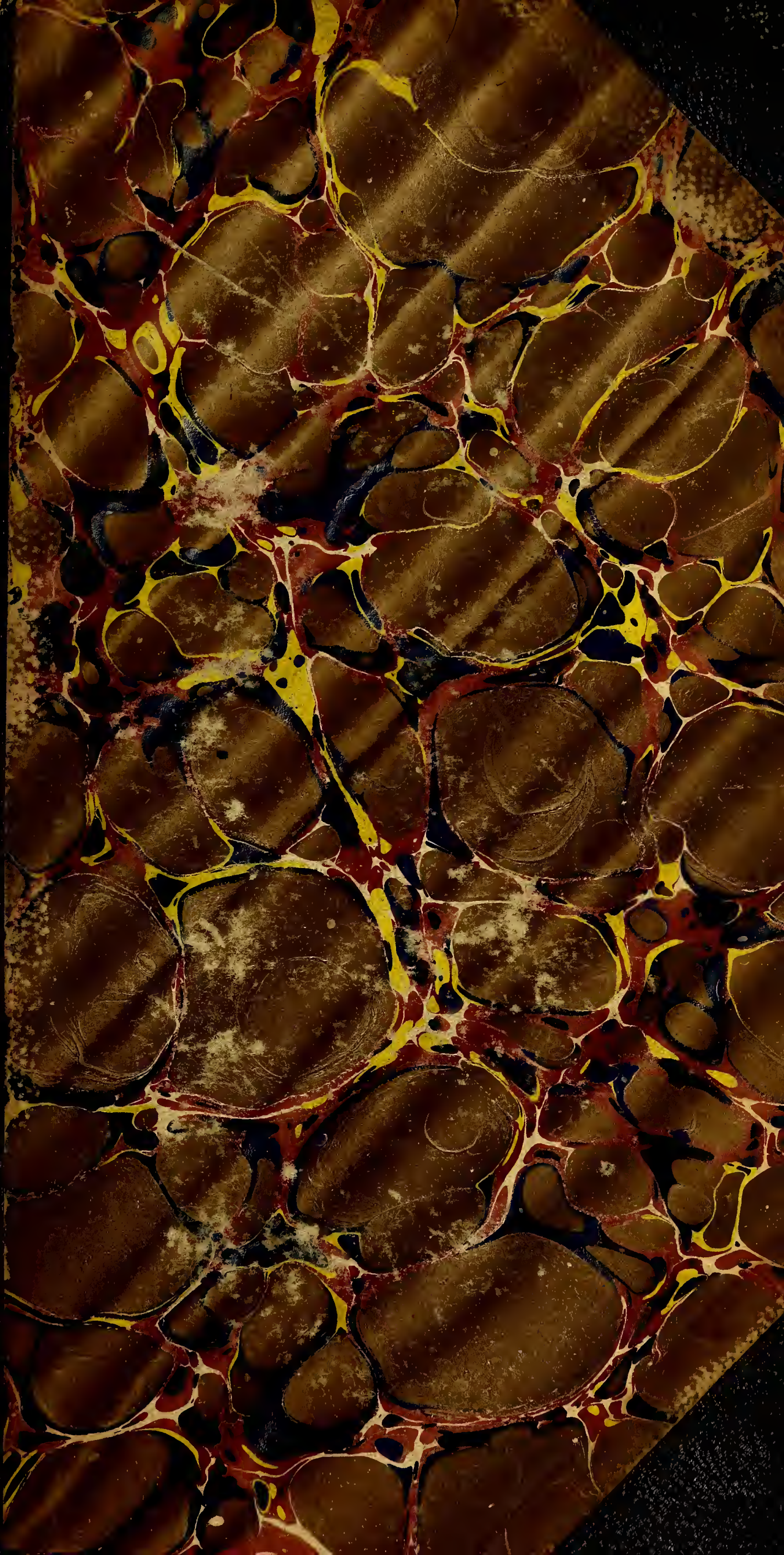

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APRIL, 1847.

ART I.—A REVIEW OF CERTAIN DOCTRINES ADVANCED BY THE CELEBRATED LIEBIG, AND SANCTIONED BY GREGORY AND KANE.* By Robert Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

The means by which the various ferments respectively, produce their appropriate changes, are involved in the greatest obscurity. Some important additions have been made to our knowledge, as respects the facts. The ferments have all been shown to be vegeto-animal matter in a state susceptible of oxidizement, and an analogy has been inferred between their influence and that of some other agents, supposed to act by what has been called catalysis, which is a new name given by Berzelius, to an old mystery. It has long been known that there are two modes by which chemical changes are to be excited. In one of these, the presentation of one or two extraneous elements causes decomposition and recomposition, by the reactions between the elements so presented and those subjected to alteration, as in the various cases of elective affinity: in the other mode, substances are made to re-arrange their constituents into one or more new combinations, by the presence

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* See "Traité," "Introduction," p. xii. See also Kane's Elements, p. 31. Gregory's Outlines of Organic Chemistry.

of other bodies with which they do not combine, and which, in some cases, undergo no change themselves. It is to the last mentioned mode of reaction that the name above mentioned has been applied. Yet, under this head, processes have been associated which have irreconcilable features.

