude, that the following substances are the constituents of the leaves of the Juniperus Virginiana, viz ; Gum, Tannic Acid, Vegetable Albumen, Bitter Extractive, Resin, Chlorophylle, Volatile Oil, Fixed Oil, Lime in a free state, and Lignin.

ART. XXXIV.—ON SOME INCONVENIENCES WHICH MAY OCCUR FROM THE USE OF THE SULPHURIC ACID OF SAXONY, OR OF NORDHAUSEN, AS A REAGENT.

By M. A. Dupasquier.

In testing for minute traces of iodine in any liquid, sulphuric acid affords the most sensible results by its addition to the liquid, with which a small quantity of a solution of starch has been previously mixed; at least this is the result of comparative trials which I have made, and which have demonstrated that, to set free the iodine, sulphuric acid is preferable to the use of chlorine, the chlorides of the oxides, aqua regia, the voltaic pile, &c.

Since making these experiments, chance has informed me that it is not a matter of indifference, in the detection of iodine, what kind of sulphuric acid is used, and for the following reason: In one of my latter lessons at the School of Medicine I wished to demonstrate the sensibility of this reagent, and was surprised at not obtaining the violet blue color as I expected. At the moment when I poured the acid into the liquid a faint violet tint was produced, but immediately disappeared.

On investigating the cause of this unexpected result, I learnt that my assistant, not having the ordinary acid, had given me a bottle of that of Nordhausen. From this explanation I immediately concluded, that the non-coloration of the starch was due to the *sulphurous acid*, which is commonly present in sulphuric acid, obtained by the distillation of sulphate of iron. In fact, we know that free iodine, in contact with a solution of sulphurous acid or a sulphite, immediately disappears, passing to the state of hydriodic acid. The following experiments have rendered certain this explanation of the non-coloration of starch.

1. I poured ordinary sulphuric acid into a glass of water

to which one drop of a solution of iodide of potassium and some solution of starch had been previously added; the liquid immediately assumed a violet blue color.

2. The same experiment was repeated, some drops of a solution of sulphurous acid being added before the sulphuric; the color was not manifested, even on the addition of a large excess of this latter acid.

3. The same experiment repeated, some drops of a solution of sulphite of soda being substituted for the sulphurous acid, and with the same result; the liquid remained uncolored.

4. The same experiment with a large proportion of iodide of potassium; the same result, only at the moment when the sulphuric acid was added, faint traces of violet appeared, but immediately faded away.

From these experiments we must conclude, that the presence of sulphurous acid in the sulphuric acid of Nordhausen, is the true cause of the non-coloration of the starch, when this acid is used to detect the presence of an iodide in a liquid.

This influence of sulphurous acid on iodine gives a satisfactory explanation of the following fact, which is analogous to that just pointed out.

In my chemical experiments, made during five or six years, on the employment of protiodide of iron, I have taken care to direct that the urine of the patient should be preserved, to ascertain, by a chemical test, whether this remedy had been really taken. The test consisted in diluting the urine with an equal bulk of water, then adding a little solution of starch, and finally some sulphuric acid. The liquid immediately assumes a blue color, whenever the patient had taken the iodide of iron, a short time before voiding the urine. The addition of water is indispensable; for the color is not manifested, or is hardly sensible, when the urine is very much charged with, or is not rendered more clear, or less abundant in organic matter, by means of this liquid. Is it not evident that the non-coloration of the amidon, under this circumstance, of a highly charged urine, is due to the formation of a small quantity of sulphurous acid, from the reaction of strong sulphuric acid on the animal matter? The addition of water causes a decrease of action of the acid on the organic substances contained in the urine.

The presence of sulphurous acid in the sulphuric acid of Nordhausen should equally cause its rejection when operating with Marsh's apparatus, since MM. Fordos and Gelis have demonstrated that sulphurous acid is, under these circumstances, converted into hydrosulphuric acid, which precipitates the arsenic as sulphuret, and diminishes, although it does not completely prevent, the production of the arsenical spots. We, however, know that the Nordhausen acid is recommended in preference for this purpose, because it never contains arsenic.

In conclusion: *the sulphuric acid of Nordhausen or Saxony, used as a reagent in place of the ordinary acid, may become, in many chemical researches, a cause of serious error. This inconvenience results from this acid usually containing sulphurous acid.*

Journ. de Pharm. and de Chim.

ART. XXXV.—ON THE MINUTE DIVISION OF MERCURY.

By Jacob Bell.

The effect produced on mercury by trituration with other substances has been for many years a subject of dispute, and it is at this time so undetermined that we can scarcely find any two authorities which coincide. The explanations which are given are so hypothetical and indefinite, and the experiments on which they are founded so liable to fallacy, that a further examination of the properties of mercury, when thus triturated, is desirable.

The Pharmaceutical Chemist is particularly interested in this question; for until he has determined to what extent the efficacy of mercury is dependent on oxidation, and in what manner the required change in the metal may with certainty be effected, he cannot ensure an absolutely uniform result in the following preparations—Hydrarg. cum Cretâ—Pil. Hydrarg. —Ungent. Hydrarg., &c.

Quincy asserts in his new Dispensatory, A. D. 1753,

"Notwithstanding the mildness and inactivity of crude quicksilver undivided, when resolved by fire into the form of a fume, or otherwise divided into very minute particles, and prevented from reuniting by the interposition of proper substances, or combined with mineral acids. it has very powerful effects; affording the most violent poisons and the most excellent remedies that we are acquainted with."

This sentence contains nearly as much practical information as is comprised in the following quotations from modern authorities:—

Hydrarg. cum Creta. *(Powell's Pharmacopœia, 1815.)*—"It appears to be very slightly oxidized by the trituration, as it contains, according to Fourcroy, only .04 of oxygen."

(Murray's Meteria Medica, 1816.)—"Quicksilver, when

triturated with any substance that aids the division of its globules, and extends their surface, appears to be susceptible of oxidation from the action of atmospheric air; and the gray oxide formed by this operation is the basis of the common mercurial pill," &c.

Pil. Hydrarg. "The trituration of the quicksilver in this preparation was formerly supposed to reduce it merely to a state of extreme mechanical division. But there is every reason to believe, that an oxidation of the metal is effected, and that the medicinal efficacy of the preparation depends on this oxide. Quicksilver, in its metallic state, being inert with regard to the living system, the activity of the preparation itself is a presumption of this; but it is further known that by agitation with atmospheric air quicksilver affords a portion of gray powder, soluble in muriatic acid, and which, therefore, must be an oxide, metallic quicksilver being insoluble in that acid."

Mr. Murray having informed us that mercury is also in a state of oxide in the unguentum hydrargyri, proceeds,

"There are even additional grounds for admitting this conclusion, with regard to mercurial ointment. Unctuous matter appears in general to promote the oxidation of metals by the action of the air, as is exemplified in the green crust which copper speedily acquires when coated thinly with grease."

* * * * * *

"The improvement of the ointment from keeping affords a similar presumptive proof.

"Unctuous matter, more especially that of an animal origin, becomes rancid from the action of air, and this rancidity appears to be connected with the formation of an acid produced from fat—the sebacic. This change may take place, to a certain extent, during the trituration, and still more when the ointment is kept, and may promote the oxidation of the mercury, while any acid that is formed may combine with the oxide. According to this view, mercurial ointment will consist of unctuous matter, in which is diffused oxide and sebate of mercury, with a portion generally of metallic mercury, its activity, of course, depending on the former."

This explanation of the oxidation of mercury by grease is not very conclusive, since we know, that by means of saccharine substances, which are unfavorable to oxidation, the metal is reduced to the same condition in which it exists in the ointment. If unctuous substances possess the general *oxidizing* property alluded to by Mr. Murray, it is difficult to account for their successful application to the protection of machinery and metallic implements from rust.

(Duncan, 1815.*)*—"Quicksilver has a strong affinity for oxygen, and absorbs it slowly from the atmosphere." * *

"The black oxide is the mildest, but, at the same time, the most efficacious of the preparations of mercury. Combined with magnesia or chalk, it is not in general use; but in the form of the common mercurial pill and ointment, it is more employed than any other preparation of the same metal, except calomel."

This statement is contradicted by Phillips in the Pharmacopœia of 1824.

Hyd. cum Creta. *(Phillips' Pharmacopœia, of* 1824.*)* "I have only slightly examined this preparation, and I am uncertain whether it consists merely of chalk and mercury, in a state of minute division, or whether it is a sub-oxide of mercury formed by absorbing oxygen during the trituration."

"The mercury is totally insoluble in acetic acid, and, therefore, is not the black or protoxide; but when the chalk has been separated by acetic acid, the mercury does not form one fluid mass, like metallic mercury, but exists in the state of separate and minute globules."

Pil. Hydrarg. "It has been asserted, that the mercurial pill and ointment both contain the black or protoxide of mercury. It is, however, possible, as I have already hinted, when treating of hydrarg. cum cretâ, that a sub-oxide of mercury may exist, and form the base of these preparations."

Rennie, in the year 1829, differs from Phillips.

Hyd. cum Creta. *(Rennie's Supplement,* 1829.*)*—

"During the trituration a small quantity is converted into the protoxide, and the remainder is mixed with the chalk in a state of very minute division."

Dr. Duncan, in 1830, differs from both, and gives, as a *possibility*, a statement which he had, in the year 1816, asserted as a fact:

Pil. Hydrarg. *(Dr. Duncan's Dispensatory,* 1830.*)*—"In this preparation the mercury is minutely divided, and possibly converted into the black oxide."

Brande in 1833, gives rather a different version of the case:

(Brande's Manual of Pharmacy, 1833.*)*—"By triturating mercury with chalk, a very small portion becomes converted into protoxide—the remainder is very minutely divided; and thus, perhaps, acquires some activity as a mercurial when taken into the stomach."

The same professor, in 1836, renders the subject a little more complex.

(Brande's Manual of Chemistry, 1836.*)*—"Some have regarded these preparations as merely containing finely divided mercury, and deny the possibility of oxidizing the metal, when pure, by mere agitation in the contact of atmospheric air, or trituration with viscid and oleaginous substances; it is certain that perfectly pure mercury, if at all thus acted on, is converted into an oxide extremely slowly, whilst mercury, containing a little lead or bismuth, is speedily converted into a black powder.

"If heated or exposed to the sun's rays, the protoxide is converted into peroxide and metallic mercury."

(Dr. Ure's Chemical Dictionary, 1835*)*.—"By triturating mercury with unctuous or viscid matters, it is changed partly into protoxide, and partly into very minute globules. By exposing mercurial ointment to a moderate heat, the globules fall down, while a proportion of the oxide remains combined with the grease."

In the year 1837, Phillips revives the old theory with respect to pil. hydrarg. and unguentum hydrarg., and starts a new one in favour of hydrarg. cum cretâ. PIL. HYDRARGYRI. *(Phillips's Pharmacopœia*, 1837.*)*—"The mercury in this preparation is probably in a state of minute division only."

UNGUENTUM HYDRARGYRI. During the trituration with the fatty matter, the mercury is probably reduced to the same state as that in which it exists in the pilula hydrargyri."

HYD. CUM CRETA.—"I have found that a small portion of the mercury is, by the long trituration required, converted into peroxide; and this being the case, the effects derived from the use of this medicine are readily accounted for."

Mr. Phillips does not inform us how he accounts for the efficacy of blue pill and mercurial ointment. Dr. Collier remarks—

PIL. HYDRARGYRI. (*Dr. Collier's Pharmacopœia*, 1837.) —"I see no good reason for doubting that the mercury in this pill, as in the hydrargyrum cum cretâ and unguentum hydrargyri, is partially oxidized. I have known considerable quantities of metallic mercury—a pound or more—remain for many hours in the alimentary canal, without any other effect than what was purely mechanical.

"If any faith is to be placed on analyses, the exact proportion of oxidized and minutely divided mercury was stated by Professor Brande twenty years ago, although the College authority tells us that blue pill is probably nothing but metallic mercury minutely divided."

To complete the explanation, Dr. Collier observes, with reference to hydrarg. cum cretâ, that

"The name (to be consistent) ought to have been hydrargyri protoxydum cum cretâ."

Adding in a note,

"It is scarcely possible to render the globules invisible by any trituration, however diligent."

UNGUENTUM OXIDI HYDRARG. CINEREI. (*Dr. A. T. Thomson's Dispensatory*, 1837.)—"As the whole of the mercury in this ointment is oxidized, it might, *à priori*, be supposed that it would answer all the purposes of the mercurial ointment; but it cannot be so easily introduced by friction, the oxide remaining on the surface of the cuticle, after the unctuous matter is absorbed. Dr. Paris justly remarks, that this is owing to its being a mechanical mixture, instead of a chemical combination; an opinion, however, which is rendered doubtful, by the experiments made to prove the non-oxidation of the mercury in the preparation of the mercurial ointment."

Dr. Thomson mentions that,

"M. Roux triturated mercury and maltha, a species of pitch, in a vacuum, and produced the extinction of the metal as well as if the operation had been performed in the air. Thence he concludes that the metal is not oxidized, but merely mechanically divided in the ointment. There are still, however, some difficulties in deciding this point. Whatever tends to favor oxidation, as, for instance, a slight degree of rancidity in the lard or oil of eggs, shortens the time, and lessons the labor required for the preparation of the ointment."

Dr. Pereira qualifies his statement as follows:—

HYDRARG. CUM CRETA. (*Dr. Pereira's Materia Medica*, 1839.)—"It consists of mercury and chalk, with perhaps a little protoxide of mercury."

The following is Professor Mitscherlich's explanation:—

(*Lehrbuch der Chemie. Berlin*, 1840.)—"When quicksilver is triturated with fat and other substances, in contact with air, there forms ultimately a black powder, which consists of metallic particles only. This can be readily ascertained by muriatic acid; because protoxide of mercury affords with muriatic acid, calomel, which is easily recognized by sublimation.

"It can be easily shown that in the common mercurial ointment (ung. hydrarg.), only finely divided quicksilver is contained, by removing the fat with ether, or by saponifying it, and then removing the soap with alcohol; the residuum, treated with a little muriatic acid and sublimed, affords only metallic quicksilver.

"If an ointment be prepared, on the other hand, quite in the same way, only using the protoxide instead of quicksilver, then the residuum, treated with muriatic acid, affords calomel."

From this chronological series of contradictory statements, it would appear that our knowledge of the subject goes very little further than this—that mercury, by oxidation, *or* by division, acquires the power of absorption by the system, a fact noted by Quincy in the year 1753.

The theory of metallic division, which was discarded in the year 1815, is now revived, and is ably supported ; but, notwithstanding the numerous investigations which have been made in order to establish the truth, we cannot consider the question entirely settled, while some of our first authorities give us their opinions as probabilities. In a scientific point of view, the subject is interesting ; and it is rendered intricate by the manner in which this metal passes from one state of oxidation to another, by exposure to light, heat, and other agencies, and the fallacies which may hence arise during our manipulations.

The cinereous or protoxide of mercury spontaneously undergoes a partial decomposition, resolving itself into a mixture of protoxide, binoxide, and metallic mercury. Globules may occasionally be observed in a bottle containing this preparation, after it has been kept for some time exposed to light, and they have also been detected in black wash. The binoxide is less liable to decomposition, but it appears that the affinity between mercury and oxygen in a low state of oxidation is very slight. Some of the phenomena which are observable in experiments on this substance, would lead us to suspect the existence of a compound containing a smaller proportion of oxygen than the protoxide, probably a hydrated suboxide, but further investigation is required in order to substantiate this theory.

But this consideration which more particularly concerns the Pharmaceutical Chemist, is the amount of importance attached to oxidation in giving medicinal activity to mercury, and the practical application of the knowledge we possess to the manipulations of that metal.

In mixing hydrarg. cum cretâ with extractum rhei, globules of mercury are frequently seen in the mortar. This is invariably the case when the extract is of that hard and tenacious consistence in which it will retain its form when made into pills. If it be only the oxide which exerts an influence on the system, this separation of the pure metal is unimportant, excepting inasmuch as it proves that the preparation is imperfect ; and if a portion of the mercury be oxidized by trituration with the chalk, we may infer that the whole might be so oxidized by continuing the trituration, since all the metal is exposed to the same treatment. But we know by experience that the process may be continued for weeks or even months without reducing the preparation into a state in which metallic globules cannot be separated from it ; therefore, on the supposition that the oxide alone possesses any virtue, a mixture of that substance with chalk would make a more efficacious compound, and black wash, as an internal remedy, might be substituted for a preparation which, by the hypothesis, must be defective.

But we know that in the case of the unguentum hydrargyri this substitution of the oxide for the metal is quite inadmissible, as the ointment made with the oxide leaves the mercury on the surface of the skin, while the other ointment is absorbed. It may be the case that a portion of the mercury exudes in globules, and escapes unobserved during its application, but the facility with which ptyalism is produced by mercurial frictions, is a sufficient proof that a considerable portion of the metal enters the system. Although we cannot have ocular demonstration of this assimilation of mercury when taken inwardly, we may infer that the absorption of the metal may take place when applied to the coats of the stomach and other tissues in a finely divided state. It is not unlikely that, when thus divided, it may be capable of oxidation, during its passage through the alimentary canal, and in this state combine with the acids which it may meet with, forming compounds more or less active, and thus producing as much medicinal effect as it would have done if administered in the form of an oxide.

A single dose of blue pill will sometimes act as a purgative, and a few small doses taken at intervals will effectually salivate; if therefore we attribute its efficacy to the minute portion of mercury, which may "*probably*" become oxidized during the trituration of the mass, we need go only a step further to become the disciples of Hanneman.

The manner in which mercury combines with other substances, in the form of amalgams, is not a little mysterious, although it may probably throw some light on this subject.

An amalgam of mercury and potassium placed on a piece of muriate of ammonia, and subjected to the action of voltaic electricity, increases in volume and weight, acquiring more ductility, and evidently entering into chemical union with the salt.

The linimentum hydrargyri is said to salivate more freely than the unguentum—the camphor and ammonia appearing to promote its absorption.

Tin, lead, and other metals, in conjunction with mercury, are vapourised at the boiling point of that metal.

In manufactories, where mercury is vapourized to any considerable extent, the workmen are often salivated, and sometimes die in consequence of this insensible absorption of the metal thus minutely divided.

The conversion of the metals into glass is another instance of metamorphosis, which can only be explained by a bare statement of the fact. A silver coin held in the hand of a person whose system is saturated with mercury, has been observed to become tarnished by the amalgam formed with the mercury exuding through the pores of the skin.

Platina can also be reduced to a black powder, which consists of the pure metal, and is nevertheless so fine that it may be mixed with a vehicle and used as a pigment. Other metals may also be powdered.

Arsenic exists in union with hydrogen as a gas, and in that state may be inhaled and assimilated like atmospheric air.

From these facts, it is evident that the properties of a metal, in substance, afford no criterion of its effects or diffusibility, when mechanically placed under circumstances favorable to chemical action and combination.

These considerations, originating in the endeavor to account for the separation of mercury from chalk by trituration with tenacious extracts, induced me to try a variety of experiments, in order to satisfy myself as to the actual state of the metal in that preparation, and the laws which regulate its reduction to and continuance in a state of minute division.

A portion of hydrarg. cum cretâ was tied in a piece of leather, and subjected to the force of a powerful press ; on removing it, a considerable quantity of the metal was found to have been separated in the form of globules.

Another portion was boiled in excess of dilute acetic acid, so as to ensure the complete saturation of the chalk. The residuum was washed with water, and appeared like a black powder moistened into the form of a paste. Some of it, in a glass with a little water, was placed by the side of another glass containing cinereous oxide in the same fluid. The precipitates appeared similar, but on adding muriatic acid to both, the oxide was converted into calomel, the other remained without any visible alteration. The remainder of the black paste was dried upon a filter ; as the evaporation proceeded the globules appeared, and when it was perfectly dry, almost the whole of it assumed the metallic state, as may be seen by the result, which is on the table. The same experiment was tried without using heat, the precipitate being dried in the dark. The result is also on the table, consisting chiefly of metallic mercury, with a very small quantity of black powder. Some of the precipitate in the latter experiment was boiled with dilute acetic acid. Before the ebullition commenced, the precipitate rose to the surface, floating in the form of minute spherical particles. These alternately rose and fell in the liquid, like pith balls electrified under a tumbler. When cool, their former specific gravity returned, and they fell down like a heavy precipitate. The acetic acid in which the above had been boiled was tested, and gave no indication of the presence of a mercurial salt.

Two drachms of peroxide of mercury were triturated with one drachm of the metal. For a considerable time very little effect was produced, excepting that the powder assumed a black color, the metal remaining in a fluid state : on adding a little water, the mercury gradually disappeared, and the mixture ultimately became a reddish black powder. This was placed on a filter and dried in the dark. When dry a globule of mercury was separated ; the remaining powder was of a greenish red color. This shows that the peroxide of mercury, when moist, has the power of dividing the metal without imparting to it the oxygen required for converting it into a protoxide.

Hyd. cum cretâ, when used as plate powder, gives silver a peculiar black tinge and brilliant polish, dependent on the amalgam formed by the two metals. A mixture of the cinereous oxide of mercury with chalk has a very different effect, which may be easily observed by cleaning a silver spoon with each of the two powders and comparing them together. It is clear that mercury, when in the state of an oxide, does not possess the same power of uniting with silver as an amalgam.

Extractum rhei, which was rather hard and tenacious, was triturated with hydrarg. cum cretâ : globules were separated as usual. A few drops of water were added, and by continuing the process, the mercury was again absorbed ; the mass was then too soft for dividing into pills. The division of mercury by extract is probably analogous to the division of oil and wax by water in cold cream. If stale cold cream be stirred in a mortar, a large proportion of the water separates, but the union is restored by persevering in the trituration.

M. Desmarest, in an article in the *Journal de Pharmacie* on the division of mercury (1829,) informs us, that "fat and viscous substances have not the property of invariably maintaining the division of mercury : but they lose it when their consistence is increased to that point at which they may be considered more like solids than liquids, because then the envelope which they form round the globules, having lost its flexibility, breaks, and allows them to re-unite. Having solidified mercurial ointment by exposing it to a freezing temperature, or by saponifying it, I have seen the mercury separate in large globules by trituration, which also occurs on drying the mercury and gum (*mercure gommeux*) of Plenck, and the pills of Belloste, which I have verified several times."

The effect which consistence has in favoring or obstructing the division of mercury, throws some light on the increased facility which grease possesses when rancid, of effecting the disappearance of the globules, which circumstance was formerly supposed to depend upon the promotion of oxidation. In becoming rancid, the stearine and elaine in ointments become converted into margaric and oleic acids, and a substance is also generated resembling a volatile oil, in its viscous property. M. Desmarest has shown, in the paper above mentioned, that the peculiar viscosity which belongs to essential oils, is favorable to the extinction of the mercurial globules, and the consistence of rancid ointment being altered by the decomposition, we may infer that the difference of its effect on the metal is more mechanical than chemical.

If the extinction were occasioned in all cases by chemical action, we might expect to find that sugar, which is unfavorable to oxidation, would be incapable of effecting the change. To ascertain the limitations of the divisibility of mercury, by means of saccharine substances, the following experiments were tried. Two drachms of mercury were rubbed with simple syrup of the ordinary consistence, for above half an hour ; no change had taken place in the metal. The globules ran together as freely as ever, and appeared more obstinately metallic than before. Powdered sugar was added in small quantities, and the trituration was continued. When the syrup assumed a plastic viscous consistence, the mercury appeared unable to resist its influence, and gradually became divided without difficulty. In less than half an hour the globules were quite extinct, or at least they were invisible with the naked eye. Water being added, and the sugar dissolved and separated, the residuum was a black precipitate, similar to that which results from treating hyd. cum cretâ with acetic acid; and when dry, the mercury appeared as usual on the filter. The same experiment was tried, substituting *mel despumatum* for syrup. The honey, in the first instance, divided the mercury more readily than the syrup, but the completion of the division was ultimately expedited by the addition of enough sugar to give it the right consistence.

These experiments confirm the supposition that chemical action is not necessarily concerned in the division of mercury by trituration, but that the effect depends upon the mechanical texture of the substance employed.

An additional proof of this fact is found in the extreme difficulty of effecting the extinction of mercury with a dry substance like chalk, as compared with the effect of other more appropriate substances. To obviate this difficulty in the hydrarg. cum magnesiâ of the Edinburgh Pharmacopœia, the mercury is directed to be triturated with manna, moistened with a little water; after the union is complete, the magnesia is added, the manna separated by washing, and the precipitate dried.

The following experiment with blue pill is as conclusive as those already mentioned: Blue pill was boiled in water, and the sediment having subsided was washed several times to separate the conserve. The result was placed on the filter, and allowed to dry spontaneously. As long as it retained a soft consistence very little appearance of mercury was observable—it was like a black paste. But in the course of a few days, it became quite hard and brittle. When broken between the fingers the greater portion of it fell down in the form of pure mercury. A simple fracture displayed a surface of extremely minute globules in a spongy substance. It was evident that the whole of the conserve had not been separated, but the experiment was sufficiently accurate for the purpose.

The late Mr. Earle recommended a pill composed of one drachm of mercury with five drachms of extract of hemlock, which, by trituration for a quarter of an hour, become completely united. Mr. Earle frequently ordered this compound, and stated, that in obstinate cases, in which the usual mercurial remedies failed to affect the system, three or four grains of the "pilula conii cum hydrargyro" had the desired effect in a short time. He also observed, that in almost all cases in which hyd. cum cretâ or pil. hydrarg. were indicated as an alterative, the addition of the conium was rather an advantage than otherwise, as its sedative properties facilitated the absorption of the mercury by preventing its action on the bowels, while the narcotic effect was not perceptibly objectionable.

Following up this idea, it occurred to me that other extracts might be applicable for the reduction of mercury in the same manner, which the subjoined experiments prove to be the case.

Extract of hyoscyamus was found to unite with metallic mercury, by trituration, in about half an hour; extractum sarsæ. in twenty minutes; extractum taraxaci in ten minutes, and extractum rhei in about twenty minutes. In mixing these preparations, a very perceptible change takes place in the extract, at the time the union commences. Ext. hyosciami, for instance, loses its friable and spongy texture, becomes adhesive and plastic, making a crackling noise as it is stirred in the mortar. The union with ext. taraxaci appears to be more complete than with any of the others; for it was found impossible entirely to separate the mercury afterwards by washing. Filtering paper, the texture of which was such as to allow the passage of the extract, would not retain the mercury, which came through it in so minute a division that it scarcely had the appearance of a precipitate, but seemed to be completely suspended in the liquor.

This property of dividing mercury cannot depend upon any acid which the extracts contain, since vegetable acids have little or no chemical action on the metal, and extractum taraxaci, supersaturated with caustic potash, was found to divide it as easily as without the addition of the alkali.

The elements of an extract being united, namely, albumen, sugar, essential oil, gum, starch, fæcula, and resin, it was found that the compound had the power of dividing mercury with great facility ; and the absence of coloring matter afforded the opportunity of observing its composition. A portion of it, rubbed on a plate of glass, showed no globules ; the color became darker, and the friction appeared to confirm the extinction of the metal. But as it dried, very minute globules started up, as if suddenly liberated from confinement, in the same way as the metal makes its appearance on the filter, in the experiments with hydrarg. cum cretâ, &c. Resin, moistened with essential oil, was found to divide the metal with greater facility than any of the substances or compounds above mentioned. In two minutes the globules were invisible in the mortar to the naked eye. The other elements of an extract, unassisted by resin and essential oil, were found to have much less power of dividing mercury, above half an hour being required for the extinction of globules. From what has been stated, we may conclude that

The preparations under consideration are dependent for their efficacy on the impalpably minute division of the mercury, and if any oxide exist in them, the circumstance is accidental, and the quantity so small as to be unimportant.

Mercury, when alloyed with other metals, is speedily reduced to a black powder, as stated by Professor Brande, but it is not yet proved that this powder consists entirely of oxide.

Chalk has a very limited power of dividing the metal, or retaining it in a state of division. The vehicles for hydrarg. cum cretâ should, therefore, be such as are not likely to effect the separation ; and soft friable extracts possess the requisite texture.

Extracts in general have great facility in dividing the particles of mercury, and the direct union of the metal with some of these preparations might be attended with advantage.

Extracts which are of a viscous, tenacious texture effect the division more speedily than those which are soft and friable ;

the former, however, when too hard, liberate the mercury instead of promoting its division.

The addition of substances which act chemically upon mercury is unnecessary in effecting its extinction, as the circumstance requiring particular attention is the degree of viscosity possessed by the menstruum, and resinous substances are particularly applicable.

An insoluble powder divides the metal with increased facility when mixed with water into the form of a stiff paste.

Lond. Pharm. Trans.

ART. XXXVI.—ON THE DAPHNE TRIBE OF PLANTS.

By Mr. Squire.

Having ascertained that a considerable quantity of the root supplied to the trade as Mezereon, is, in fact, the root of the Daphne Laureola, I propose to offer some remarks on this tribe of plants, with the result of a few experiments which I have made, for the purpose of ascertaining the comparative efficacy of the above species.

Dr. A. T. Thomson states, in a foot-note in his Dispensatory, that in France the Daphne Gnidium and in Germany the Daphne Laureola are indiscriminately used for the Daphne Mezereum. In Dr. Pereira's Materia Medica it is stated, that Tragus (1532) is the earliest author who mentions the Daphne Mezereum, and says, that the Mezereon of Avicenna and of other Arabian authors, is declared by C. Bauhin to be the Chamelæa Tricocca (now called Cneorum tricoccon,) a plant of the order Euphorbiaciæ; but it is probably identical with the χαμελαια of Dioscorides, which is declared by Sibthorp to be the Daphne Oleoides. It is unnecessary to give a botanical description of these plants, as they are described in every work on medical botany.

In the Daphne tribe there are many varieties. The following are on the table, all of which appear to possess, in a different degree, the irritating property peculiar to the class:—

			Introduced into England.
Daphne	Neapolitana	*Native of Naples*	1822
“	Cneorum (Garland flower)	*Austria*	1752
“	Indica	*China*	1800
“	Indica rubra		
“	Oleafolia (silky)	*Crete*	1820
“	Gnidium	*Spain*	1597
“	Axillaris		
“	Pontica	*Pontus*	1759
“	Pontica rubra	*hybrid*	1827
“	Collina (hill)	*Italy*	1752
“	Tarton-raira	*France*	1640
“	Dauphinii		
“	Mezereum	*Woods, England*	
“	Laureola	“	

In the London Pharmacopœia only the bark of the root of the Daphne Mezereum is ordered. In the French Codex the powder of the bark of the Daphne Gnidium only; and a caution is given in the arrangements for powdering a substance so dangerous to the operator. I have myself suffered severely when powdering either the Daphne Mezereum or Laureola, from the small particles rising and irritating the nostrils.

In the remarks on Decoctum Sarsæ. Co., in the London Pharmacopœia, it is asserted, that “Mezereon is the only active substance here added to the sarsaparilla: it contains a neutral vegetable matter, called Daphnine.” The Edinburgh and Dublin Pharmacopœias order a decoction of Mezereon, made with two drachms to three pounds of water, boiled to two-thirds, to which half an ounce of liquorice-root is added.

Several foreign Pharmacopœias have formulæ similar to this, but the proportion of Mezereon is greater. Formulæ for gargles, ointments, tinctures, and paper saturated with the acrid resinous matter, are to be found described in other works.

According to Dr. A. T. Thomson, these plants are violently emetic and purgative, useful in chronic rheumatism, scrofulous swellings, lepra, and other cutaneous diseases. Dr. A. Russell recommended Mezereon for venereal nodes. Dr. Home found it a very powerful deobstruent in all venereal tumours of a scirrhous kind, when mercury had failed. Mr. Pearson denies its efficacy in curing venereal disease in any stage. Dr. Cullen employed it in cutaneous diseases. It has been used with success in paralysis of the throat. In France it is used to produce vesication, the bark being macerated in hot vinegar, and applied with a compress and bandage. Linnæus states, that six berries of the Daphne Mezereum will kill a wolf; and he saw a child, who had taken twelve of them for an ague, die by excessive vomiting and hæmoptysis. Lewis, in his Pharmacopœia, states, that the leaves, taken in small doses, produce vomiting and purging, and cannot be ventured upon with safety, unless their virulence be previously abated by long boiling, and even then they are precarious remedies. He asserts, that the flowers and the pulp of the seeds are harmless, but that the seeds themselves are as acrid and virulently purgative as the leaves.

The Daphne Mezereum seldom rises higher than four feet; it is chiefly cultivated in our gardens, but is said to grow wild in the central counties. The Daphne Laureola is generally from two to three feet high, and grows wild in the woods over the whole of Europe as far south as Sicily.

The inner bark of the Daphne Mezereum is highly acrid, creating in the mouth and fauces a burning sensation, and, if swallowed, it affects the whole lining of the œsophagus and stomach in the same manner. With some individuals this sensation continues only a few hours, while others feel it as long as two days. In the case of Daphne Laureola, I remarked that this effect is followed by a profuse perspiration of the face, head, and neck, and that as soon as this was fairly produced, the heat in the œsophagus and stomach began to subside.

I could not obtain any blistering effect from the resin extracted by alcohol, and I imagine that moisture is necessary, in order to produce an irritating effect. I made several experiments to ascertain the difference in effect between Daphne Mezereum and Daphne Laureola. When recently dried, they both possess a peculiar odor, which is stronger in the latter than in the former; but the Mezereon has decidedly the advantage, both in the degree and duration of the irritation produced on the mucous linings of the throat. The inner bark (of the Daphne Laureola in particular) is very tough, being broken with difficulty by manual force.

The bark of the root is the most efficacious part of this class of plants; next in order the bark of the stems, the leaves, the woody parts of the stems and roots, and, lastly, the flowers.

13¾ lb. of fresh Mezereon root produced in drying - -	3¼ lb. of wood, 3½ lb. of bark, dry, equivalent to 8½ lb. of fresh bark.

3 lb. of stems of Mezereon produced ¾lb. of dried bark.

7 lb. of Daphne Laureola root yielded 4 lb. 5 oz. of fresh bark, or 1 lb. 1¼ oz. of dry bark.

11 lb. of the stems yielded 1¾ lb. fresh bark, which, when dried, weighed ¾ lb.*

The pungent odor given off, by boiling Mezereon root in water over a lamp, is so powerful, that after holding my head over it for a short time, great irritation was produced, and it was difficult to carry on respiration. I observed the same effects from boiling the Daphne Laureola, but in a less powerful degree.

The active principle of the Mezereon being volatile in aqueous vapor, it is likely that maceration with heat, in close vessels, would be a more efficacious mode of preparing it than by decoction.

---

* The bark of this plant is, in Germany, collected in the spring.

In order to repeat Vauquelin's experiment of distilling the alcohol from the tincture of Mezereon, I digested half an ounce of bruised bark of the root in ten ounces of alcohol, for twelve hours, at about 150°, and then distilled off one-half of the alcohol. In this process none of the pungency of the root comes over, and consequently the tincture, which remains in the retort, is concentrated in proportion to the quantity of alcohol removed from it. By this means we may obtain a very effective preparation, which may be given internally, or mixed with lard, to form a stimulating ointment. When an ointment is made by boiling the root in lard, it very soon spoils by keeping.

The above ten ounces of tincture yielded a drachm of dry resin; but the Daphne Laureola, treated in the same manner, yielded only forty-five grains.

It is my intention to make further experiments on this subject, with a view to investigate the active principle on which the effects of this class of plants depend, for it is clear the efficacy does not reside in the so-called vegetable alkaloid Daphnine. Those who are interested in it may find some information in a paper, by M. Vauquelin, in the "Annals of Philosophy," new series, 8th vol., page 305, where several experiments are described, showing the active principle to be analogous to conia in its nature. *Ibid.*

ART. XXXVII.—ON THE GELATINIZATION OF TINCTURE OF KINO. By Mr. Redwood.

The change which takes place in tincture of kino from the fluid to the gelatinous form, is a frequent source of inconvenience to the Pharmaceutical Chemist. This change being often effected when the tincture has been prepared only a few months, and the demand for the preparation being very limited, it is found difficult to preserve a supply, at all times fit for use.

No satisfactory explanation appears to have been hitherto given, either of the nature or the cause of this change, although it is alluded to in most Pharmaceutical works. By some authors it is said to be peculiar to a particular species of kino; and where accounted for at all, it has generally been ascribed to the presence of pectin or pectic acid.

Dr. A. T. Thomson describes four different kinds of kino, under the names of African, Botany Bay, Jamaica, and East Indian or Amboyna kino. To the second of these, the Botany Bay kino, which is the produce of the *Eucalyptus resinifera* or *iron-bark tree,* he ascribes the property of forming a tincture which gelatinizes on keeping.

Dr. Pereira also in alluding to this property in tincture of kino, says, "where this occurred, probably the Botany Bay kino (inspissated juice of the Eucalyptus resinifera) had been employed." Pereira further states with regard to this species of kino, "that when digested in cold water, it swells, becomes soft and gelatinous (like red currant-jelly,) and yields a red liquid which reddens litmus, and yields precipitates with lime-water, gelatine, acetate of lead, sesqui-chloride of iron, and, if caustic potash or ammonia be previously added, with the chloride of calcium. Alcohol and emetic tartar occasion no precipitate. Digested in rectified spirit, Botany Bay kino becomes gelatinous as with water, and yields a similar red solution, from which water precipitates nothing, but which reddens litmus, and deposits a copious precipitate when potash, ammonia, or lime-water is dropped in. From these and other experiments (says Pereira,) I infer that Botany Bay kino consists principally of pectin and tannic acid."

It is well known, that alcohol added to a solution of pectin, causes it to assume the form of a consistent jelly; but this result sometimes does not ensue until after an interval of several days, which in some degree seems to correspond with the phenomena observed in tincture of kino. On the presumption, therefore, that the gelatinization of this tincture depends on the presence of pectin, rectified spirit has been used in its preparation instead of proof spirit, with the view of obviating that result, pectin being insoluble in rectified spirit. This substitution, however, has not been found to effect the intended object, as the tincture prepared with rectified spirit is subject to the same change as that made with proof spirit.

There is one fact connected with the change effected in tincture of kino, which, although incidentally noticed by Pereira, appears not to have been sufficiently taken into account in explaining the cause of the gelatinization. It has been observed that the tincture, as it assumes the form of jelly, loses in a great measure its astringent property. On first directing my attention to this subject, I thought it probable this might arise from the insolubility of the gelatinous mass; and finding allusion made, in a paper by Berzelius, in the *Annales de Chimie et de Physique*, for 1828, to an insoluble combination of pectic acid and tannin, which he and others had met with in the extract of nutgalls, and more especially in the extract of oak bark, I concluded that the gelatinous tincture of kino would prove to be a compound of a similar nature. Both pectin and tannic acid are susceptible of such a variety of changes, under the influence of different agents, that some modification of their characters might be anticipated in such a compound. Thus pectin is converted into pectic acid by the action of alkalies or strong acids, and again into metapectic acid by the prolonged action of an alkali. Tannic acid, also, when in solution, speedily undergoes a change, even from the action of the atmospheric air. We might, therefore, easily account for the conversion of pectin into pectic acid, supposing the former to be present in the kino.

But it does not appear that Botany Bay kino is now introduced into our market. Dr. A. T. Thomson says, he has been informed "that little of it has been brought to this country since 1802." He states that the kino generally met with in the shops, is that imported from the East Indies, and is an extract formed by inspissating a decoction of the branches and twigs of the *Nauclea Gambir*, a plant belonging to the natural order *Cinchonaceæ.*

East Indian kino has been examined by Vauquelin, who gives the following as the result of his analysis: *Tannin* and *peculiar extractive matter* 75; *red gum* 24; *insoluble matter* 1. Now we have no mention here of the existence of pectin in this species of kino; and this fact, taken in connexion with that of the tincture becoming gelatinous when made with rectified spirit, would naturally tend to the conclusion, that the property under consideration must be due to some other cause than that to which it has been assigned.

The following experiments were undertaken with the view of further investigating this subject. A sample of tincture of kino was obtained, which was almost completely gelatinized, a small portion only of fluid floating on the surface. This fluid was separated by repeatedly washing the gelatinous mass with cold water. The washings slightly reddened litmus paper, and on being tested with gelatine afforded a precipitate indicating the presence of tannic acid. The quantity of tannin detected in this way was very small. The jelly, after being purified by washing, was perfectly insipid, and insoluble in cold water, in alcohol, and in ether. This substance was dried and pulverized, and then treated with boiling water, which took up a very small proportion, and formed a slightly-colored solution, neutral to test paper, but yielding precipitates characteristic of tannic acid, with gelatine, sulphate of copper, and nitrate of silver. A black precipitate was formed on the addition of protosulphate of iron.

The insoluble residue, left after treating the gelatinous substance with boiling water, was now boiled in solution of ammonia, in which, as well as in solution of caustic potash, it was found to be perfectly soluble, forming a deep brown solution. The solution with ammonia being boiled so as to expel the excess of ammonia, and chloride of calcium being added, afforded a copious precipitate of a reddish-brown color. This precipitate was washed with diluted muriatic acid, and collected on a filter. It was insoluble in water with boiling, and equally so with the addition of sugar. Alcohol dissolved it entirely, and formed a solution which showed no disposition to gelatinize. It is very evident, therefore, that the precipitate thus obtained was not pectic acid, and that neither pectin nor pectic acid was present in the gelatinous mass.

The solutions formed with ammonia and with potassa, throw down precipitates on the addition of nitric, sulphuric, or muriatic acid; they afford a deep, black precipitate with sulphate of iron, but no precipitate with gelatine. *The ammoniacal solution affords a deep red precipitate with nitrate of silver.*

These reactions correspond so exactly with those of ulmic acid, that I am disposed to consider the gelatinous matter formed in tincture of kino, to be identical with, or very analogous to that substance.

The class of bodies to which the terms ulmine, ulmic acid, and humus, are applied, have not been much studied until very lately, when more attention has been directed to them in consequence of their supposed influence upon the fertility of soils. These bodies, as generally met with, are produced either by the decomposition of vegetable matter in the soil, or as the result of disease in plants. They may also be produced by the action of dilute acids and heat upon sugar, or by exposing sawdust and hydrate of potassa, moistened with water, to a moderate heat. By this last process, ulmate of potassa is formed, which is soluble in water, and from which ulmic acid may be precipitated by either of the strong acids.

Ulmic acid, thus obtained, is similar in color to the gelatinous tincture of kino. It is insoluble in water, alcohol, and ether; but soluble in solution of caustic potash or of ammonia. The alkaline solutions, on the addition of chloride of calcium, yield a reddish-brown precipitate, which is soluble in alcohol. They yield a black precipitate with sulphate of iron, but no precipitate with gelatine. *The ammoniacal solution yields a deep red precipitate with nitrate of silver.*

I have not yet submitted the insoluble product of the gelatinous tincture to an ultimate analysis, but the result of its examination by reagents, appears to be so conclusive, as to leave but little doubt of its identity with ulmic acid. There are several points, connected with the conversion of the tannin contained in tincture of kino, into this substance, which open a wide field for further investigation, and will add to the interest which has already been felt, in what may be called the *tannin family.* The difference which exists in the properties of this body as obtained from different sources, and the changes which so readily take place in the several kinds of tannin, have frequently attracted the attention of chemists. In a paper on tannic acid by Berzelius, to which I have already alluded, he observes that "the tannin contained in kino, differs greatly from that obtained from nutgalls, cinchona bark, or catechu:" "that it has so great a tendency to form *extractive,* that its solution becomes turbid from contact with the air, and deposits a transparent red substance." The organic matter to which the term extractive is thus applied, appears to be but ill defined and imperfectly understood. According to Dr. Kane, it consists of that portion of a plant which has been dissolved out by means of water, and partly decomposed during the process of inspissation.

He says, "when the conversion of the real constituents of the plant into apotheme is yet incomplete, the material which dissolves equally in water and dilute alcohol, but not in absolute alcohol or in ether, is termed *extractive.*"

Now, in accordance with this definition, we may consider the kino or inspissated decoction of *Nauclea Gambir*, and the gelatinous tincture of kino, to be both products in which a change has been effected, first, from pure tannin to extractive, and then, from extractive to insoluble apotheme, or ulmic acid; only that, in the latter product, this change has been more complete than in the former. Thus it will be found that the insoluble residue of the kino, left after making the tincture, corresponds precisely with the gelatinous matter afterwards formed in the tincture. The partial conversion of the tannin into extractive and insoluble apotheme in the kino, has been effected by the action of the air and moisture, expedited by heat, during its inspissation. In the absence of moisture this change is suspended, and kino, if properly preserved, will be found to contain these three constituents, *tannic acid*, *extractive* or *altered tannin*, and *insoluble apotheme*, or *ulmic acid.* In the preparation of the tincture, the tannic acid and extractive are taken up by the alcohol, and the conditions essential to the progress of the change being now again present, the transition of the tannin into ulmic acid is gradually completed, giving rise to the gelatinous tincture under consideration.

The most effectual means of preventing this change would probably be, in preparing the tincture, to extract as speedily as possible the most soluble part of the kino, without allowing the solution, thus formed, to remain long in contact with the altered and less soluble constituents. It is well known that organic matter in a state of transformation acts as a kind of ferment in promoting a similar change in those bodies with which it may be in contact; and with a substance so susceptible of change as tannic acid, the influence thus exercised would, no doubt, be very decided. In confirmation of this, it will be found that tincture of kino made by the process of displacement is much more fluid than that prepared by maceration; the latter being generally too thick and viscid to pass through a filter, while the former is a perfectly limpid solution. It is stated in the Edinburgh Pharmacopœia that tincture of kino cannot be made by displacement; but it is only necessary to mix the kino with a proper proportion of clean white sand, to enable the spirit to percolate through it with perfect facility.

In the American Journal of Pharmacy for 1840, allusion is made to the preparation of this tincture by displacement, and equal quantities of kino and of sand are directed to be used in operating in that way. It is also stated, that tincture of kino thus made has been kept for more than twelve months without becoming gelatinous.

In addition, however, to the adoption of percolation in preparing the tincture, the further precaution should be taken, of keeping it in well filled bottles, accurately stopped, so as to preclude, as much as possible, the access of atmospheric air. This precaution I conceive to be important. If a pint of the tincture be made, it should be put into two half-pint bottles, instead of keeping it in a quart or two quart bottle for dispensing, as is frequently the case. The contact of a large body of atmospheric air must undoubtedly tend to expedite the change, and it is evident, that long before the tincture has become gelatinous, a considerable proportion of the tannic acid will have assumed a new and altered condition, from which its medicinal properties will be greatly impaired.

Ibid.

MISCELLANY.

Purification of the Hydrated Peroxide of Iron. By M. VICTOR LEGRIP.—Several Chemists, and among others M. Orfila, have lately discovered the presence of arsenic in the hydrated peroxide of iron, which is recommended as an antidote for that poison. However small the quantity of arsenic may be in this preparation, and however inoffensive its effects, it is nevertheless desirable that we should be able entirely to eliminate from an antidote, the poisonous substance which it is intended to combat. The following process will attain this object:

It consists in treating a clear solution of sulphate of iron with sulphuretted hydrogen in great excess. The best way is to pass a current of the gas through it for a long time. It is then to be boiled until it affords no smell of the sulphuretted hydrogen; allowed to stand for a day, then collected on a filter, converted into oxide, at the maximum of oxidation, by means of nitric acid with the aid of heat; passed through a filter, and the whole of the peroxide precipitated by ammonia. The ferruginous precipitate should be well washed and preserved for use. It is important to attend to the purity of the water used in the process, which should be either distilled water, or at least rain water well purified and filtered.

Journal de Chimie Medicale.

Transformations of Cinnamic Acid.—M. E. SIMON states, in a communication to the *Annalen der Pharmacie*, that cinnamic acid is transformed into oil of bitter almonds, by distillation with a mixture of sulphuric acid *and bichromate of potass.* If, on the other hand, cinnamic acid be distilled with three times its weight of slacked lime, a colorless volatile oil is obtained, much resembling benzine, partaking of the same composition, but which possesses entirely different properties, and probably also a different atomic weight. M. Simon calls it cinnamomine. Treated with fuming nitric acid, a substance is formed, which, by its taste and smell, resembles nitro-benzide, and which he calls nitro-cinnamide. A deeper investigation into these compounds would not be devoid of speculative interest.—*Berzelius's Report on the Progress of Science.*

THE

AMERICAN JOURNAL

OF

PHARMACY.

JANUARY, 1843.

ART. XXXVIII.—OBSERVATIONS ON EXTRACT OF RHATANY.

By William Procter, Jr.

Read at the Pharmaceutical Meeting held Nov. 7th, 1842.

Rhatany and its preparations enjoy a reputation among the medical practitioners of this country deservedly high, and have in some parts almost superseded kino and catechu. Of the preparations of rhatany, the extract is perhaps the most generally employed, with the exception of the tincture, and is the most liable to be found of inferior quality. This depends as well on the menstruum employed, and its temperature, as on imperfect manipulation.

The design of this paper is to exhibit the relations which the chemical constitution of rhatany has with its pharmaceutical preparations, and particularly with its extract; and to show the importance of a knowledge of these relations to the pharmaceutist.

According to the experiments of Vogel, Gmelin, Peschier and Trommsdorf, the root of *Krameria triandra* contains *tannin, extractive, insoluble apotheme, gum, fecula, krameric acid*, etc.*

Extract of rhatany has been prepared by five different methods or processes, yielding products varying much in com-

---

* Soubeiran's Traité de Pharmacie.

position and medicinal activity, viz.: 1st. By alcohol. 2d. By diluted alcohol. 3d. By decoction in water. 4th. By infusion in warm water: and lastly; by displacement with cold water.

1st. Rhatany, when treated* with alcohol of 33° Baumé, yields a larger amount of extract than by any other means; but it is the least soluble, and hence Soubeiran has suggested that it should be banished from the list of therapeutic agents.

2d. The Codex of 1818 directs this extract to be made with alcohol of 22° Baumé, or diluted alcohol. By this treatment the root yields a large product, but the menstruum takes up a quantity of inert apotheme, and to this extent the remedy is reduced in power. This mode of preparing the extract has been much employed in France, and it is to be preferred to the boiling process.

3d. The next form of extract is that obtained by boiling the root in water, which is the least to be recommended of all the modes of treating rhatany. Not only is the temperature of boiling water injurious, but also in proportion to its continuance. According to Boullay,† when treated by immediate displacement with boiling water, until four parts of fluid have passed, rhatany yields nearly one-fifth of its weight of dry extract; one-half of which is soluble in cold water.

If, on the contrary, one part of rhatany is boiled in four parts of water, then thrown on a displacement filter and suffered to drain, and afterwards enough boiling water added to make four parts of the decoction, the product in dry extract is only *one-sixth* of the root employed, not one-half of which is soluble. By repeating the decoction with as much boiling water, about half as much more extract was obtained, less soluble than the preceding. Thus, by two successive decoctions, one pound of rhatany yielded thirty-one drachms of extract, containing only twelve and a half drachms of soluble matter.

---

* Guibourt, Pharm. Raisonée.

† Essay on Displacement.

4th. By infusing one pound of rhatany in four pounds of hot water, Boullay obtained seventeen drachms of extract, of which thirteen and a half drachms are soluble in cold water.

5th. Finally, by lixiviating rhatany in powder with cold water, without previous maceration, so as to obtain four parts of product, it produces about fifteen drachms, or about eleven per cent. of dry extract, only one-fifteenth of which was insoluble.

From the foregoing remarks, it is evident that the use of boiling water as a menstruum is inexpedient, for two reasons. It dissolves matter contained in the root which is insoluble in cold water, viz., apotheme; and it renders part of the soluble astringent matter insoluble and inert.

Guibourt* has advanced the theory that the astringent coloring principle is held in solution by the action of the free acid and gum in the juice of the plant, while the lignin and starch remain insoluble. When the dry root is treated by infusion, the lignin is not changed, nor is the starch dissolved, merely the dried juice of the root is liquified; which is the reason that the infusion produces an extract almost entirely soluble in water. By boiling the root the starch is dissolved, and combines with the astringent substance to form a compound soluble in boiling water but insoluble in cold, and the extract is thus increased in quantity at the expense of its quality

These views of Guibourt, admitting his premises to be correct, account very satisfactorily for the changes which occur during the ebullition of rhatany in water; but the analyses of this root prove that it contains very little fecula; and Gmelin did not find any; hence there cannot be enough to account for the large quantity of insoluble matter obtained by boiling. The existence of an insoluble substance in the root, naturally, as proved by the action of cold alcohol which extracts it, will account for a large portion of the insoluble matter found in the extract produced from the decoction; yet the fact, that

---

* Pharmacopèe Raisonée, p. 141. Edit. 3d,

less soluble matter is obtained by boiling than by cold water, proves that some of this principle must undergo a change, which change seems proportioned to the length of time the root is exposed to the temperature of ebullition, in contact with the atmosphere.

Having now exposed most of the views which have been offered on this subject by the more prominent authorities, it remains to detail the results of some observations I have made.

One thousand parts of rhatany root of good quality, varying from one-half to one-tenth of an inch in diameter, were carefully decorticated, and found to consist of

$$\left.\begin{array}{ll}\text{Bark,} & 560 \text{ parts.} \\ \text{Wood,} & 440 \quad \text{``} \end{array}\right\} 1000$$

The bark and wood were then separately reduced to moderately fine powder.

1st. One hundred parts of the powdered bark was macerated for eight hours in diluted alcohol, and then subjected to displacement until 600 parts of tincture was obtained. This, when evaporated to dryness, produced 52 parts of dry extract, of which 30 per cent. was insoluble in cold water.

2d. One hundred parts of the powdered bark was macerated in 800 parts of water for eight hours, boiled for twenty-five minutes and strained. The decoction yielded 45.5 parts of dry extract, of which 48 per cent. was insoluble in cold water.

3d. The same quantity of the powdered bark, after maceration for eight hours, was subjected to displacement until 600 parts of cold infusion was obtained. This, on evaporation, produced 33 parts of dry extract, of which only 1.6 per cent was insoluble matter.

4th. One hundred parts of the powdered wood, by displacement with cold water, yielded 6.8 parts of extract.

5th. One hundred parts of the wood, boiled in the same manner as the bark, yielded 6.6 parts of extract.

From these observations it is evident that the ligneous portion of the root affords but little extract, compared with the bark; and consequently, in choosing the root, attention should be given to this circumstance,—the smaller roots containing the largest proportion of bark, and consequently the most activity.

As the ready performance of an operation is a feature of great importance in causing its general adoption, the difficulty of reducing rhatany to that state of division *absolutely necessary* to its use in the method of displacement, is a great barrier to the adoption of that method in the formation of the extract. Now this difficulty is altogether due to the woody portion of the root, which is extremely tough and difficult to reduce. In consideration, therefore, of the large proportion of cortical portion, of the ease with which it is separated, and of the large product which it yields, it is now suggested, that in *preparing the extract the bark only be used*, which is readily powdered.

If we suppose that the root is composed of equal parts of wood and bark, then

50	parts of	bark	yield	16.5	parts of extract.
50	"	wood	"	3.5	" "
100	"	root	"	20.	" "

Now it would be far better that the operator should wholly reject the ligneous portion, or at least treat it separately, than by a resort to boiling, to injure the whole product; for it has been clearly shown, that while the gross amount of extract obtained by boiling is the largest, its soluble and really active portion is much the least.

But a serious difficulty to overcome in procuring the general adoption of a process, the product of which is improved in quality at the expense of its quantity, is the cupidity of the manufacturer; and whilst the self-interest of the pharmaceutist is prized higher than the welfare of the patient, the greater product will be chosen and the better rejected. The extract of rhatany, which entered into the composition of an extemporaneous mixture, has been known to almost entirely precipitate, when the mixture was allowed to rest for a short time, even when care had been extended, owing to the insolubility of the extract. What, then, would result from careless manipulation but a sand-like deposite, equally disagreeable and inert.

The experiments which have been made above have reference to products carefully obtained by the different processes; but in order to exhibit the character of the article in actual use, the solubility of specimens from various sources have been tried with the following results, viz:

No. 1. 100 parts of extract yielded 50 parts of insoluble matter.
" 2. 100 " " " 17 " " "
" 3. 100 " " " 25 " " "
" 4. 100 " " " 50 " " "
" 5. 100 " " " 70 " " "
" 6. 100 " " " 50 " " "

The formula for extract of rhatany, introduced into the last edition of the U. S. Pharmacopœia, resembles that of Boullay by displacement with cold water, but differs by raising the temperature of the cold infusion to the boiling point and straining previous to evaporation; the advantage of which is not very obvious, as no vegetable albumen or other coagulable matter has been observed in the root. It should be especially observed, that it is this *soluble aqueous extract* which is directed by that authority in the preparation of syrup of rhatany. As, therefore, only the soluble parts of the extract can enter into the composition of the syrup, the employment of one made by boiling will reduce the strength of the preparation to one-half.

ART. XXXIX.—REPORT OF THE COMMITTEE CHARGED BY THE PHARMACEUTICAL SOCIETY WITH THE EXAMINATION OF A PAPER ENTITLED "OBSERVATIONS ON EXTRACT OF RHATANY, BY WILLIAM PROCTER, JR."

THE subject of Extract of Rhatany, which has engaged Wm. Procter's attention, is one that has been particularly dwelt upon by the Messrs. Boullay in a very interesting and elaborate memoir upon the displacement system: it furnished them the type by which the results of the principle of lixiviation were beautifully prefigured. They proved conclusively that, by displacement only, and with cold water menstruum, could a good extract of this substance be obtained, having for its character perfect solubility and transparency.

All the experiments of Wm. P., as detailed in his essay, tend to corroborate this assertion: besides exposing to view the disparity in the results of the different processes, they also exhibit in a lucid manner the chemical agency which air and temperature have upon the deterioration of the extract by the common methods of preparation.

The observations of Wm. P., regarding the decortication of the root, are deserving of notice, as offering a readier means of conducting the lixiviation. Your committee would remark, from their own experience, that the best method of division in the case of this root, (pounding in a mortar being too difficult,) is to have it ground in a mill, a large quantity at a time, to separate the bark from the ligneous portions, which latter, adhering together in large broken fibres, admit of being easily picked out. The smaller fibres remaining cannot materially impair the preparation, owing to the limited time of contact of the woody fibre with the cold water; but if decoction be employed, then the separation of the woody fibre becomes a matter of great importance.

The experiments made by Wm. P. upon six different samples obtained in this city from different sources, and purporting to be extract of rhatany, the best of which having been found only *half* soluble, are of great interest, as proving the little dependence to be placed by physicians upon an article of questionable purity.

It is to be regretted that cupidity should thrust into the market an inferior article, consequent upon the adoption of a bad process yielding a larger product: but your committee trust that the facts elicited by Wm. Procter, and other pharmaceutists who have written upon the subject, may have some influence upon the manufacturer, and cause also the consumer to be less indifferent to the quality of this superior astringent, more especially as the new National Pharmacopœia gives directions for its preparation.

A. DUHAMEL,

JOS. C. TURNPENNY.

Twelfth mo. 5th, 1842.

ART. XL.—ON POPULUS TREMULOIDES.

By LAURENCE TURNBULL.

(*Extract from an Inaugural Essay.*)

THE vulgar names of this species are, White Poplar and American Aspen. The Aspen is common in all the northern and middle States. It prefers open lands of a medium quality; its ordinary height is about thirty feet, and five or six inches in diameter. The bark is greenish and smooth, except at the bases of the old trees, when it becomes furrowed and very rough; it blooms about the first of April, ten days or two weeks before the birth of the leaves. The aments which spring from the extremity of the branches are composed of silky plumes, of an oval form, about an inch in length; the leaves are about two inches broad, narrowing at the summit, and supported by long petioles; they are of a dark green color in the spring. The nerves are reddish, in stalks of seven or eight inches in height; they are nearly round, and bordered with obtuse, irregular teeth; on the young shoots they are twice the size, heart shaped, and acuminate at the summit. Of all the American Poplars, this species has the most tremulous leaves; the gentlest air is sufficient to throw it into agitation. The wood is light and soft. The Populus Grandidentata very much resembles the Populus Tremuloides, but it is a larger tree; it is from forty to fifty feet in height, and in the spring the leaves are covered with a white down, which falls off in the beginning of summer. These two species are easily confounded; and I owe the means of detecting them to the kindness of Mr. Nuttall.

PROPERTIES.

All parts of the American Aspen possess bitter and tonic properties. The bark appears to be the portion in which most of the activity resides. It does not yield readily under the pestle, the fibres being very tenacious; but is more easily ground, in which form it is most generally found in our shops.

MEDICAL HISTORY.

The Populus Tremuloides is noticed in the United States Dispensatory, last edition, Appendix, as a tonic. It has been very little used by medical practitioners, except the Thomsonians. It has been used by them for a number of years, and it enters into several of their preparations. Samuel Thomson, the founder of the system, remarks in his work, that the bark, given in the form of a tea, is one of the best articles to remove bile, and restore the digestive organs, of anything he ever used. He prescribed an ounce of the bruised bark to a pint of boiling water; the dose of which is to be from one to two ounces. It is also used by them as a diuretic with much success.

CHEMICAL HISTORY.

No chemical analysis has been made of this plant, as far as I have been able to learn, although the Populus Tremula or European Aspen has been thoroughly analyzed by Bracconnot and other eminent chemists, who obtained salicin and populin; salicin having been previously obtained by M. Leroux, in 1830, from the Salix Helix, from which it obtained its name. Its powers as a remedy have caused it to be substituted for quinine, in the cure of intermittents, as has been confirmed by Majendie and other medical writers.

The following experiments will show what the bark contains:

Experiment 1.—*Starch, Gum, Tannic Acid.*

An infusion of the bark was made by displacement with boiling water, which, with tincture of iodine, formed a bluish black precipitate of iodide of starch; and when a solution of subacetate of lead was added, a white, insoluble compound of gum and protoxide of lead immediately subsided; also, with a solution of the persulphate of iron it yielded a precipitate of a bluish black color; and to confirm the nature of this solution a solution of gelatin was added, which precipitated tanno-gelatin. With a fresh portion of the infusion, the tincture of muriate of iron formed a black precipitate of the tannate of iron ; with the ferrocyanuret of potassium the infusion afforded no precipitate.

Experiment 2.—Extractive Matter and Chlorophylle.

A portion of the fresh bark was bruised, and a pint of alcohol, of 36°, was poured over it in a displacement filter; after being returned and repassed during three hours it was of a greenish color, and very bitter. It was then evaporated to dryness, and consisted of chlorophylle and extractive matter, associated with the bitter principle, as well as a portion of tannin; by the action of heat, chlorophylle was changed to black from green: and, when treated with cold water, the extractive matter and tannin were dissolved, and the chlorophylle rose to the surface. The liquid, when filtered, was of a dark brown color; when tested by reagents, the following were the results: with persulphate of iron a blackish precipitate; with lime water a slight precipitate of a dark red color; and with a solution of gelatin a precipitate of a brown colour.

Experiment 3.—Fixed Oil.

To a fresh portion of the bark four ounces of sulphuric ether were added in a displacement filter, and returned several times during two hours; the etherial tincture had a bright green color, and very bitter taste; and upon evaporation it yielded a yellow oil, with the chlorophylle in small proportion, of a black color, floating on the surface. This oil left a greasy stain on paper; and when mixed with a solution of carbonate of potassa formed a soapy compound.

Experiment 4.—*Lime, Potassa, and Iron.*

An ounce of the bark was incinerated and treated by boiling water until all the soluble matter was removed, and the solution filtered; to this liquid a solution of chloride of platinum, with a few drops of hydrochloric acid, was added and boiled to dryness; on mixing a few drops of water, it yielded crystals of a yellow color, of the double chloride of platinum and potassium: also, upon evaporation of another portion of the solution, it yielded crystals of carbonate of potassæ, (by the absorption of carbonic acid from the atmosphere during evaporation;) the residuum, after treating the ashes by boiling water, was acted upon by nitric acid, and the nitric solution diluted with water. To this was added oxalate of ammonia in solution, when it yielded a copious precipitate, having all the characteristics of oxalate of lime. To another portion of the nitric solution ferrocyanuret of potassium was added, and the well known precipitate of Prussian blue was produced.

Experiment 5.—*Gallic Acid.*

A strong decoction of the bark was made, and after filtering and digesting with hydrate of alumina, it yielded no precipitate with a solution of gelatin: but with a solution of persulphate of iron it formed a dirty brown precipitate, indicating the existence of gallic acid.

Various processes were tried to obtain the bitter principle of this bark; for instance, precipitating the decoction by subacetate of lead; removing the lead by hydrosulphuric acid; concentrating the liquor to the state of an extract; redissolving in alcohol boiling with animal charcoal, filtering and evaporation; precipitating with acetate of lead; and boiling with chalk to precipitate the lead, evaporation, &c. These and other processes were tried, but without success, until the process of Messrs. Tyson and Fisher (Journ. Philada. College of Pharmacy, Vol. 3, page 213,) was adopted with the following results:

A portion of the bark was boiled with water and caustic lime, filtered, and sulphate of zinc added to the solution until the lime was precipitated and again filtered. This liquid was then carefully evaporated to dryness, and the extract treated with boiling alcohol, and again evaporated. Spontaneously, a brown coloured matter was obtained, which possessed much bitterness, but was not crystalline. This substance was redissolved in alcohol, and a portion of pure animal charcoal added, and the mixture boiled for ten minutes and filtered; the filtered liquid was then suffered to evaporate spontaneously, numerous flocculi being suspended in it and on the sides of the vessel. The whole was then thrown on bibulous paper and subjected to strong pressure, until all the fluid part was absorbed, leaving a light brown matter on the surface of the paper. This was collected and redissolved in alcohol, and allowed to evaporate spontaneously, when numerous prismatic, acicular crystals were obtained, which possessed the following characters. They were soluble in alcohol, sparingly soluble in cold water, very soluble in boiling water, and very slightly soluble in ether. The taste is bitter, followed by the after taste of the bark, which is so peculiar in salicin. When added to sulphuric acid it instantly becomes purple, and communicates the color to the acid. When added to concentrated hydrochloric acid, and slowly heated, it was dissolved; but on increasing the heat, a white, insoluble compound was separated. From these, and other characteristics, there can be no doubt of the identity of this principle with salicin, thus adding another instance of a species of poplar yielding this principle.

From the foregoing experiments it may be inferred, that the bark of the Populus Tremuloides contains the following principles: Gum, Starch, Extractive Matter, Tannic Acid, Gallic Acid, Chlorophylle, Fixed Oil, Salicin, Salts of Lime, and Potassa.

ART. XLI.—ON THE BEAKED HAZEL.

By AUGUSTINE DUHAMEL.

(*Read before the Pharmaceutical Society.*)

As this plant has served a useful purpose in medicine as a substitute for cowhage, its botanical description, with a brief notice of its character, may not be without some interest.

CORYLUS ROSTRATA, (Aiton.)

The beaked hazel is a shrub two or three feet high, belonging to the natural order Amentaceæ, suborder Cupuliferæ; *Monœcia polyandria* of the artificial system of Linnæus. The leaves are on short petioles, oblong-ovate, acuminate, slightly cordate.

STERILE FLOWER.—Ament cylindrical, scales three cleft, *stamens* eight.

FERTILE FLOWER.—*Ovaries* several, *stigmas* two, *nut* ovate, surrounded with 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 the *Mucuna* (Dolichos) *pruriens*. This shrub grows in the mountainous regions of North America. These short and stiff bristles have been found to possess anthelmintic properties equal to cowhage, in mechanically injuring and expelling the worm without injuring the intestines. Dr. Heubener, of Bethlehem, Pennsylvania, from whom this specimen was obtained, has made an essay of its virtues and was highly pleased with its efficiency. Like the cowhage, it may be administered in some consistent vehicle, and in like doses.

ART. XLII.—PHARMACEUTICAL NOTICES.—No. XXIII.

By AUGUSTINE DUHAMEL.

Tar Beer.

OF late there has been brought into use a new preparation of tar under the various names of Jew's Beer, Wine of Tar, Balsam of Tar, and Tar Beer. Having become acquainted with it indirectly, I am unable to speak of its origin. I am not aware that any notice of its preparation has yet been published. As far as my information extends respecting it, it was first prepared here by a family in which pulmonary disease threatened to carry off one of its members. Having accomplished a cure in this case, its good effects reached the observation of a physician who, pleased with it, freely recommended it to a number of his patients afflicted with obstinate cough. Its use becoming more general, it finally reached the apothecary, in whom a readier means was found of obtaining it prepared, as properly belonging to his province. It is as follows:

Put one quart, by measure, of Bran,
One pint, " " Tar,
Half pint, " " Honey,
and Three quarts, " " Water,

into a new earthen pipkin; let the mixture simmer over a slow fire for three hours, then remove, suffer it to cool, and add half a pint of yeast: after it has stood thirty-six hours strain, and it becomes fit for use. Dose, a wineglassful before each meal.

The saccharine matter of the honey diffused through a large proportion of water and the presence of a fermental body, (the bran through its starch and gluten,) aided by an elevated temperature and contact of air, gives rise to the vinous fermentation, in the process of which a large quantity of tar is taken up, or rather its liquid constituents, such as the empyreumatic oil, acetic acid, &c., leaving the pitch or resinous parts behind. The yeast added is intended, as it would appear, to hasten the process of fermentation It is much more highly charged with the volatile principles than the *Aqua Picis.*

As obtained, it is of an opaque yellow color, but after a few days standing becomes clearer. It has a strong odor of tar, and a sweetish, with an after acrid taste. It exercises an acid reaction upon litmus.

It possesses balsamic properties, and is given freely in coughs, bronchial diseases, and the various forms of incipient consumption.

Syrup of Gum Arabic.

Gum syrup is an article prescribed almost daily as a useful addition to mixtures formed of certain incongruous bodies, requiring the mediation of some viscous substance to unite or suspend them, or else by its insinuating, pleasing character, to prepare the way for the administration of nauseous remedies repugnant to the fauces. It is to the apothecary almost an indispensable vehicle for forming pilular masses. It constituted, formerly, one of the *Preparations* of the U. S. Pharmacopœia, but having been expunged from the new edition, the cause of which we are left to divine, makes it desirable that a good process be placed before our *confreres* through the medium of this journal. The following improvement upon the old formula was suggested to the committee of pharmaceutists engaged in revising the formulas of the old, with the view of eliciting important changes in the new Pharmacopœia, and by them adopted.

Take of

Gum Arabic, the whitest,	4 ounces or	8 parts.
Sugar,	32 "	64 "
Boiling Water,	1 pint or	32 "
Orange Flower Water,	4 drachms or	1 "

Dissolve the gum in the boiling water with frequent stirring; then add the sugar; boil so as to form a syrup, and strain. When cold add the orange flower water.

The quantity of gum is here placed at a medium between the French and former American standards. When the gum is in large proportion it is very apt to ferment, even when thickly boiled, and besides, is not very miscible with water. The slight addition of orange-flower water makes it more agreeable.

Paregoric Elixir.

Some of our brethren complain, and not without a cause, of the new formula for this preparation. That they would not be readily inclined to adopt it in strict conformity with the directions might have been supposed, from the fact of the very wide distinction in its appearance from the former paregoric. Made according to the new recipe, it exhibits an absence of color, while that of the old formula was not only colored, but so deeply with liquorice, as to present very little, if any, apparent difference from laudanum. This sudden change, so visible to our customers, to whom explanation as to causes is most frequently thrown away when the evidence of their external senses cannot be overcome, engenders suspicion as to the merits of a remedy, and operates to our prejudice. How many times does it occur that a remedy appearing different from heretofore, is either brought back or peremptorily refused in the first place? For this reason we find it necessary to add a sufficient quantity of *red saunders* to impart a deep red color, which it is presumed will be done by others, or else adhere to the old formula.

ART. XLIII.—SOME NOTICE OF FULIGOKALI AND ANTHROKOKALI. By AUGUSTINE DUHAMEL.

THESE names (terms derived from the Greek and Latin) have been given to two new medicinal compounds of carbon. The first is a compound of soot and potash, first introduced to public notice by Dr. Gibert: the second, of anthracite combined with the same alkaline body, made known by Dr. Polya anterior to the first mentioned. These gentlemen are French practitioners attached to the St. Louis Hospital of Paris, so well known for its treatment of syphilitic, scrofulous, and cutaneous diseases.

Fuligokali is prepared as follows:

Caustic potash,	20 parts.
Shining soot, in powder,	100 "
Water,	q. s.

Dissolve the potash by heat in a small quantity of the water, and add it to the powdered soot placed in a capsule; mix well by stirring, and add sufficient water that the mixture may boil for some time, then let it cool: afterwards dilute it further with water, filter, and evaporate to dryness to obtain the fuligokali in powder or in scales, and enclose it in dry bottles.

As thus prepared it is in the form of a black powder, having an empyreumatic odor, and a mild alkaline taste; is partially soluble in alcohol, and extremely soluble in water. It is decomposed by the mineral acids.

Dr. Gibert combines it with sulphur in the following proportions, under the name of

Sulphuretted Fuligokali.

Fuligokali,	60 parts.
Caustic potash,	14 "
Sulphur,	4 "

Dissolve the sulphur and potash by heat with a little water, then mix the fuligokali, and evaporate the whole to dryness.

This is very soluble and has an extremely fetid odor, partaking both of carburetted and sulphuretted hydrogen.

Anthrokokali and its compound with sulphur are preparations analogous to the two above mentioned. Dr. Polya directs 160 grammes of porphyrized stone coal to be mixed with 192 grammes of a very concentrated and boiling solution of caustic potash in an iron dish over a fire: when well mixed it is withdrawn from the fire and stirred with a pestle, until converted into a uniform black powder. It is then transferred to well stopped bottles to prevent deliquescence.

To prepare the *sulphuretted anthrokokali* add to the 160 grammes of finely levigated coal sixteen grammes of sulphur, and proceed as above directed. The combination of anthracite with potash is not so complete as in the case of soot. The product afforded by Dr. Polya's process deposits from its aqueous solution some uncombined carbon, and the same solution, filtered and evaporated, furnished a dark colored powder, consisting principally of carbonate of potash.

It becomes difficult to give a formula expressing the exact constitution of anthrokokali, the chemical nature of coal being so little known; but we are aware that it is a fossil resulting from the decomposition of lignite, carbonized by galvanic action, and differs in constitution according to differences of locality, containing more or less argilaceous matter, sulphur, &c., but consisting almost wholly of carbon, with but little hydrogen and oxygen. Soot consists principally of carbon and *pyrotine* (pyrogenic resin) with acetic acid combined with lime, potash, and other substances.

From what we know of the composition of coal and soot, it is to be inferred that the action of an elevated temperature upon these substances causes a quantity of carbon to be converted into carbonic acid, which, uniting with the potash, destroys its causticity, while other reactions taking place dissolve some of the various constituents of these organized bodies. In the case of the soot all the empyreumatic oil is taken up by the lixivium of potash.

These substances have been employed with advantage in tetter, scrofulous and chronic rheumatic affections, and gouty calcareous concretions of the joints. Their properties are resolutive, detersive, and slightly stimulating. Their internal use has not been attended with much success; but externally their use appears to have fully answered the expectations regarding them. An ointment may be prepared from either of these substances, in the proportion of one part to thirty parts of lard, which may be applied to the affected parts twice a-day.

Fuliginous preparations have long since been employed for their tonic and antiseptic properties. What might be considered a weak solution of fuligokali has been used for many years in this city under the various names of medical lye, soot tea, alkaline solution, and dyspeptic lye, by Drs. Physick, Dewees, and others.

ART. XLIV.—NOTE ON EXTRACT OF SENEGÆ.

Extract of Senegæ appears to have attracted but little if any attention from either the physicians or pharmaceutists of this country, while in France it forms one of the catalogue of extracts in all the more prominent works on Pharmacy. Here the compound syrup of squills, into which senegæ equally enters, for a long time was the only truly officinal preparation of it generally kept, the simple syrup of senegæ being little used, and the decoction being of course an extemporaneous preparation. Latterly, the employment of syrup of senegæ has, deservedly, increased. The object of this note is to exhibit a formula for Extract of Senegæ, the product of which is worthy of attention for its intrinsic value.

Take of

Senegæ, in coarse powder,	16 ounces.
Alcohol,	2 pints.
Water,	4 "

Mix the alcohol and water, and macerate the senegæ in one-half of it for two days; place the mixture in a displacement filter, and operate with the same menstruum until six pints of tincture are obtained. Evaporate this on a water bath till reduced to the consistence of an extract. Senega yields one-eighth of its weight of a yellowish brown transparent extract. One dram of this extract dissolved in a pint of water yields a preparation of the same theoretical, but greater actual strength than the officinal decoction, and made in five minutes instead of half an hour or an hour.

ART. XLV.—GALLIPOTS.

To the Editors of the Journal of Pharmacy.

Permit me, through your Journal, to suggest an improvement in Gallipots, used for ointments and cerates. Those in common use are of glazed earthenware, and (as every apothecary knows,) filthy things—the contents saturating the vessel, oozing through, soiling the shelf on which it stands, and often destroying the label. This is so uniformly true, that in twenty years experience I have never found an earthen gallipot that would hold mercurial, basilicon, or tar ointment, with the exception of a few coarse China vessels that accidentally fell into my hands. Now, at about the same cost, glass ones may be made, which would, of course be perfectly impervious. It would be a luxury to have such, even if made of common porter bottle glass, so nice and clean would they be. The French, and perhaps the English have them; and if one of our glass manufacturers will furnish the article at a fair price, I think he may be sure of an extensive sale; and let me suggest that the cover should be made to shut *outside* or *over* the vessel, with a *lip* rather *deep*, that it may securely retain its place.

Index.

ART. XLVI.—REPORT OF THE COMMITTEE ON AN ARTICLE PURPORTING TO BE JALAP, NOW IN THE MARKET.

(*Read at the Pharmaceutical Meeting, January* 2, 1843.)

The Committee entrusted by the College of Pharmacy with the duty of investigating the properties of a certain article of false jalap recently brought into the New York market, hereby submit the following Report as the result of their examination.

One of the members of your Committee, during a visit to New York city, procured a pound of this fictitious article, selected in a manner to present a fair sample of its general character, which, upon examination, was found to be made up of the following pieces:

1st. A large spindle-shaped dried root, or rather tuber, flattened on one side, about six inches long and three wide, weighing six ounces.

2d. The larger half of a similar tuber, transversely cut, forming a segment four inches in its largest diameter, weighing three and a half ounces.

3d and 4th. Two entire tubers, smaller in size, ovate, one of them kidney form, and pointed, weighing together about five ounces.

A further description of this article is comprised under the following general features:

It is light in weight compared with jalap; externally very rugose, not minutely so, like the jalap, but coarsely furrowed: it is of a light brown color, with dark shades of black occupying the cavities, through which are interspersed minute shining black specks. Its fracture is rough and uneven, and its interior surface presents a uniform, grayish-white, ligneous appearance, and somewhat loose texture, marked by ash-colored concentric circles, composed of a harder and more compact substance indicating resin. One of the smaller tubers wanting this distinguishing character appears purely farinaceous. The taste and smell of these different tubers are feeble, sweetish, peculiar, and closely associated, though very distinct from jalap.

The largest root divided transversely with a saw exhibits vertical cavities, proceeding from incisions made through the whole length of the exterior surface to facilitate drying. In No. 2 the incisions are perceptible, but it has no holes like the other. Although a slight disparity exists in the internal appearance of these several tubers, yet their identity, in point of taste and smell, conclusively proves them to be of a common origin. The powder is grayish white, and does not excite coughing or sneezing during pulverization.

This *drug* was represented to your Committee as coming from Mexico. A considerable quantity of it is to be found in the house of a drug broker in New York, who offers it for sale as *overgrown jalap root*, at a price little inferior to that which the genuine commands.

Your Committee are at loss to determine from what plant it derives its source, as it bears no very close resemblance to the various adulterations to which jalap, as found in commerce, is known to be subject. It bears no analogy with the different specimens contained in the cabinets of our Professors of Materia Medica. Diligent inquiry among our druggists, (to whom it appeared novel,) led to no more satisfactory acquaintance with it, from which no doubt is left upon the minds of your Committee that the present is its first introduction into an American market.

It is evidently the produce of a *Convolvulus*, but of what particular species it is difficult to say. It does not respond to the description of the dried root of the *C. panduratus*, nor any of the known falsifications furnished by this genus. The same observation applies to two varieties of adulterations mentioned by Guibourt in his *Histoire des Drogues*.

It differs from the Mechoacan (*Jetichucu—Batata da Purga*) in odor, taste, and not being sliced and deprived of its exterior bark. It agrees with it, however, in its internal white and starchy appearance, but wants the marks of the severed radical fibres upon the superior extremity of the root, which in the Mechoacan are very numerous.

It differs from the fusiform or male jalap (*Convolvulus orizabensis*) in not being cylindrical, uniformly fusiform, lengthy and branched at its inferior extremity, and wanting the external yellow color and interior lactescence of that species.

Contrasted with the well known characters of officinal jalap, (*Ipomœa jalapa*,) it presents the following discrepancies.

It is larger, lighter in comparison, wants brittleness, shining fracture and compactness, acridity of taste, odor, and color. It is also deficient in resin, and wants the striated and reticulated appearance of exterior which the other possesses.

In order to ascertain how its chemical relations would comport with jalap, a number of experiments were conducted by the Chairman of your Committee, the result of which enables them to furnish a proximate analysis of its composition as follows. In juxtaposition are placed the analyses of officinal and male jalaps.

False Jalap.

Resin, consisting of 15 soft and 20 of dry brittle resin,	35.
Gummous Extract,	85.
Starch mixed with Inulin,	140.
Lignin,	116.
Albumen and Gum,	50.
Saccharine Matter, Salts of Lime, and loss,	74.
	500

Analyses from 500 Parts.

Of Jalap, by Cadet.		*Of Male Jalap, by Ledanois.*	
Resin, - - -	50	Resin, - - -	40
Gummy Extract, -	220	Gummy Extract, -	128
Fecula, - - -	12	Fecula, - - -	16
Lignin, - - -	145	Lignin, - - -	290
Albumen, - - -	12	Albumen, - - -	12

Your Committee offer a brief summary of the operations made during this chemical investigation. These consisted in selecting a portion of a tuber apparently richest in resin, which was carefully powdered and afterwards treated with ether by lixiviation; then by alcohol, as in the process for obtaining resin of jalap; then with water, in the same manner, to obtain the extractive and gum; elutriation, to separate the albuminous matter and fecula; and finally, isolation of the lignin, by alternate action of diluted acids and alkali. The resin has a reddish brown color, and a sweetish, somewhat nauseous taste; is partially soluble in ether, soluble in alcohol, and insoluble in water, by which it is thrown down from its alcoholic solution. The dried extractive is sweetish, and in flavor approaches nearest to that of roasted potatoes. The mixture of starch and inulin is colored blue by iodine, but is not rendered gelatinous by boiling. The aqueous infusion of this root is of a straw-yellow color, turbid, and slightly nauseous. Sub. acet. plumbi produces a flocculent permanent white precipitate. The soluble parts of the incinerated product gave a feeble acid reaction with litmus, and evinced traces of lime.

Having proceeded thus far, it remained for your Committee to ascertain its medicinal properties, if, after what is here related, it could be supposed to possess any. This they were enabled to do through the courteous offer of Prof. Dunglison. A trial of its virtues was made at the Blockley Hospital, under the inspection of some of the resident faculty, upon six different individuals, in doses of fifteen to twenty grains, without obtaining any effect whatever.

Proving thus destitute of purgative qualities, your Committee pronounce it a worthless article, to be guarded against; and impressed with the advantages of making publicly known all falsifications and impure remedies, they entertain the hope that this exposition will be extended sufficiently wide to preclude the possibility of deception being practised upon members of our profession.

Augustine Duhamel,
Charles Ellis,
John H. Ecky.

January 2, 1843.

NOTE TO THE REPORT ON FALSE JALAP.

Since the Report, as above drawn up, was submitted, the November number of the *Journal de Chimie Medicale*, containing a "Notice by M. Guibourt on a False Jalap," has come to hand. This adulteration was furnished to M. G. by a druggist, who found it mixed with jalap coming in bales from Mexico. From his description of it, it would seem to bear a strong analogy with the article to which allusion is made above.

It is styled by him *rose scented jalap*, from a supposed resemblance to the odor of roses when respired. He considers it a *Convolvulus*, and places it intermediate between the true jalap and the sweet potatoe.

With the view to determine its worth, an analysis of it was undertaken by M. G. Being at the same time embarrassed by the discordant results of the different analyses made of officinal jalap, and suspecting the presence of sugar in it, he instituted similar experiments at the same time upon that substance, which allowed him to compare the analyses of the two jalaps together, as follows:

	Officinal Jalap.	*Rose Scented Jalap.*
Resin, - - - -	17.65	3.23
Molasses obtained by Alcohol, -	19.00	16.47
Brown sugary extract, obtained by water,	9.05	5.92
Gum, - - - -	10.12	3.88
Starch, - - - -	18.78	22.69
Lignin, - - - -	21.60	46.00
Loss, - - - -	3.80	1.81
	100.	100.

An essay was also caused to be made by M. G. in one of the French Hospitals, of the purgative value of this false jalap, but it proved to be ineffectual in four different cases.

A. D.

ART. XLVII.—ON THE PREPARATION AND USE OF CYANIDE OF POTASSIUM.

By J. Liebig.

One of the best methods to procure cyanide of potassium consists, as is known, in decomposing the ferrocyanide of potassium at a red heat; but it has many inconveniences, and we are constrained to lose a third part of the cyanogen which the salt contains. Composed of two atoms of cyanide of potassium, and one atom of cyanide of iron, no change is produced in the former of these combinations by a red heat; but the latter is decomposed into carburet of iron with the disengagement of nitrogen. The carburet of iron formed, absorbs the fused cyanide of potassium like a sponge, and we are compelled to have recourse to solvents, especially alcohol, to obtain the cyanide of potassium free from iron, and without loss.

But, as the cyanide of potassium possesses properties which render it a precious means for reduction and separation in chemical analysis, I have endeavored to simplify its preparation.

If we dry perfectly (by gentle calcination) on a hot plate eight parts of ferrocyanide of potassium, and then mix it intimately in fine powder with three parts of dry carbonate of potassa, and throw the whole together into a red hot Hessian crucible, which is to be retained at that temperature, the mixture fuses into a brown mass, with a rapid disengagement of gas; in a few minutes, when the mass has become fluid, and has arrived at a red heat, we perceive the depth of the color to decrease, and by continuation of the heat to become clear, and of an amber yellow; on the introduction of a glass rod, the portion adhering when withdrawn, on becoming solid, remains at first brown, but becomes yellow; and finally, at the end of the operation, the liquid is clear and colorless as water, and becomes, on cooling, a crystalline mass, of a brilliant white color.

During the fusion brown flocculi are seen floating in the liquid, which finally unite together into a gray spongy mass. If the crucible be now withdrawn from the fire and allowed slightly to cool, it usually happens that the gray powder settles to the bottom: this deposit is facilitated by one or two stirrings with the glass rod. The hot and fused mass which swims above may be then decanted with great facility into a hot porcelain capsule, without admixture with the smallest quantity of the gray powder.

The mass separated from the iron by decantation is a mixture of two combinations; the principal is cyanide of potassium, the other is cyanate of potassa. They are mixed in the proportions of five atoms of the former to one atom of the latter.

The following is the reaction which takes place between the ferrocyanide of potassium and the carbonate of potassa:

At the commencement of the fusion, the cyanide of iron of the ferrocyanide of potassa, decomposes with the potassa of the carbonate of potassa into cyanide of potassium and protocarbonate of iron, from which latter, at a more elevated temperature, the cyanide of potassium takes away all its oxygen, resulting in the formation of cyanate of potassa and metallic iron.

If we consider the mixture to consist of two atoms of ferrocyanide of potassium and two atoms of carbonate of potassa, we will have:

Ferrocyanide of Potassium.	Carbonate of Potassa.
$Cy^{12}Fe^{2}K^{4}$	$+ K^{2}O^{2}2CO^{2} = Cy^{12}Fe^{2}K^{6}O^{2}2CO^{2}$.

and we will have, after fusion,

Cyanide of Potassium.	Cyanate of Potassa.	Iron.	Carbonic Acid.
$Cy^{10}K^{5}$	$+ Cy^{2}O,KO$	Fe^{2}	$2CO^{2}$

We obtain from two atoms of ferrocyanide of potassium five atoms of cyanide, and consequently one-fourth more than by fusion at a red heat. The cyanate of potassa, with which it is mixed, does not injure it for any of its uses. It is readily detected by supersaturating the cyanide with an acid; effervescence then results from the disengagement of carbonic acid, and an ammoniacal salt is found in the liquid.

The explanation of the formation of cyanide of potassium, under the conditions indicated, is not strictly exact; for the carbonate of the protoxide of iron, which is formed, is decomposed previous to reduction into carbonic acid and black oxide of iron; and at the expense of this latter there is formed an indeterminable quantity of cyanate of potassa, over and above that indicated by the preceding formula.

The metallic iron remaining, as well as the sides of the crucible, is covered with cyanide of potassium; to obtain this, the most advantageous process consists in dissolving from the crucible, by warm water, every thing soluble, and heat the solution with a little sulphuret of iron, which is readily dissolved.

From this solution the ferrocyanide may be obtained by evaporation; and the mother waters contain sulphuret of potassium.

Preparation of Hydrocyanic Acid.

The cyanide is much superior to the ferrocyanide of potassium for the preparation of hydrocyanic acid, because the product is more abundant, and the distillation is conducted with more facility.

In the distillation of ferrocyanide of potassium with sulphuric acid, there is deposited a bluish white powder, a combination of cyanogen, potassium and iron, analogous, in composition, to the ferrocyanide of zinc, and is expressed by the following formula:

$$2\mathrm{Cfy} + \left.\begin{matrix}\mathrm{K}\\ 3\mathrm{Fe}\end{matrix}\right\} (\mathrm{Cfy} = \mathrm{Cy}^6\mathrm{Fe}.)$$

From the formation and composition of this body there results, that from five atoms of ferrocyanide of potassium, which contains thirty atoms of cyanogen, there cannot be obtained more hydrocyanic acid than from nine atoms of cyanide of potassium, viz.: eighteen atoms of hydrocyanic acid, the other twelve atoms remaining with bluish white ferruginous precipitate.

If the ferrocyanide of potassium be converted into cyanide by the method indicated, there may be obtained from five atoms of ferrocyanide, twenty-five atoms of hydrocyanic acid, consequently seven atoms more.

For the decomposition of one atom of ferrocyanide, one atom of sulphuric acid is usually directed, which suffices to form with the potassa an acid sulphate of potassa: in using the cyanide there is required but one atom of acid.

Equal parts of hydrated sulphuric acid and cyanide of potassium are the best proportions for the preparation of hydrocyanic acid; the sulphuric acid suffices to form with all the potassa a neutral sulphate and an acid sulphate of ammonia with all the ammonia produced by the decomposition of the cyanate of potassa. The cyanide is to be dissolved in double its own weight of water, and the sulphuric acid, diluted with three times its weight of water, is to be gradually added in small portions, allowing the effervescence produced by each portion to subside previous to the addition of another.

Preparation of Cyanate of Potassa.

Cyanide of potassium, prepared by the method just indicated, offers an excellent means for preparing the cyanate. To prepare this salt, common litharge, which has been previously heated red hot, should be preferred. The cyanide being fused in a Hessian crucible, pulverised litharge is gradually added; the oxide of lead is reduced, and the metal remains in the form of powder mixed with the cyanate formed; by an increase of the heat it is fused into button. The fused mass, which is nothing else than cyanate of potassa, is poured out, reduced to powder, and boiled with alcohol as often as it yields crystals on cooling. This crystallization is not necessary for the preparation of urea.

Cyanide of Potassium as an Agent for Reduction.

It is not easy to convey an idea of the extreme facility with which cyanide of potassium abstracts oxygen or sulphur from certain metallic oxides or combinations of sulphur; a property in which it is the most nearly allied to pure potassium.

The preparation of cyanide of potassium and of cyanate of potassa affords two examples of this reductive power, The oxides of iron fused with cyanide of potassium are reduced with great readiness; the iron remains mixed with the fused cyanate of potassa in the form of powder, or rather as a spongy mass.

On this reduction we may found a process to ascertain, in the dry way, at a single operation, the proportion of the metal in a mineral. If we expose to a strong red heat, in a porcelain crucible, a weighed amount of the mineral with a mixture of cyanide of potassium and carbonate of potassa, the alumina and silica pass into the scoria, and the reduced iron may be separated by washing with cold water and weighed. Protoxide of manganese is not reduced by cyanide of potassium; hence, to determine its presence in a mineral of iron, a special operation becomes necessary.

If the oxide of copper be thrown into fused cyanide of potassium, it is immediately reduced with development of light and heat; and after washing there is obtained a compact button of pure copper.

The most striking reductions are those of the oxides of tin and antimony; by a feeble red heat the oxide of tin is changed into a brilliant regulus, which can be separated from the scoria as a well fused button; and in the same manner the oxide and acids of antimony may be reduced to the metallic state.

All these reductions are effected at a feeble red heat, not visible in day light; and hence the peculiar advantage that no loss can arise from the volatilization of any portion of the reduced metal.

The sulphurets of tin and antimony are reduced by a gentle fusion with cyanide of potassium, by means of a lamp, in a porcelain crucible, with much greater facility than the corresponding oxides. The scoria contains sulpho-cyanide of potassium. This reductive property is possessed by the cyanide, not only in the dry, but also in the state of solution. If, for example, we mix it with alloxane, in a few seconds there is formed a heavy, crystalline, scarcely soluble precipitate of dialurate of potassa.

Cyanide of Potassium as an Agent of Separation.

Nickel, cobalt and manganese, are so much alike in their properties, that a rigorous quantitive separation of these metals present great difficulties.

It is only under one form of combination that nickel differs from cobalt, in a manner which we can take advantage of as a means of separation. Heated with cyanide of potassium and hydrocyanic acid in excess, the oxide, or a salt of cobalt, or the chloride, &c., is converted into cobalto-cyanide of potassium, whose solution in water is not in the least decomposed by ebullition with hydrochloric, sulphuric, or nitric acid, as was ascertained by L. Gmelin.

The oxide and salts of nickel are precipitated by the cyanide of potassium; this precipitate dissolves in an excess, causing a yellow color; and the double combination of cyanide of nickel and cyanide of potassium is not completely decomposed by acetic acid, but readily by diluted sulphuric acid, and the cyanide of nickel is precipitated.

If to a mixture of the salts of nickel and of cobalt, acidulated with free acid, cyanide of potassium in excess be added, so that the resulting precipitate be redissolved, the solution will contain free hydrocyanic acid, cyanide of potassium, cyanide of nickel, and cyanide of cobalt; this last changes by heat into cobalto-cyanide of potassium; if diluted sulphuric acid be then added in the cold, the results may be presented under three forms:

Cobalt and nickel existing in the solution, in the proportion of two of the former to three of the latter, (proportions corresponding to their atomic weights in the cobalto-cyanide of nickel,) the precipitate which forms is cobalto-cyanide of nickel, of a bluish white color. The liquid, after filtration, contains neither nickel or cobalt.

The solution containing an amount of nickel less than that corresponding to the above proportions, (two cobalt, three nickel,) there remains in the liquor a certain quantity of cobalto-cyanide of potassium, and the precipitate is equally cobalto-cyanide of nickel.

If there be more nickel in solution, the precipitate contains a mixture of cyanide of nickel, and cobalto-cyanide of nickel.

In the first and second case, the precipitate formed by the addition of diluted sulphuric acid is boiled in the acid liquor, in a matrass, as long as any traces of the disengagement of hydrocyanic acid can be perceived, (or, what is better, evaporated to dryness on a salt water bath,) and then slightly heated with carbonate or hydrate of potassa in excess; the cobalto-cyanide of nickel is then decomposed into pure carbonate or oxide of nickel, which may be washed on a filter, dried and weighed, and into an alkaline liquor which contains all the cobalt. On evaporating this latter to dryness, adding a little nitrate of potassa, heating the dry residue to redness, and washing with water, all the cobalt is obtained in the state of oxide.

This process is applicable to all the analyses of cobalt minerals, where this metal predominates. With the minerals of nickel, in which the cobalt is consequently in the lesser amount, it is necessary to take care to use hydrochloric acid in great excess, to precipitate the metallic cyanides dissolved in the cyanide of potassium, and the mixture should, under these circumstances, be kept in ebullition for one hour.

In fact, the precipitate formed in this case contains cyanide of nickel, which is decomposed with the potassa into cyanide of potassium and oxide of nickel; but this cyanide of potassium retains a portion of nickel in solution.

By boiling the precipitate with hydrochloric acid, the cyanide of nickel is decomposed into chloride of nickel and hydrocyanic acid, which, by boiling, escapes, and thus no longer prevents complete precipitation. For the traces of hydrocyanic acid to disappear, it only remains to continue the boiling a sufficient length of time.

The attempts to separate the two metallic cyanides by ebullition with deutoxide of mercury in cyanide of potassium, yield less certain results.

It is necessary in this process to direct attention to the following facts:

As the cyanide of potassium contains a certain quantity of cyanate of potassa, there is formed during the decomposition by a mineral acid, a certain quantity of an ammoniacal salt, so that on ebullition, and the addition of caustic potassa, ammonia is set free, which retains a certain quantity of oxide of nickel in solution. Boiling for some minutes, or the addition of caustic potassa, causes the complete deposit of this oxide of nickel.

The same process is applicable to the separation of cobalt from manganese; only in this case a complete resolution of the precipitate, caused by the cyanide of potassium in the mixture of the salts of these metals, is not to be expected; the greater part of the cyanide of manganese remaining undissolved. This residue is to be separated by the filter, and the liquor treated as in the separation of nickel from cobalt.

The cyanide of potassium is not less advantageous in the separation of the oxide of chromium from oxide of iron.

When a mixture of these two bodies, in which care has been taken to saturate with sulphuretted hydrogen, (a few drops of hydrosulphuret of ammonia will answer,) so that the iron may be in the state of protoxide, be precipitated by an excess of cyanide of potassium, the iron immediately dissolves as ferrocyanide, and the oxide of chromium is left behind.

In certain cases cyanide of potassium may be employed with advantage to separate iron from alumina, (alumina being in great excess,) through the great solubility of the protoxide and sulphuret of this metal, and the insolubility of alumina in the cyanide of potassium.

This latter body deserves study as a general means of separation; but unfortunately, we know of the great number of double combinations which it forms with other cyanides, only the composition, and not their modes of reaction with mineral and vegetable acids; this study, therefore, requires a review of the whole subject. A. G. V.

Journ. de Chim. and de Pharm.

ART. XLVIII.—A MODE OF DISCRIMINATING BETWEEN NITRATES AND CHLORATES IN VERY DILUTE SOLUTIONS.

By M. Vogel, Jr., of Munich.

When a solution of nitrate of potassa is rendered blue by the addition of a few drops of tincture of litmus, and concentrated sulphuric acid is added, the tincture is reddened by the sulphuric acid, and by the nitric acid set free, but its color is affected in no other manner. On the contrary, a solution of chlorate of potassa, rendered blue by the tincture of litmus, is totally decolorised by the addition of concentrated sulphuric acid; a result by which the chlorate may be essentially distinguished from the nitrate.

To ascertain the extent to which the chlorate may be diluted, without losing its power of decolorising litmus, I dissolved one part of this salt in thirty-two parts of water. The colour of the litmus instantly disappeared on the addition of concentrated sulphuric acid. The same was the case when the salt was dissolved in sixty-four parts of water; but with a solution in eighty parts, the color of this litmus was not destroyed.

The decoloration of tincture of indigo took place with a much weaker solution of chlorate of potassa; for a solution of one part in 500 of water retained the power of destroying the color by the aid of sulphuric acid.

This mode of discriminating between nitrates and chlorates in dilute solutions, offers this advantage, that it affords certain results from producing the decoloration of tincture of litmus, even when the chlorates are accompanied by other salts. With this in view, I added many other salts, principally chlorides, to the solution of chlorate, without preventing the loss of colour.

The tincture of litmus is not decolorised on the addition of sulphuric acid to a weak solution of nitrate of potassa, although this salt may be accompanied by several per cent. of chloride of sodium or any other chloride; this effect is produced only in case the solution of the nitrate contains the chloride in a very concentrated state.

Journ. de Pharm. and de Chim.

ART. XLIX.—ON ANNUAL AND BIENNIAL HYOSCYAMUS.

By Joseph Houlton, M. D.

I beg leave to direct the attention of the Pharmaceutical Society to the consideration of an annual cultivated hyoscyamus which is now in season, and which has so much of the appearance of the true hyoscyamus niger, that it may be easily taken for that plant; yet a practised botanical eye can readily detect the difference.

Observing in that excellent work of Dr. Pereira's on Materia Medica, that there is an annual variety cultivated at Mitcham, I wrote to Mr. Tipple, surgeon of that place, who politely furnished me with some of the seeds, which I sowed in my garden in March last, and the plants are now in flower.

The flowering period of the true indigenous hyoscyamus niger is now, I believe, past, yet I have some reason to think that we shall for some weeks to come be supplied with a fine fresh flowering hyoscyamus, that is the annual. I was yesterday in the Royal Botanical Gardens, Regent's Park, where I saw plenty of the annual but none of the biennial hyoscyamus. I am now not surprised that authors should disagree respecting the duration of this plant. Thus we see in Alston, "*the black (henbane) is always biennial;* Bergius, *biennis;* J. A. Murray, *biennis.*" In Smith, Hooker, Duncan, &c., *annual.*

I am not at present able to determine the botanical relation of the annual to the true hyoscyamus niger in its degree of affinity, nor am I able to give any information respecting the difference in the medicinal properties of these two plants—these are two important points, and deserve to be carefully investigated; and I hope before next season we shall be in possession of that knowledge, by the labors of some who are competent to carry on the inquiries in a proper manner.

London Pharm. Transactions.

ART. L.—ON THE VARIETIES OF HYOSCYAMUS.

By Jonathan Pereira, M.D., F.R.S., &c.

In the Pharmaceutical Journal of August 1, 1842, is a communication from Mr. Houlton, on the annual and biennial Hyoscyamus niger, from which I gather that he suspects them to be distinct species, as he says "I am not at present able to determine the botanical relation of the annual to the true Hyoscyamus niger."

Having carefully examined both plants, I have no hesitation in declaring them to be one and the same species—an opinion which I have expressed in the 2d edition of my "*Elements of Materia Medica and Therapeutics*," vol. ii, p. 1222. The biennial variety is larger, stronger, and more branched than the annual one. In the *Botanical Magazine*, 2394, is a drawing of the latter, which the editor regards as a variety of Hyoscyamus niger. Both varieties have long been used in medicine and are cultivated at Mitcham; but their relative degree of power has yet to be ascertained.

It is curious to observe the different statements of botanists as to the duration of Henbane. Linnæus, Alston, Bergius, B. I. Andrew Murray, Persoon, Woodville, Lindley, and the editors of the *Beschreibung officineller Pflanzen* declare it to be biennial; whereas, Hudson, Withering, Smith, Hooker, Richard, A. T. Thomson, and the editors of the *Handbuch-der medicinisch-pharmaceutischen Botanik* state it to be annual. It is remarkable that, in the two works just quoted (the *Beschreibung* and *Handbuch*,) of both of which the late celebrated Professor T. F. L. Nees von Esenbeck was part editor, the duration of this plant is so differently stated.

Loudon, Geiger, and I. L. Wheeler declare, correctly as I believe, that the Hyoscyamus niger is both annual and biennial; and in a letter which I received some months since from

Sir W. J. Hooker, he says the *niger* "ought to be marked '*annual* or *biennial.*'"

Hyoscyamus niger differs not only in its duration (annual or biennial,) but also in the simple or branched condition of its stem, in the depth to which the leaves are incised, in being more or less hairy, in its flowers being sessile or subsessile, and in its corolla being either more or less strongly marked with violet veins, or even entirely yellow. In consequence of this, some botanists have been led to describe varieties of H. niger as distinct species. Thus the *H. agrestis* of Kitaibel, and the *H. pallidus* of the same botanist are merely varieties of *niger*. I am supported in this statement by the high authority of Sir W. J. Hooker, who tells me that he has, in his Herbarium, native specimens of both *H. agrestis* and *pallidus*, and he has no "hesitation in saying, that they are identical with *H. niger.*" Moreover, Brandt and Ratzeburg, in their *Deutschlands phanerogamische Giftgewächse* (p. 60,) observe: "From our examination of Kitaibel's original specimens in Willdenow's Herbarium, as well as from our observations of numerous plants of black henbane during their whole development from seeds, we are led to regard *H. agrestis* as a variety merely of *H. niger*. The distinguishing characters assigned, by different authors, to the former, are all found in the latter plant. *H. niger* is a true annual. It occurs small and large, as well as with or without a branching stem. Both the radical and lower cauline leaves are invariably stalked; the middle cauline ones are broader or narrower, ovate or oblong, with larger or smaller teeth. The flowers have shorter or longer stalks. The uppermost cauline leaves are always more or less entire. Lastly, on the same plant we find variations in the intensity of the color of the corolla. So that of the characters distinguishing *H. agrestis*, as given by Schultes, Roth, Mertens, Koch, Bluff, and Fingerhuth, not one is left on which we can found its claim to be regarded as a distinct species—or scarcely even as a variety β *minor*. *Hyoscyamus pallidus* is distinguished merely by the absence of the violet reticulated veins of the corolla, and, therefore, may be compared to the white flowered varieties of plants, which normally have colored flowers. It is obvious, therefore, that this cannot be admitted as a specific character."—*Ibid.*

ART. LI.—PROTOSULPHURET OF IRON, A NEW ANTIDOTE FOR CORROSIVE SUBLIMATE.

By M. Mialhe.

It results from my experiments, that the protosulphuret of iron, a totally inert article, instantly decomposes corrosive sublimate, giving rise to two inoffensive compounds—protochloride of iron and deutosulphuret of mercury. This invaluable property leads me to announce the protosulphuret of iron, in the form of hydrate, as affording by far the best antidote for this poison.

At some future time I will publish the details of my chemical researches, as well as the results of the physiological experiments which I propose to institute on this subject. In the mean time, I advance a chemico-physiological proof in favor of the efficacy of this antidote which appears to possess real value.

Whenever a few centigrammes of corrosive sublimate is placed in the mouth, it immediately produces its characteristic insupportable metallic taste. It is then sufficient to wash out the mouth with the hydrated protosulphuret of iron, in the state of a thin pulp, a condition in which it should always be used, to cause all the metallic taste to disappear as if by enchantment. This fact needs no commentary. It speaks for itself, without need of any explanation.

This antidote is not restricted in its effects to the soluble compounds of mercury—it serves also to destroy the injurious action of many other metallic salts, and particularly those of copper and lead.

To prepare the protosulphuret of iron, any quantity of pure protosulphate of iron is to be dissolved in at least twenty-four times its weight of distilled water, which has been boiled to drive off any atmospheric air; this solution is to be precipitated by a sufficient quantity of protosulphuret of sodium, likewise dissolved in boiled distilled water. The protosulphuret of iron thus formed is to be washed with pure water, and preserved for use in a closely stopped bottle, which is to be completely filled with distilled water.

Although the protosulphuret of iron may be made in a few moments, it is nevertheless proper that it should be kept ready prepared, to avoid the loss of any precious moments in a case of poisoning.

The direction to preserve this sulphuret from contact of the air should be very strictly followed, as this compound has a strong tendency to pass to the state of sulphate.

Journ. de Pharm. and Chim.

ART. LII.—ON THE PURIFICATION OF SULPHURIC ACID.

By M. Jaquelin.

Sulphuric acid of commerce contains a certain quantity of nitrous acid, the presence of which is rendered manifest on the addition of proto-sulphate of iron, by the assumption of a violet tint, while with the pure acid no color is produced.

It was long since proposed to boil the impure sulphuric acid with flowers of sulphur, which becoming acidified at the expense of the oxygen of the nitrous acid, destroys this latter, and thus purifies the acid. More recently M. Pelouze has proposed the addition of a certain quantity of sulphate of ammonia, and distilling; the ammonia and nitrous acid, by reaction, are changed into water and protoxide of nitrogen. M. Jaquelin proposed to treat the sulphuric acid at first with flowers of sulphur, then the product by chlorine, to convert into sulphuric acid any sulphurous acid which it may contain. The sulphuric acid is then to be boiled to drive off the excess of chlorine and the hydrochloric acid formed.

According to M. Jaquelin, narcotine, which is recommended as a reagent for the detection of nitric acid in sulphuric acid, on account of the fine red color produced, is not to be relied on, since even to pure sulphuric acid it communicates a yellow color, which might produce an error.

Journ. de Pharm. et de Chim.

ART. LIII.—PREPARATION OF PERCHLORIC ACID.

By M. Ad. Nativelle.

Perchloric acid, so valuable as a reagent, is seldom met with in our laboratories. This arises no doubt from the small quantity of the acid which is obtained by using the proportion of sulphuric acid generally directed in books, rather than from any difficulty in the operation, which, in itself, is sufficiently simple. It is merely necessary, as is known, to introduce into a glass retort, one part of perchlorate of potash with half its weight of sulphuric acid diluted with a third part of water, and apply heat to obtain the perchloric acid, much diluted it is true, and in very small quantity in proportion to that of the perchlorate employed. On examining the phenomena which take place in this operation, it will be observed, that the water employed to dilute the sulphuric acid first passes over without any acidity, and although at this period of the operation, the contents of the retort are in active ebullition, nearly the whole of the perchlorate remains undissolved. It is not until a subsequent period, when the sulphuric acid has regained its original concentration, that a part of the perchlorate begins to be decomposed, but as the proportion of sulphuric acid is much too small for the perchlorate of potash used, the distillation proceeds very slowly, and a part of the free perchlorate is decomposed by the heat, as it would be if alone, into oxygen and chlorate of potash. This chlorate, aided by the action of the heat and the surrounding acid, is easily decomposed into oxygen and oxide of chlorine, and even chlorine. These gases are disengaged during the continuance of the operation, and if at the end of the process, the residue contained in the retort be examined, a large proportion of the perchlorate will be found unacted upon. As for the product of the distillation, as I have already stated, it is but slightly acid, especially if the precaution has not been adopted of rejecting the portion first distilled over, which is nothing but pure water.

Notwithstanding the very diluted state of the perchloric acid obtained in this way, still it reacts very well on the salts of potash; it is this probably that has led to the belief, that the whole of the salt contained in the retort had been decomposed, and that the perchloric acid obtained, represented very nearly the salt employed, which is far from being the case, independent of the partial decomposition of the perchlorate into its elements by the mere action of the heat.

If the operation be well observed, it will be seen that the water added to the sulphuric acid is useless. or nearly so, and that the quantity of sulphuric acid is insufficient for the decomposition of the whole of the perchlorate; because here, contrary to the ordinary law of substitutions, the influence of mass, a sort of union of forces, if I may be allowed the expression, is required to overcome the pre-existing affinity; the perchloric acid being capable, under certain circumstances, to displace the sulphuric. Having arrived at this point, it only remained to determine the proportion of sulphuric acid necessary to decompose the whole of the perchlorate. This proportion I will now give, and although at first sight, it may appear arbitrary, it is nevertheless indispensable for obtaining the whole of the perchloric acid.

Introduce into a glass retort 500 parts of perchlorate of potash, deprived as much as possible of any chlorate, and reduced to powder; add 1000 parts of sulphuric acid at 66°, free from nitric acid; then add 100 parts only of distilled water. This small quantity of water is not indispensable, for it will be seen further on, that by omitting it, the perchloric acid is immediately obtained in the solid form, in crystals. Fit to the retort a long adapter, terminating in a tubulated receiver, surrounded with cold water. It is necessary to avoid luting the apparatus with paper, or any other organic substance, for this, when heated and in contact with the vapors of perchloric acid, would soon cause a decomposition, accompanied with slight detonations: if the apparatus be well adjusted, the use of lutes may be avoided, but if found necessary, a little asbestus will answer the purpose. On carefully applying heat, the whole of the perchlorate will soon dissolve, and some management will be necessary, in regulating the heat, to prevent a quantity of sulphuric acid from passing over in the distillation. The best way to regulate the operation is to avoid ebullition, by always keeping the heat a little below that point. In this way very little sulphuric acid will pass over, and this may be known, for perchloric acid rises in vapor at 316° Fahr., a temperature much below that at which sulphuric acid distils. It may be ascertained that the operation is terminated by the residue in the retort being quite transparent and yet colorless, or still better, by the drops coming over slowly, although the temperature is nearly sufficient to carry over the sulphuric acid. The quantity resulting from the distillation will vary in each operation, according to the manner in which the process has been conducted; this difference depending upon the greater or less quantity of sulphuric acid, which is carried over in the distillation. As an average, the above process, conducted with care, yielded 300 parts of impure acid of about 45° density from the quantity specified of perchlorate. Should the operation be conducted too fast, the density of the impure acid will be nearly that of sulphuric acid, and the quantity equal to the perchlorate employed.

It is very easy to render this acid pure, by removing the sulphuric acid and the small quantity of chlorine which it contains. For this purpose, it is first to be shaken with a slight excess of a saturated solution of sulphate of silver; the chlorine will be precipitated with the silver; this precipitate is to be separated with a filter, and the acid put into a large capsule; hydrated carbonate of baryta, prepared artificially and well washed, is now to be added until the whole of the sulphuric acid has been thrown down, and a small quantity of perchlorate of baryta formed; the precipitate is again to be separated by a filter. The liquor will now contain nothing but perchloric acid, combined intentionally, with a small quantity of the perchlorates of silver and baryta. It is next to be placed in a tubulated retort, and distilled by a gentle heat with the same apparatus as that used in the previous operation, and with the same precautions as before. As the liquor which first distils over is merely water, it should be received into a capsule, and the receiver should not be adapted until it has been ascertained, by means of test-paper, that the acid is coming over. In general, the more slowly the operation is conducted, the less water will be retained in the retort, and the greater the density of the acid. It is well to put a few pieces of ice into the water used for cooling the receiver. The distillation may be carried on almost to dryness, always taking care to avoid the decomposition of the perchlorates of silver and baryta, which should remain as the residue. The perchloric acid thus obtained is perfectly pure, colorless, and transparent, its density varies from 60° to 65°, it is oleaginous, like sulphuric acid. From 500 parts of pure perchlorate of potash, I have obtained 150 parts of concentrated acid.

In a future communication, I will give the process for obtaining the pure perchloric acid in crystals.

Journal de Pharmacie.

ART. LIV.—RESEARCHES ON MM. VARRENTRAPP AND WILL'S METHOD OF ANALYSIS. By M. REIZET.

M. REIZET has given an attentive examination to the new process recommended by MM. Varrentrapp and Will, for the determination of Nitrogen in the analysis of organic substances. This process* is founded on the general law, that organic substances are decomposed under the influence of the fixed alkalies, into water, and carbonic acid, and, when nitrogen is present, ammonia. It results from the experiments of M. Reizet, that this process is not free from sources of error. In the first place, the mixture of lime and soda retains a portion of atmospheric air in a peculiar state of condensation; this air cannot be separated either by a current of gas or by the influence of a vacuum. During combustion the nitrogen of this air gives rise to ammonia, and consequently increases the resulting amounts of this compound. Faraday has some time since remarked that, organic bodies, not containing nitrogen, carbon itself, and those metals which decompose water, yield ammonia, when calcined in contact with air and potassa.

Another source of error is, that the alcohol in which the perchloride of platinum is dissolved, reduces this salt into insoluble protochloride ; this reduction takes place slowly—nevertheless there is sufficient of the protochloride formed to increase the weight of the ammoniacal salt of platinum, and consequently augment sensibly the estimation of the nitrogen. It is inexplicable how MM. Varrentrapp and Will have always obtained less nitrogen than theory would indicate in the objects of their analysis, since the cause of error would tend to give an excess, unless it be admitted that, during the pro-

---

* See page 141 of this Volume.

cess, nitrogen is disengaged, either in a free state, or under some other form than of ammonia—or, that this latter gas has not been totally condensed.

Journ. de Pharm. and Chim.

ART. LV.—ON A VERY SIMPLE AND CORRECT METHOD OF SEPARATING AND DETERMINING THE QUANTITIES OF POTASH AND SODA WHEN PRESENT ALONE, OR ACCOMPANIED WITH MAGNESIA IN A SOIL OR OTHER MIXTURE. By MR. WILLIAM HORATIO POTTER, M. R. A. S.

Now that it is almost universally acknowledged, both by the chemist and the agriculturist, that the alkalies *Potassa* and *Soda* exercise a very important function in every *fertile* soil, anything tending to simplify the method of separating them when occurring together, and the ascertainment of their relative proportions, cannot fail to be esteemed by those who are interested in either science, as a matter of considerable moment. Hitherto it has been reckoned, and that justly, to be one of the most difficult problems that chemistry proposes for our solution, to discriminate in a simple and correct manner between the two fixed alkalies Potassa and Soda, and to effect their accurate separation.

The difficulty and complexity of the case, is very much enhanced if *magnesia* is also present, as is very frequently the case, and much time is necessary to arrive at a correct result.

Since it has become a matter of prime importance in the analysis of soils to estimate the quantity of the alkalies they contain, I was led to consider whether a concise, yet exact method might not be devised for accomplishing this object, and I am now prepared to place before your Society my new plan, and to detail some of the experimental results which confirm its exactness and general applicability. Its simplicity will be best demonstrated by contrasting it with the directions given by that most excellent chemist Berzelius, than whom no analyst deserves more of our praise or confidence, or has done more towards bringing analytical chemistry to that high standard of perfection to which it has now attained.

After setting before chemists the two processes, and assuring them that the second does not yield in accuracy to the first, I shall leave it for them to choose which they will in future employ.

Berzelius's words are these, which I translate from the French of M. Essligen.

"If it should happen that both alkalies be present, it is *very* (assez) *difficult* to separate them, so as to determine their exact proportions. Of several modes I have tried, the following has suceeeded the best ; we mix the salt obtained (chloride or chlorides,) with three and three quarter times its weight of crystallized chloride of platinum and sodium, this being the precise quantity necessary for the potassium to replace the sodium contained in the double salt, on the supposition that the salt we are examining is nothing but chloride of potassium.

"We dissolve the mixture in a very little water, and evaporate to dryness, by a gentle heat, then we treat it with alcohol, which dissolves the chloride of sodium, and the chloride of platinum and sodium, but it does notdissolve the chloride of platinum and potassium, which is to be washed with alcohol, and then dried and weighed ; 100 parts of this salt contain 30.86 of chloride of potassium.

"The deficiency of the original weight is chloride of sodium. The quantity of pure alkali corresponding to these chlorides iscalculated from the tables.

"*Remark.*—It is not equally advantageous to use the simple chloride of platinum, because an excess of this salt must be employed, which is easily decomposed by alcohol, in which, however, the chloride of platinum and sodium is soluble without decomposition."

Again, when magnesia is likewise present, he says:

"When a mineral contains magnesia, we always obtain this earth as a sulphate of magnesia, combined with sulphate of alkali. Its presence is discovered by pouring into the concentrated solution of the salt a large excess of strong caustic ammonia, which precipitates part of the magnesia. In this case, we evaporate to dryness, in order to volatilize the ammonia, and we treat the residual salt (as we have just said) with acetate of barytes. If, after the combustion of the acetic acid, the residue is treated with water, this liquid dissolves the alkali and leaves the magnesia mixed with carbonate of barytes. This earth may be separated by means of a sulphuric acid."

The latter quotation refers solely to the mode of separating the magnesia: if the portion dissolved by the water should contain *both* alkalies, the operose process described in the first, will have to be performed.

My method is founded upon the property of a *saturated* solution (at a given temperature) of sulphate of potassa being capable of dissolving sulphate of soda, while it is of course totally incapable (the temperature being the same) of dissolving any more of the sulphate of potassa. This appears pretty evident, but it was necessary to prove, by actual experiment, whether the presence of a soda salt might not influence this insolubility, either by the formation of a double salt or from some other cause. I accordingly prepared some pure sulphate of potassa by saturating exactly, crystallized bicarbonate of potassa with pure sulphuric acid, evaporating and igniting in a platinum crucible. I prepared also some pure sulphate of soda, in a similar manner from pure carbonate of soda.

I then mixed a known weight (nearly equal) of the two salts, by rubbing them to fine powder, and submitted the mixture for about an hour (taking care to keep the temperature uniform) to the action of a sufficient quantity of a saturated solution of sulphate of potassa which refused to dissolve the minutest portion of sulphate of potassa, when added in the finest powder. It was then filtered through two counterpoised filters, and washed with a little of the saturated solution. The filters were then put between folds of bibulous paper, and pressed with a weight, and dried thoroughly by a heat just insufficient to char the paper, until there was no further loss of weight. The weight of the sulphate of potassa cellected on the inner filter (obtained by the difference of weight of the two filters,) corresponded exactly with that known to exist in the mixture. The weight of the sulphate of potassa collected on the inner filter, (obtained by the difference of weight of the two filters,) corresponded exactly with that known to exist in the mixture. The weight of the sulphate of potassa thus obtained, deducted from the weight of the mixed salts, gave of course that of the sulphate of soda.* I have been thus particular in mentioning the *manipulation*, in order that the process may succeed equally in other hands than my own. Having attained such an exact result in a simple mixture of sulphates of alkalies, I was anxious to know whether my plan was equally applicable, in combination with the ammoniacal phosphate of soda, to the separation of magnesia: and here I had occasion to notice the interference of the formation of a double salt in vitiating the result. My first trial was directed to the dissolving out of the mixture of sulphates, the sulphates of magnesia and soda; by the saturated solution of sulphate of potassa, expecting that the sulphate of potassa would be left intact, as in the former case; but I found that it did not weigh much more than half the proper quantity. This I repeated more than once with a similar result.

I proceeded, however, to precipitate the magnesia by the double phosphate, which gave the quantity correctly. I then altered my plan, by dissolving the mixed salt in a small quan-

---

*The quantities of the pure alkalies are to be obtained by calculations from the known composition of their sulphate.

tity of *water*, and then added a sufficient quantity of double phosphate to precipitate the whole of the magnesia; I assisted the separation by a gentle heat, received the precipitate on a double filter, washed with a little water, and dried on filter, at about 100° Fahr. By calculating the ammonio-phosphate of magnesia thus procured, to contain nineteen per cent. of magnesia (which was proved by a comparative experiment made exactly in the same way with Epsom salts alone,) it gave me the original quantity in the mixture. I also submitted the ammonio-phosphate of magnesia to a red heat, and calculated the magnesia from the remaining magnesian phosphate (allowing thirty-nine per cent. magnesia,) with the same result. It now remained to separate the two alkalies; which was done by procuring their sulphates, by evaporating the filtered liquor and washings, and proceeding as in the first case.

It should not be concealed that there was a little deficiency here in the obtained weight of the sulphate of potassa, and consequently a corresponding inferred weight in the sulphate of soda, arising undoubtedly from the impossibility of copiously washing the ammonio-magnesian phosphate, on account of its partial solubility.

I have proved, by my own experience, the simplicity and speediness of the operation, by separating and weighing the three substances in little more than two hours.

London Pharm, Transactions.

ART. LVI.—TABLE OF THE DENSITIES OF ALCOHOLIC LIQUIDS. By H. Beasley.

The annexed table, drawn up for my own use from the best sources within my reach, may, perhaps, be acceptable to some of your readers. I trust it will be found sufficiently correct for all practical purposes; but should any material error have been overlooked, I shall be obliged to any correspondent who will point it out.

Table of the Densities of Alcoholic Liquids employed in Pharmacy, showing the corresponding degrees of the principal Areometrical Scales.

	Specific Gravity at 60° Fahr.	G. Lussac's Alcoholometer, at 59° F	Sykes's Hydrometer, at 60° Fahr.	Baume's Areometer at 59° F.	Cartier's Areometer at 59° F.
ALCOHOL ABSOLUTUM			Over proof.		
Gay Lussac's - - - -	794.1	100		47.2	44.19
Ed. Ph. - - - - -	796	99.6		47	44
Paris Codex - - - -	796.4	99.5		46.7	43.7
	799	99		46.2	43.2
	800	98.8		46	43
	808	97	70.7 ?	44	41.3
Dub. Ph. Alcool a 40–42° P. C.	810	96.6	69.7	43.7	41
L. Ph. and Ed. 1817 -	815	95.3	67.2	42.7	40
Amst. Ph. - - - - -	820	94	65	41.6	39
SPIRITUS RECTIFICATISSIMUS					
Hann. Ph. - - - - -	822	93.4	64	41	38.5
	824	93	63	40.7	38¼
Austr. and Swed. Ph. -	830	91.2	60	39.5	37
SPIRITUS RECTIFICATUS					
	834	90	57.8	38.6	36.2
L. 1824, Ed. 1817, Amer. Ph. - - -	835	89.7	57.3	38.5	36.1
New L. and Ed. Ph. Alcool repurgatus, Paris C. - - - -	838	88.8	55.8	37.7	35.6
Dub. Ph. - - - - -	840	88.2	54.8	37.4	35.1
Alcool a 86 cent. P. C.	847	86	50.8	36	33.8
Austr. Ph. - - - -	850	85	49	35.4	33.3
SPIRITUS COMMUNIS					
Alcool du Commerce, P.	863	80.5	41	33	31
	867	79	38	32	30.3
	900	66	15.6	26	24.6
SPIRITUS TENUIOR					
L. and Ed. Ph. - - - Dub. Ph.	920 919.4	57	0	22.5	21.4
			Underproof		
Alcool faible, P. C. - -	923	55.7	2.5	22	21.2
	927	53.8	6	21.3	20.4
L. 1824, and Dub. 1807	930	52.3	8.3	21	20
Ed. 1817 - - - - -	935	50	13	20	19.2
	940	47	18	19	18
	952	40	30	17.2	16.6
	1000	0	100	10	10

The numbers on Gay Lussac's scale denote the per centage, by measure, of absolute alcohol; those of Sykes's hydrometer the excess or deficiency, per cent., of *proof spirit* in the sample. The Batavian scale is 10 less than Baumé's throughout, water being 0 instead of 10.

ART. LVII.—ON THE ADULTERATION OF SENNA.

By Jacob Bell.

Although it is well known that the leaves of Alexandrian senna are invariably mixed with a certain proportion of the cynanchum arguel, no decisive measures have yet been adopted to put an end to this fraud ; other leaves are occasionally found in it, but the above is the adulteration which chiefly demands our attention, from the circumstance that it is systematically practised to so great an extent as to affect materially the quality of the drug. Alexandrian senna contains a mixture of two or more species of true senna. It consists principally of the cassia lanceolata, with a few leaflets of cassia obovata and cassia obtusata, and, according to some authorities, it sometimes contains cassia acutifolia. This mixture is unimportant, but the cynanchum, which generally constitutes a fifth of the weight on an average, possesses properties differing in some respects from true senna, and which render it particularly objectionable.

Dr. Christison has paid considerable attention to this subject; and in order to test the quality of the cynanchum, he administered it to several patients, prepared in the same manner as the senna which he was in the habit of prescribing. He found that it produced much griping, flatulence, and uneasiness, with a very scanty purgative effect, and he attributes the unpleasant effects and nauseous taste frequently ascribed to senna, to the leaves of cynanchum contained in it. It is chiefly on this account that the Alexandrian senna is seldom used in Edinburgh, the Tinnivelly senna having almost entirely taken its place.

Dr. Christison mentions a case in which a patient, who had been in the habit of taking a syrup of Tinnivelly senna, being supplied with the same preparation in which the Alexandrian had been substituted, was extremely annoyed at the griping and unsatisfactory effect. On examining the leaves, they were found as usual much adulterated with the cynanchum. A syrup was prepared from the Alexandrian senna, from which the spurious leaves had been removed, and the result was as good as that obtained from the Tinnivelly ; but this process being attended with too much trouble to admit of its being generally adopted, there appeared to be no advantage in using Alexandrian senna while the Tinnivelly was free from objection.

This is a question which deserves the consideration of the Pharmaceutical Society, as it ought to be decided which kind of senna is actually the best, and if we give the preference to the Alexandrian, in accordance with the usually received opinion, we ought to take steps for preventing an adulteration which is calculated to bring the article into disrepute. In cases of this kind individuals have but little opportunity of effecting a reformation ; but a society, one object of which is to improve the quality of our Materia Medica, is in a position to exert a beneficial influence. The Alexandrian senna, like every other commodity, is collected and brought into the market according to the demand, and while we are willing to submit to the imposition, and offer no opposition to the circulation of a spurious article, it is not likely that the collectors will discontinue their present practice.

But it is our duty as a public body to issue proper instructions respecting the importation of drugs, and by publishing among our members an exposure of any fraud, with the means of detecting it, we shall confer on a genuine article that comparative value which will ensure a constant supply in the market. There is one objection to the general adoption of the Tinnivelly senna, which is, that the quantity imported into this country is not nearly sufficient to meet the demand. It is cultivated only on one estate at Cape Comorin, and in the event of a deficiency the other varieties of East India senna (Bombay or Madras) might be substituted. As these are inferior in quality, it is necessary to observe the distinction. The Tinnivelly senna is known by the size of the leaflets, which are much larger than those of any other variety; they are also less brittle, thinner, and larger, and are generally found in a very perfect state, while the other varieties, especially the Alexandrian, are more or less broken.

The leaves of the cynanchum are similar in form to those of the lanceolate senna, but they are thicker and stiffer, the veins are scarcely visible, they are not oblique at the base, their surface is rugose, and the color gray or greenish drab; their taste is bitter and disagreeable, and they are often spotted with a yellow intensely bitter gummo-resinous incrustation. Being less fragile than the leaflets of true senna, they are more often found entire, and are very easily distinguished from the varieties which constitute true Alexandrian senna. In their botanical characters they are essentially different, being distinct leaves, and not leaflets, which is the case with true senna.

Lond. Pharm. Journ. and Trans.

ART. LVIII.—ON AN EXPLOSIVE COMPOUND FORMED DURING THE DISTILLATION OF HYDROCYANIC ACID.

By Mr. Alsop.

The late catastrophe at Apothecaries' Hall, on the preparation of fulminating mercury, has recalled to my recollection a circumstance which took place several years since which may probably be interesting to the members of the Pharmaceutical Society.

At the time adverted to, I was residing at the house of John Bell and Co. and we were accustomed to prepare hydrocyanic acid, by distilling the bicyanide of mercury with hydrochloric acid ; on one occasion the process was stopped before the whole of the prussic acid had been evolved from the materials in the retort, which were therefore reserved to be added to a future distillation. This liquid, retaining strongly the hydrocyanic odour, was transferred to a stoppered phial and kept in a dark closet for two or three months. It was subsequently submitted to distillation, together with fresh materials, in a retort capable of holding about four pints, and which was more than half full. The heat of a lamp had not long been applied to it, when an opalescent appearance was manifested, and a gradual formation of exceedingly minute and pearly crystals was observed to pervade the liquid. This was doubtless no other than fulminating mercury. At first it was supposed to be protochloride of mercury, arising from the decomposition of a protocyanide which appears sometimes to be formed by acting on Prussian blue, and therefore did not attract much attention, notwithstanding its suspicious appearance. This deposit continued to increase ; it was left for a few minutes, and happily no one was present, when the laboratory was shaken by a most alarming explosion. The contents of the retort were discharged on the ceiling, showing that the explosion had taken place from the bottom, to which the deposit had subsided. The fragments of the retort were also entirely dispersed—tradition says, "they were no where to be found." The laboratory man in alarm rushed into the apartment, and was in great danger from the hydrocyanic vapor, when he was hastily removed.

The circumstance is curious, as presenting the formation of this dangerous substance where it was quite unlooked for; and, although the fulminic acid appears to be isomeric with the cyanic, it is rather difficult to account for the formation of an oxygen acid united with an oxide, from the elements concerned, *viz.*: bichloride of mercury, bicyanide of mercury, and hydrochloric and hydrocyanic acids, unless in some way water had been decomposed, and the hydrogen liberated or disposed of. The bicyanide was prepared by boiling red precipitate with Prussian blue; whether, in this instance, well crystallized salt only was employed, I cannot now say, but on considering the subject, I strongly incline to the opinion, that nitric acid must have been present, probably from its not having been perfectly expelled in the preparation of the red precipitate.

While on this subject, I will advert to a remark common in early chemical works, that hydrocyanic acid has the property of expanding to five times its bulk any gas with which it may be mixed, and that many dangerous explosions have arisen from this cause, on which account capacious vessels are directed to be employed in its preparation. I have never observed any such mischievous expansibility in the ordinary form in which it comes over, and should explosions have arisen from the concentrated acid, I should rather apprehend it might have arisen from its passing into the gaseous state by change of temperature in vessels not large enough to allow of its expansion, or not strong enough to bear it, rather than from any mysterious propensity of outriding any other gas with which it may come in contact. Another conjecture arises, whether these early operators may not have encountered unawares, some of these dangerous fulminates or niturets.—*Ibid.*

ART. LIX.—OBSERVATIONS ON DISCOLORATION OF THE SKIN FROM THE INTERNAL USE OF NITRATE OF SILVER, AND ON THE MEANS OF PREVENTING AND REMOVING THAT EFFECT.

By CHARLES PATTERSON, M. D.

NITRATE of silver is undoubtedly a medicine of great service, especially in the treatment of various spasmodic diseases, but the danger of producing discoloration of the skin by its internal administration, prevents its employment as extensively as might otherwise be the case. It must therefore be an object of importance to devise some means of preventing that untoward effect.

Dr. Patterson first quotes the opinions of Dr. A. T. Thomson on the subject, who supposes that the nitrate is taken into the circulation undecomposed, and, arriving in that state at the capillaries of the skin, is there decomposed, and converted into chloride of silver, which is deposited in the rete mucosum. The chloride, he says, acquires a gray leaden color from its contact with animal matter; and, as it is insoluble, it is incapable of being reabsorbed, is fixed in the rete mucosum, and a permanent stain is given to the skin. Dr. Thomson suggests that, by ordering diluted nitric acid, at the time of administering the salt, its decomposition may be effected.

In opposition to these views of Dr. Thomson, Dr. Patterson quotes various experiments which he has made, and then brings forward his own conclusions, viz. that the chloride of silver is not the coloring ingredient on which the blackness of the skin depends; but that the discoloration of the skin is most probably owing to the decomposition of the chloride of silver circulating in the cutaneous tissue through the chemical action of the sun's light, and the deposition there of its metallic basis. All persons are not subject to this accident; for the influence of the sun's rays can only be effective in those cases where the cutis is more than ordinarily vascular and is clothed with a thin transparent cuticle.

The permanence of the stain is not easily accounted for; but it would seem that the metals constitute one class of substances for which the absorbents have no attractive affinity, as is shown in those instances where bullets have remained for years in the body, in the use of metallic ligatures, and in the internal exhibition of quicksilver.

Means of Prevention.—Nitric Acid.

Dr. Patterson considers that the contemporaneous administration of nitric acid, with the intention of preventing the decomposition of the nitrate of silver, must be entirely useless. The nitric acid undergoes decomposition in its passage through the circulation, and consequently can hardly reach the surface of the body to influence the chemical changes there in operation: and even if it did, and met with nitrate of silver there, its action would be to promote and not to retard the formation of the chloride of that metal; for this reason, that coming into contact with the soluble muriates, it would decompose the muriatic acid, with the evolution of free chlorine,

The conclusion to which Dr. Patterson comes on this subject is, that the only way to prevent all risk of discoloration, would be to substitute for the nitrate, some preparation of silver not liable to be acted on by chlorine, or the sun's light. And happening to be employed in some photographic experiments, his attention was directed to the property displayed by solutions of the iodide of potassium in rendering nitrate of silver insensible to the influence of the sun's rays. When a piece of paper was washed with solution of nitrate of silver, and then immediately immersed for a few seconds in a solution of hydriodate of potash, its color, even when exposed to the strongest sunshine, remained unaltered. It was evident, in this process, that the hydriodate and the nitrate were both decomposed, and that an ioduret of silver was the result. It then remained to be determined whether, in contact with animal matter or medicinally administered in combination with chemical agents, it would retain that power.

To ascertain this point various experiments were executed;—the ioduret was mixed with different animal and vegetable substances, and submitted to the action of different chemical agents, and then exposed to the action of the sun, without, however, producing the least change of color.

Having thus satisfied himself as to the chemical habitudes of the ioduret, Dr. Patterson's next endeavors were directed to ascertain its therapeutic effects. The first and principal class of diseases in which opportunities were afforded of administering it, were those various stomach affections to which the Irish peasantry are so very liable, and in which the internal use of nitrate of silver has been found to be most generally successful. They, therefore, afford the best criterion whereby to judge of the comparative efficacy of the ioduret.

In such, a number of which Dr. Patterson relates, it proved almost uniformly beneficial. In epilepsy the result was not so satisfactory; but as the medicine was only administered in two cases, it has not had a fair trial in that disease. In hooping-cough it had variable success, but where that complaint was uncomplicated with fever or bronchitis, the ioduret appeared to produce an immediate improvement in the spasms, and hastened the final abatement of the cough. Sufficient time, however, has not yet been afforded, to allow of any definite conclusion to be come to on the subject.

Removal of Discoloration of the Skin.

Dr. Patterson considers that "there can scarcely be a doubt that in those cases, where the skin has become discolored from the long use of nitrate of silver, the discoloration may be removed by the internal and external employment of suitable preparations of iodine."

The following is the formula which Dr. Patterson employs for the administration of the ioduret of silver.

℞. Iodureti argenti, Nitratis potassæ, } *aa.*	gr. x.
Tere simul ut fiat pulvis subtil. dien adde	
Pulv. glycyrrhizæ,	ʒss.
Sacchari albi,	℈j.
Mucil. arab.,	q. s.
♏. Fiant pil. xl. quarum sumat æger j. ter in die.	

Med. Chirurg. Rev., Oct. 1842, from *Dublin Med. Press*, Aug. 24, 1842.

ART. LX.—ANTIDOTE TO CORROSIVE SUBLIMATE.

By J. M. Wallace.

The October number of the American Journal of the Medical Sciences contains, under the head of Progress of the Medical Sciences, the following:—

"*Antidote to Corrosive Sublimate.*—M. Mialhe, in a note read to the Academy of Paris, August 16, states, as the results from his experiments, that the hydrated proto-*sulphate* of iron (a substance quite innocuous,) possesses the property of instantly decomposing corrosive sublimate. The products of the decomposition are the proto-chloride of iron, and the *bisulphate* of mercury, inert substances." Page 496.

There is obviously an error here. The only precipitate procured by this preparation of iron is the peroxide. The translator has no doubt mistaken proto-*sulphate* for proto-*sulphuret*, and *bisulphate* for *bisulphuret.* The former substance (proto-sulphate) has no effect in decomposing corrosive sublimate, but the latter (proto-sulphuret) *is* an antidote and acts by double decomposition. The mode of preparing this new antidote may not be without interest.

Add a solution of sulphuret of potassium (Hepar sulphuris) to a solution of proto-sulphate of iron, (copperas,) and the black proto-sulphuret of iron is precipitated. Wash this with water, and you have the antidote ready for use. When this is added to a solution of corrosive sublimate, the reaction is such, that two equivalents of proto-sulphuret of iron, and one equivalent of bichloride of mercury, yield two equivalents of the protochloride of iron, and one equivalent of the bisulphuret of mercury, or vermilion, and not the slightest trace of mercury is found in the filtered liquid. We have thus an antidote for corrosive sublimate, as efficient as the hydrated sesquioxide of iron for arsenic.

While on this subject, I may mention that I have just witnessed another proof of the efficacy of the latter article. A child, eighteen months old, ate some bread and butter, on which arsenic had been thickly spread for rats; he was at a distance from the city, and the iron was not procured for two hours after the poison had been taken. He is now recovering without a bad symptom. In this case the freshly prepared article was procured by Mr. Procter, in *eight minutes* from the time he received the order, by precipitating from a solution of the persulphate of iron by ammonia, as recommended by him in his paper published in the Journal of the College of Pharmacy, and in the Medical Examiner, for this year, p. 295.

Medical Examiner, October 8, 1842.

ART. LXI.—PREPARATION OF DECOCTUM ALOES COMPOSITUM.

Mr. Maddock, of Tunbridge Wells, in a communication on this subject, alludes to the great difference which exists in this preparation, as obtained from different houses; and ascribes this difference to the length of time during which it has been kept—the aloes and myrrh being gradually deposited, until at last the decoction is left nearly destitute of these ingredients.

He says, "The plan I adopt is to follow the Pharmacopœia implicitly, as to articles and quantities ordered; but instead of boiling the saffron with the other ingrediednts, I first make an infusion of it in a small quantity of boiling water, which infusion is added to the tincture, and the almost spent saffron added to the other articles, to be boiled the proper time, completing the process by an accurate attention to the quantity of the required product. By this means much of the flavor of the saffron is preserved, which, by boiling, is dissipated to a great degree; but the question is, What is next to be done? I would beg to suggest, that the decoction should be allowed to stand twenty-four hours to cool and deposit, after which it should be filtered through paper; and subsequently, whenever used, that the deposit that will still continue to form, should be as much as possible combined with the decoction by agitation, so that something of an uniform preparation may be kept by all."

We agree with Mr. Maddock that this preparation is subject to considerable variation, resulting not only from the degree of care which is bestowed in making it, but also from changes which necessarily take place, and which occur when no deviation has been made from the instructions of the Pharmacopœia. It is very desirable, therefore, that some means should be devised whereby the uniformity in appearance and operation of this valuable medicine may be ensured.

The principal cause of the deposition of so much of the aloes, when the decoction has been kept for some time, may be traced, we believe, to the action of the heat during its preparation. A large proportion of the aloes and of the myrrh is soluble in solution of carbonate of potassa, even without the aid of heat, the insoluble parts being, according to some eminent authorities, more highly oxidized in their constitution, and more irritating in their effects, than those that are dissolved by this menstruum. By the continued application of heat, a change is effected in the soluble constituents, which are thus rendered to a certain extent insoluble, while the mucilage of the myrrh, together with the extract of liquorice, tend to prevent the immediate deposition of the insoluble particles: a portion of the volatile oil of the saffron is also driven off during the boiling.

Thus upon the care bestowed in preparing it—upon the degree of heat applied in the boiling, will in a great measure, depend the constitution and the effect of the medicine; and as it is impossible, according to the instructions of the college, to define or to regulate exactly the heat applied, it follows as a necessary consequence, that decoction of aloes made according to the Pharmacopæia, is seldom met with twice alike.

A preparation possessing, we believe, all the properties of that designed by the college, and not subject to the same variations, may be obtained by making an *infusion* instead of a *decoction*, and, we trust, the college in a future edition of their Pharmacopæia will consider the propriety of making this alteration in the formula: it would be in strict accordance with the mode of proceeding directed in another case namely, that of the purified extract of aloes, in which the aloes is ordered to be macerated with the water at a gentle heat for three days, and the clear liquor decanted from the dregs. *Lond. Pharm. Journ. and Trans.*

ART. LXII.—COMPOUND OF BORON AND OXYGEN.[1]

AC'IDUM BORA'CICUM.—BORACIC ACID.

History.—Beccher (Thomson's *History of Chemistry*, vol. i. p. 248. Lond. 1830,) "was undoubtedly the first discoverer of boracic acid, though the credit of the discovery has usually been given to Homberg," who, in 1702, (*Histoire de l'Academie Royale des Sciences*, 1702; *Memoires*, p. 50,) obtained it in small shining plates, which have been called *Sedative* or *Narcotic Salt* (*Sal sedativum Hombergi.*) In the year 1776 it was discovered in the lagoons (*Lagoni*) of Tuscany by Hoefer* and Mascagni,† and more recently by Mr. Smithson Tennant,‡ Dr. Holland,§ and Mr. Lucas,‖ in the crater of Volcano, one of the Lipari Islands.

Natural History.—Boracic acid is peculiar to the inorganized kingdom. It is found both free and combined.

a. Free Boracic Acid.—The boracic acid *lagoons* of Tuscany are spread over a surface of about thirty miles. There are nine establishments for the manufacture of this acid; viz. at Monte Cerboli, Monte Rotondo, Sasso, Serazzano, Castelnuovo, San Frederigo, Lustignano, Lurderello, and Lago. They are the property of one individual, (M. Tarderel, now Count de Pomerance,) to whom they are the source of great wealth. The earth (principally calcareous) of this part continually evolves aqueous and sulphurous vapours, which, when they burst with a fierce explosion, produce boracic acid.¶ The phenomena are explicable on the supposition,

* *Memoria sopra il sale sedativo di Toscana ed il Borace,* &c. Firenze, 1778. Uebers von B. F. Hermann. Wien. 1782.

† *Memorie della Societa Italiana*, viii. 487.

‡ *Transactions of the Geological Society*, vol. i. p. 388. 1811.

§ *Travels in the Ionian Islands, Albania, Thessaly, Macedonia, &c. during the years* 1812 and 1813, p. 9. Lond. 1815.

‖ *Ann. Chim. et de Physiq.* t. ii. p. 443. 1819.

¶ For farther details consult Tancred, *On the Collection of Boracic Acid from the Lagoni of Tuscany*, in the *Transactions of the Ashmolean Society*,

---

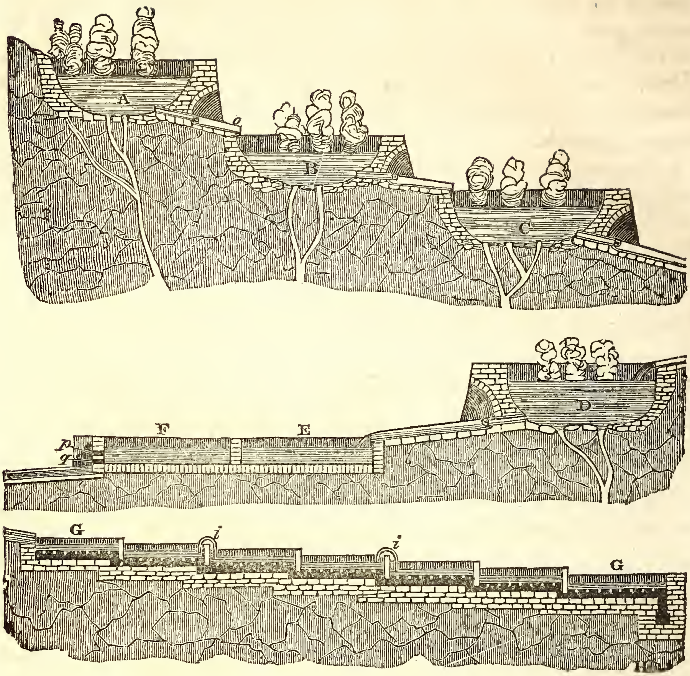
[1] This article constitutes a chapter in Pereira's Materia Medica and Therapeutics, now in the course of publication, and shortly to be issued. Edited by J. Carson, M. D. Publishers, Lea & Blanchard.

that water gains access to immense masses of sulphuret of boron contained in the interior of the earth. By the mutual reaction of these substances, great heat, boracic acid, and sulphuretted hydrogen, would be evolved. The latter taking fire would produce water, sulphur, and sulphurous acid. (Dumas, *Traité de Chimie*, t. i. p. 380. Paris, 1828.) In consequence of being found at Sasso, native boracic acid has obtained the name of *Sassoline*.

β. *Combined with bases.*—Boracic acid is found native combined with soda (forming *Tincal*,) and with magnesia (constituting *Boracite*.) It is also found in the minerals called *Datholite*, *Botryolite*, *Schorl*, *Apyrite*, and *Axynite*.

PROCESS OF MANUFACTURE.—Boracic acid is obtained in Tuscany in the following manner:—" Round the more considerable fissures a circular basin is dug, about four feet deep, and usually three or four yards across. These basins, which are called *lagoni*, being situated at different levels, the water of a rivulet is admitted into them, which, mixing with the black mud at the bottom, is made to boil up violently by the issues of vapour within its circuit. The water is generally confined in each basin for twelve [twenty-four, *Payen*] hours at a time, during which period it becomes saturated to a certain extent with acid from the steam which has passed through it. It is then drawn off from the higher basin to one beneath it, where it remains an equal length of time, till at length it reaches a building at the bottom of the hill, in which the process of evaporation is conducted." Here it enters a reservoir or cistern, where it is allowed to repose till it has deposited the mud which it held in suspension. Having cleared itself of impurities, the water is then drawn off from the cistern into flat leaden pans, under which some of the natural steam is conducted by brick drains about two feet under ground, and by this heat is evaporated. This process requires about sixty hours, the water passing successively from the pans at the upper extremity into others at the centre, and from thence into others at the lower extremity of the building, by means of leaden siphons.

vol. i., Oxford, 1837; Dr. Bowring, *On the Boracic Acid Lagoons of Tuscany*, in *The Lond. and Edinb. Philosoph. Magazine*, vol. xv. p. 21. Lond. 1839; and Payen, *Ann. Chim. et Phys.* 1841.



Boracic Acid Lagoons of Tuscany.

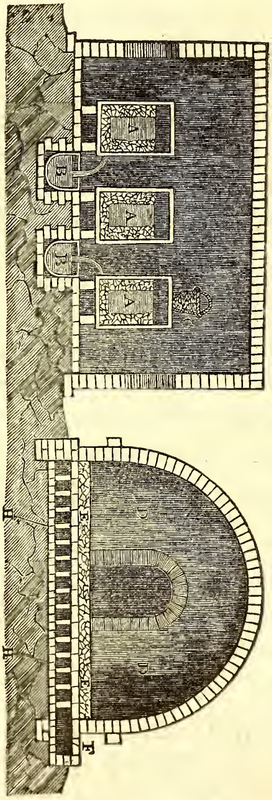
A, B, C, D. Lagoons.—The vapours enter at the bottom, and escape through the water into the air. When the water in the upper lagoon, A, is sufficiently charged with acid, it is allowed to run through the tube, *o*, into the lower lagoon, B. In this way it passes successively from B to C, from C to D, and from D into the reservoir, E.

E, F. Reservoirs or Cisterns.—In these the solution is allowed to rest, and deposite mechanical impurities. By the removal of the upper plug, *p*, the solution escapes into the upper evaporating pan, G.

G, G. Leaden Evaporating Pans.—They are supported by rafters, and are heated by the aqueous vapours, which enter at H and are confined in drains. The acid solution is conveyed from one pan to another by means of leaden siphons, *i i*.

Having arrived at a proper state of concentration, it is then conducted into wooden tubs, in which it cools for about five days, during which the crystallization of boracic acid takes place on the sides of the tubs, and on the stick in the centre, The acid having been removed from the tubs is placed in a basket to drain, and is then spread on the floor of a closed chamber, heated by vapour, to dry. The acid, thus prepared. is sent in casks to Leghorn. (Tancred, *op. supra cit.;* also Bowring, *op. supra cit.;* and Payen, *op. supra cit.*)

Cyrstallization and Drying Chambers.



A, A, A. Wooden tubs lined with lead, in which the acid crystallizes.
B, B. Mother liquor.
C. Basket in which the crystallized acid is placed to drain before it is conveyed to the drying chamber.
D, D. Drying chamber.
E, E. Boracic acid drying on the floor (F,) between which and the lower floor (H) the hot vapour circulates.

Boracic acid may also be obtained by dissolving borax in hot water, and adding half its weight of oil of vitriol. As the solution cools, crystals of boracic acid (retaining a little sulphuric acid) are deposited, which must be well washed. Or borax may be decomposed by hydrochloric acid, by which a purer boracic acid is procured.

Properties.—Crystallized boracic acid occurs in the form of white, transparent, pearly, hexagonal scales, which are odorless, have a weak, scarcely acid, taste, and communicate a wine-red tint to litmus. At 60° the crystallized acid requires 25.66 times its weight of water to dissolve it, but only 2.97 times at 212°. It dissolves readily in spirit of wine. When sufficiently heated it evolves its water of crystallization, melts, forming a transparent liquid, which, by cooling, becomes a brittle glass (*vitrified boracic acid.*)

Characteristics.—An alcoholic solution of boracic acid burns with a beautiful green flame. A hot aqueous solution of the acid renders turmeric paper brown, like the alkalis. (Faraday, *Quarterly Journal of Science*, vol. ix. p. 403.) Before the blowpipe, boracic acid fuses, and forms a glass which may be tinged blue by chloride of cobalt, and rose-red by the terchloride of gold. A mixture of one part of vitrified boracic acid, finely pulverized, two parts of fluor spar, and twelve parts of oil of vitriol, evolves, by heat, the fluoride of boron, recognised by its forming dense white fumes in the air, and by its charring paper, wood, &c.

Composition.—The following is the composition of boracic acid:—

	Atoms.	*Eq.Wt.*	*Per Ct.*	*Berzelius.*
Boron	1	10	29.41	31.18
Oxygen	3	24	70.59	68.82
Dry Boracic Acid	1	34	100.00	100.00

	Atoms.	*Eq.Wt.*	*Per Ct.*	*Berzelius.*
Dry Boracic Acid	1	34	55.74	56
Water	3	27	44.26	44
Crystallized boracic acid	1	61	100.00	100

Physiological Effects and Uses. — Though sedative properties were formerly ascribed to this acid, it is probably inert, or nearly so. Cullen (*Materia Medica*, p. 341,) gave it in large doses without observing that it produced any effect on the human body. It is, therefore, not employed in medicine; but it is extensively used in the manufacture of borax.

MINUTES OF THE PHARMACEUTICAL MEETINGS.

October 3, 1842.

Dr. Carson in the Chair.

The minutes of the last meeting were read and adopted.

Dr. Bridges, on behalf of Dr. William R. Fisher, presented to the College a box of cupreous minerals, many of them rare specimens.

The Committee to whom was referred the paper of Charles Ellis on "The Febrifuge Powder of Bark," reported.

Some observations on the volatile oil of Gaultheria procumbens were made by William Procter, Jr., which had reference to researches recently made by him on the chemical character of that volatile oil. He stated that it proved to be closely allied in its chemical relations with the Oil of Spiræa ulmaria, which has received the name of Saliculous Acid, Like that acid it unites with the bases, potassa, soda, and ammonia, baryta, &c.; and also with chlorine, bromine, and iodine, forming most generally crystalline compounds, which in many instances appear identical with those described as resulting from the union of saliculous acid with the same agents. Specimens of most of these compounds were presented for the examination of the members.

Professor Bridges exhibited specimens of several species of Aristolochia, particularly the *reticulata* of Nuttall, with a sample of its roots; and accompanied them with some remarks on the botanical differences which distinguish them.

The root of the A. reticulata had been recently introduced into this market, and sold for Serpentaria. It appears in no way inferior to the latter in medicinal power—the root is larger, and the taste more pungent. Its origin appears to be the neighborhood of Red river, and was received via New Orleans.

A specimen of the volatile oil of the Asarum Canadense was presented to the meeting by Mr. Procter.

Professor Carson exhibited the ripe fruit of the Zamia integrifolia, the plant which yields the Florida arrow root, and which, together with its product, he had spoken of at length on a former occasion.

A specimen of Bark, of doubtful origin, was laid on the table; it had some of the external characteristics of Huanuco Bark, with but little bitterness, and was evidently a very inferior article.

There being no further business the meeting adjourned.

November 8, 1842.

Professor BRIDGES in the Chair.

The last minutes were considered and adopted.

Ambrose Smith presented to the College the August and September numbers of the London Pharmaceutical Journal; and also a synopsis of the Lectures being delivered under the auspices of the Pharmaceutical Society.

A paper, entitled "Observations on Extract of Rhatany," was read by William Procter, Jr., and referred to a Committee, consisting of Augustine Duhamel and J. C. Turnpenny.

The subject of the gelatinization of astringent tinctures coming before the meeting, the Commission to whom that subject had been referred at a previous meeting, requested the addition of Augustine Duhamel to their number, which was granted.

Professor Carson called the attention of the meeting to an adulteration of Jalap. He stated that a member of the College, during a recent visit to New York, had met with an article which, under the cognomen of "overgrown jalap," did not possess the characters of the drug. It had the aspect of being derived from a large fusiform root, was very light and spongy, and had none of the resinous appearance of true jalap. It was supposed by Prof. C. to be the product of the Ipomœa Macrorrhiza, or Mechoacan, which is known to be inert. In consideration of its actual introduction into the New York market, and the possibility of its being brought here, the subject was deemed worthy of the action of a Committee.

Charles Ellis, Augustine Duhamel, and J. H. Ecky, were constituted a Committee, and instructed to report at a future meeting.

William Procter, Jr. exhibited a specimen of the fixed oil of peach kernels, and stated that, with comparatively moderate pressure, twenty per cent. of oil could be obtained, without the application of heat previous to pressure.

Specimens of the Extractum Stramonii Foliorum, Extractum Stramonii Seminis, and Syrupus Senegæ, all made in accordance with the formulæ of the last edition of the U. S. Pharmacopœia, were also presented by the same.

It was stated that twenty-two pounds of the recent leaves, collected on the 20th of September, yielded nine pints of juice, which, when coagulated by heat, filtered and evaporated, produced ten ounces, avoirdupois, of extract, which was almost entirely soluble in water. The coagulum, when dried, amounted to eight ounces, (avoirdupois,) which shows an increase of forty-four per cent. in the strength of the extract by its removal.

Dr. Bridges called the attention of the meeting to the subject of testing for arsenic.

After exhibiting the reactions of the more ordinary tests with this poison, and pointing out their relative merit in point of evidence, Dr. Bridges explained the action and mode of using Marsh's apparatus, and all the precautions necessary to ensure certainty in the result.

December 5, 1842.

Charles Ellis, Vice President, in the Chair.

The journal of the preceding meeting was read and adopted.

The August and September numbers of the *Journal de Pharmacie* were received.

Augustine Duhamel and Joseph C. Turnpenny presented a report on the paper of Wm. Procter, Jr., which was read.

A paper was read by Augustine Duhamel on the Beaked Hazel, (Corylus rostrata,) in which the hair of the fruit of that plant was recommended as a substitute for cowhage.

This paper was referred to William Procter, Jr., and J. H. Ecky.

Augustine Duhamel further communicated a paper, entitled "Some Observations on Fuligokali and Anthrokokali," two preparations of carbon recently employed in Paris.

This essay was referred to Dr. Bridges and Thomas P. James, as reporters.

A note on "Extract of Senega was read by William Procter, Jr., and referred for examination to Messrs. Turnpenny and Bridges.

Specimens of Syrup of Tolu, Syrup of Orange-peel made without heat, Extract of Senega, and Peach-water distilled from the kernels, were also presented for examination.

The Syrup of Tolu was colorless, and possessed the odor and taste of the Tolu in an eminent degree, and was made by the following formula in Guibourt's "Traité de Pharmacie, viz.:

Tolu,	1 part.
Water,	q. s.
Pure Sugar,	23 parts.

Digest the Tolu in successive portions of water in a closed vessel, (flask,) by means of a water bath, for half an hour, until twelve parts of fluid is obtained; suffer it to cool; separate the benzoic acid, which precipitates by filtration, and agitate the colorless fluid with the sugar until it is entirely dissolved.

The peach-water was proposed as a substitute for that obtained by distilling the leaves, but it was thought to have more analogy to bitter almond-water than to the product obtained from the peach leaf.

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At a Stated Meeting of the Philadelphia College of Pharmacy, held Ninth month (September) 27th, 1842,

The minutes of the last meeting, with the minutes of the Board of Trustees for the last three months, were read and adopted.

The amendments of the By-Laws, introduced at last meeting, were again considered, and after an animated discussion, the following amendments were adopted:

Insert in the line after "of the meetings," Law VII, 1st Sect., "Of the Meetings for Business."

Insert after Sect. 9, of Law VII, the By-Laws respecting the Pharmaceutical Meetings, with the following amendments:

In Sect. 1, after the "Pharmaceutical Meetings" of the College, insert "which shall be exclusively for scientific purposes."

Sect. 6 will read as follows:

"Members may introduce to these meetings strangers having an interest in science generally, who, when introduced, shall be entitled to partake in the scientific discussions."

The resolution respecting the time of holding the stated meetings of the College was deferred for consideration at our next meeting.

The Committee appointed to audit the Treasurer's account reported they had compared the same with his vouchers, and found it correct.

William Zollickoffer, M. D. was unanimously elected an honorary member of the College.

Resignations from Charles Yarnall and Edward Yarnall were read and accepted.

On motion of Samuel F. Troth, it was Resolved, That the

Publication Committee be instructed to address a circular to the members of the College, informing them of the existence of the Pharmaceutical meetings, and inviting their attendance and co-operation.

This being the time for the semi-annual election of eight Trustees,—and the election of Dillwyn Parrish to the office of Secretary creating a vacancy in the Board, it was Resolved, That the College proceed to an election.

The tellers reported the following gentlemen had received a majority of votes, who were thereupon declared to be duly elected, viz.:

Thomas P. James, Ambrose Smith,
Samuel F. Troth, Henry W. Worthington,
Charles Schæffer, Dr. Robert Bridges,
Peter Lehman, A. J. L. Duhamel,
W. W. Moore, for the unexpired time of D. Parrish.

The former Secretary reported that a copy of the resolutions, adopted at our last meeting, respecting our late Vice President, had been communicated to his family as directed.

Then adjourned.

Extracted from the minutes,

Dillwyn Parrish, Secretary.

NECROLOGY.

The death of Henry Troth, Esq., Vice President of the Philadelphia College of Pharmacy, with the resolutions elicited by that melancholy event, have already been presented to the public through the medium of the organ of the Institution, the Journal.

Again have we to lament the departure of one whose name is closely connected with the progress of the College; we allude to Dr. William R. Fisher, late Professor of Chemistry. Dr. Fisher was one of the early graduates of Pharmacy, having received his education in Philadelphia, of which he was a native. He shortly, however, removed to Baltimore, in which place the greater portion of his subsequent career was spent. Deeply engaged as he became in the literary and scientific enterprises of the community of his adoption, his feelings and affections were constantly directed to the seat of his Alma Mater, in whose welfare and advancement he had the liveliest interest, as evinced by the contributions to her periodical, of which his ready pen was prolific. Upon his return to Philadelphia, as a distinguished alumnus of the College, he was thought worthy of the appointment to the vacant Chair of Chemistry, to which he was elected. This position he held for one term only, when his views being directed to a higher and holier calling he resigned the situation, to engage in preparation for the ministry. But disease had set its mark upon him, and in the all-wise Providence of God it was decreed that his race was run. The last important work in which he was engaged, connected with the interests of Pharmacy, was the revision of the Pharmacopœia, as a member of the Committee of Revision appointed by the College of Pharmacy, and in this he afforded essential service. The mind of Dr. Fisher was rapid, at the same time accurate;

his emotions acute, and his feelings embued with the deepest sensibility. Simple and unpretending in his manners, sociable in his intercourse with the world, and actuated by the highest and noblest sentiments and impulses to action, his entire character was calculated to win regard and respect.

J. C.

MISCELLANY

Curcumine, the Coloring Matter of Turmeric. By M. Vogel.—In this paper the author gives the following as the conclusions to which he has arrived from the investigation of the subject:—

1st. That curcumine may be obtained in a state of purity, by separating it from its combination with oxide of lead.

2d. That concentrated sulphuric, phosphoric, and hydrochloric acids, dissolve curcumine, and that it may be thrown down from these solutions in a flocculent precipitate by means of water.

3d. That nitric acid decomposes it, forming a yellow substance, somewhat resembling the resins.

4th. That it forms brown combinations with the alkalies, and may be separated by weak acids.

5th. That it assumes a much deeper color with the salts of uranium, than with those of lead, or with the alkalies.

6th. That the soluble borates form gray combinations, more or less decided.

7th. That turmeric paper reddened with boraic acid, is not restored to yellow by acids, but assumes a blue tint when wetted with ammonia, and also more or less with the other alkalies.—*Journ. de Pharm.*

New method of Preparing Chloride of Zinc. By M. Righini.
Take of

Chloride of barium, pure and crystallized, ʒxxss.
Sulphate of zinc, pure, ʒxxvss.
Distilled water, ℥xxxj.

Dissolve the sulphate of zinc in one-half the water, and the chloride of barium in the other half; mix the two solutions in a matrass, apply the heat of a water bath for a few minutes only, to accelerate decomposition filter, and evaporate the liquor over a water bath, until reduced to about two ounces, put this on to a fresh filter, on which has been placed some animal charcoal with a few grains of powdered chloride of barium; evaporate the filtered liquor until the product left to itself presents the appearance of flakey crystals of a brilliant whiteness, which when dried, must be kept in a well-stopped bottle.—*Journ. de Chim. Med.*

Hyposulphite of Soda.—Berzelius proposes the following as a simple and easy method of preparing the hyposulphite of soda, now extensively used in photography:

Saturate a solution of carbonate of soda with sulphurous acid gas, so as to form a bisulphite of soda. Boil a weak solution of hydrate of soda with sulphur to saturation. Add the latter solution to the former until there shall be a slight excess of sulphuret of sodium; filter, evaporate, and crystallize. The salt thus obtained, when freed from the mother-liquor, will be hyposulphite of soda.

Lond. Pharm. Journ. and Trans.

Sialagogues.—Dr. Samuel Wright has published an elaborate and learned essay on the *Physiology and Pathology of the Saliva*, in the London *Lancet.* Among other matters he enumerates, incidentally, the various medicinal substances, which, in addition to mercury and its compounds, have been known to induce salivation. Although the fact is well understood concerning most of them, yet it may be useful to enumerate the whole in consecutive order.

1. Iodine and its salts sometimes act as remote sialagogues. *Authorities.* Carro, quoted by Bayle; Dr. Manson, Cogswell's Essay on Iodine.

Hydriodate of potash has induced ptyalism, as observed by Drs. Clendenning and Wallace, and Dr. Wright himself. Cantu, Coindet and Gairdner have detected iodine by chemical tests, in the saliva of persons who are taking it.

2. *Chlorine.*—The continued use of chlorine water is said to have caused salivation. Pereira.

3. *Bromine.*—Dr. Glover produced ptyalism in dogs and rabbits by the administration of single poisonous doses of it.

4. *Digitalis.*—A case is recorded in Rust's Magazine, in which the salivary discharge continued for three weeks. Other authorities. Withering, Christison, Barton.

5. *Hemlock.*—The injection of a watery solution of hemlock into the veins of a horse has been known to produce salivation (Moiroud.) Dr.

Wright has known a case in the human subject from the protracted use of hemlock.

6. *Belladonna* sometimes affects the salivary glands.

7. *Arsenic.—Authorities.*—Marcus, Ferriar, Furley, Trousseau and Pidoux; James Johnson.

8. *Opium*, sometimes. *Authorities.* Christison, Paris, Watson.

9. The *Salts of Antimony*, particularly tartar emetic and James' powder. Magendie produced salivation in dogs by tartar emetic. So also Griffiths Jackson in the human subject. Dr. Wright has seen an active ptyalism, for a week, consequent on the use of James' powder.

10. The *Salts of Lead* occasionally.

11. *Terchloride of Gold.*—Chrestien, Niel.

12. *Prussic Acid.*—Macleod, Granville.

13. *Nitric Acid.*

14. *Nux Vomica.*—In a case of poisoning by it, a profuse ptyalism has been observed.—*London Medical Repository*, Vol. 19.

15. *Cantharides.*—Pereira mentions an instance of poisoning by it, in which ptyalism occurred.

16. *Sulphur* used internally increases the salivary secretion.

T. R. B.

Amer. Journ. of Med. Sciences.

Phloridine.—This is a new medicine, which is now very highly spoken of by French practitioners as a useful adjunct to our cinchona preparations. It has been used for some years in Germany, Poland, and France. It is extracted from the bark of the roots of the apple-tree and the wild cherry-tree, and is thus prepared: the bark of recent roots is boiled with water sufficient to cover them, for half an hour. This is poured off, and the same quantity is again used; these two fluids are mixed together, and at the end of six hours deposit the phloridine in the form of a deep-red velvety-looking matter.

M. Lebaudy, the editor of the *Journal des Connaissances Médico-Chirurgicales*, says, "its efficacy is so decided, that we cannot hesitate to class it with the most powerful febrifuges; and it has this advantage over quinine, that it never induces gastralgia."

Braithwaite's Retrospect, No. 5.

Quinine found in the Urine and in the Blood.—On examining the sediment formed in the urine of a patient to whom quinine had been administered, on account of periodical nervous pains, M. Landerer found, besides the phosphate and urate of lime, and carbonate of ammonia, a small quantity of quinine in a free state. The urine itself contained sulphate and hydrochlorate of ammonia, and also some traces of quinine. In two other patients to whom quinine had been administered for the cure of intermittent fevers, M. Landerer endeavored to discover this alkaloid substance in the blood. One was bled for a pleurisy which supervened; the blood was inflammatory, and the coagulum covered with a thick buffy coat. When first drawn from the vessel, and so long as it preserved its heat, it had but a very slightly bitter taste; but after it had become cold, and the formation of the clot had taken place, the bitterness was very marked. A perceptible difference was discernible between the serum and the coagulated portion, the bitter taste being most marked in the former, and the quinine could be obtained from it by evaporation; then digesting the residue in acidulated water, filtering, and precipitating it by ammonia. In the second patient the analysis of the serum gave exactly similar results.

London Med. Gaz. July, 1842, from *Repertorium für die Pharmacie.*

Manna.—"In the mountains above Tropœa, are large tracts of chestnuts, and the small leaved ash, the omas, which produces the manna. They do not plant it, but cut down the strong stems, and spring it from the old stocks. In July they make a small gash, leaning upwards; the second day another, and form cups with maple leaves, into which the gum exudes.

The tyranny exercised on the poor peasants in this article is very great. The manna is farmed out, and a certain number of countrymen are appointed to gather it, during which time they are not at liberty to absent themselves, or undertake the most necessary labors for themselves. They scarcely derive any benefit from their work, as they are paid five carlini for a rotulo of manna (thirty-three ounces) which the farmers sell in Naples for nine carlini a pound (twelve ounces.) If they burn or destroy the trees, though wild, their punishment is very severe, and if the smallest quantity is found in their houses, they are sent to prison. Eight hundred poor men, thus oppressed, contributed two carlini apiece, for a memorial to the king, but no notice was taken of it."—*Swinburne's Courts of Europe at the end of the last century.* T. R. B.

Amer. Journ. of Med. Sciences.

Nature of the fat substance of Milk.—M. Romanet asserts that the globules of the milk are entirely formed of butter, which exists as a pulp enveloped in a white, translucent, elastic, and resistant pellicle; and that this cyst is broken in churning, by which the butter is allowed to escape, and the pellicles floating about separately constitute the white particles which give consistence to the buttermilk.

Comptes Rendus, April 4, 1842.

INDEX I.

AUTHORS OF ARTICLES IN THE EIGHTH VOLUME OF THE AMERICAN JOURNAL OF PHARMACY.

INDEX II.

SUBJECTS OF ARTICLES IN THE EIGHTH VOLUME OF THE AMERICAN JOURNAL OF PHARMACY.