Thus to the following processes one rationale is given by the distinguished chemist of Giessen: *the solubility acquired by platina by being alloyed with silver—the catalyzing influence of platina sponge or platina black—the explosion of fulminating powders by slight causes—the reciprocal decomposition of bioxide of hydrogen and oxide of silver—the agency of nitric oxide in the generation of sulphuric acid—the action of ferments.**

To me it seems that there is a great diversity in the characteristics of the processes thus alluded to. In that of the alloy there is at least as many atoms of silver in actual combination with platina, as there are atoms of this metal; and the change which the latter undergoes is precisely the same as that to which the former is subjected.

In the case of platina sponge causing the formation of water; or of platina black causing the acetification of alcoholic vapour, the inducing agent undergoes no change itself nor does it enter into chemical combination either with the materials or the products. Liebig ascribes the result in this instance, to the alternate absorption and subsequent evolution of oxygen by the powder; since, after exposure to the gas, it may; by exhaustion, be made to give up a portion. Yet the agency of this metallic mass cannot differ, in this case, from that in which it causes the pure elements of water to combine, and in which, if absorption take place, it is not confined to oxygen more than to hydrogen. Again the fact

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* Traité de chimie organique, Paris, 1840.

Page xix., last paragraph.

" xxvii., Du ferment, paragraph 2d.

" xxxviii. Acétification, paragraph 2d.

" 388-9, Acid acetique.

established by Faraday, that hydrogen and oxygen may be made to unite by a well cleaned plate of platina, seems irreconcilable with the idea that *absorption* is the mean of its accomplishment. But if absorption be not the cause in the case of the plate, is it consistent to suppose it to be the cause in that of the sponge? In this, as in most other cases, Liebig seems to overlook the all-important agency of electricity in the phenomena of nature. I should infer, that the metal most probably acts by altering the electrical polarity, and consequent association of imponderable with ponderable matter.

Having inconsistently assumed that during the dehydrogenation of alcohol by atmospheric oxygen in the presence of platina black, this powder is alternately endowed with the power to take it from the air, and to impart it to that, of which the attraction for oxygen, under the circumstances, is too feeble to take it from the same source, this popular theorist proceeds to make the inference that honey, mother of vinegar, and other substances promotive of acetification, act in the same way by absorbing oxygen from the air, and abandoning it to hydrogen. But if, agreeably to the view above presented, platina black does not act by absorption, no argument, founded on the agency of that substance, will justify the idea that absorption avails in other cases; and it should be recollected that platina black is most active when most free from moisture; while honey, yeast, mother of vinegar, and other substances which cause acetification, have no attraction for oxygen in the absence of water: moreover, that the necessity for moisture to the preparatory oxidizement of gluten, caseine, diastase, and other organic substances, which, by exposure in a humid state, acquire their capacity to act as ferments, is not explained. That water acts as a catalyzer, seems to have escaped notice. Before referring to the absorption of oxygen by honey, as a ground of explanation founded on the analogy of platina sponge, should not an explanation have been given by the ability of water in the one case to prevent, in the other to promote absorption of oxygen.

An electric spark, or any ignited body, a wire made incandescent by a galvanic discharge, has an influence analogous to platina sponge, of which the minutest particle is sufficient to cause ignition throughout an inflammable mixture, however large. There is, in this respect, an analogy between the explosion of inflammable, gaseous mixtures, and those of gunpowder, and of other fulminating powders, of which some, as it is well known, detonate by percussion or friction, or any cause adequate to derange the equilibrium of their particles. In the cases last mentioned, the *change* produced is the same, whatever may be the exciting cause, and the minutest portion of the congeries being made to undergo the change, is of itself competent to produce a like result as respects the whole.

Evidently the property which bioxide of hydrogen, and the oxide of silver, or bioxide of lead, have, of undergoing an explosive deoxidizement in consequence of mere superficial contact, is in some respects peculiar, since the reaction is reciprocal. In the solution of the alloy of platina with silver, one body induces another to undergo the oxidizement to which it is itself subjected. In the case of the bioxide of hydrogen and oxide of silver, two bodies, both prone to *de*-oxidizement, reciprocally induce that species of change. Besides, in this phenomenon, there is no third body to perform a part analogous to that of the nitric acid. From both of the two last mentioned instances, that of platina sponge differs, inasmuch as it undergoes no change, during its catalytic agency.

Not only have ferments power to produce *a* change, but also severally to produce *the* particular change by which either sugar, alcohol, acetic or lactic acid, &c., &c., is respectively generated. Moreover, these bodies are themselves meanwhile undergoing an oxidation or decomposition which is necessary to their power; but the change thus arising in them, is not like that which they induce. Hence, obviously, they operate differently either from the platina sponge or platina black, or from silver in the alloy formed by it with platina.

Liebig conceives that this increased solubility of platina by union with silver, is at war with electro-chemical principles; agreeably to which, any metal in contact with another metal, relatively electro-positive, becomes less susceptible of attack. But agreeably to the principles thus cited, this insusceptibility does not arise in one of two heterogeneous metals in chemical combination with each other, but in one of two such metals either in contact merely, or only communicating through a metallic conductor.

I am surprised that Liebig should find the mystery of catalysis lessened by the solubility of the alloy of platina with silver, when it must be evident that if the oxidation of an atom of a comparatively electro-positive metal, were a sufficient reason why an electro-negative metal, combined with it, should be oxidized, an alloy of gold with silver ought to be soluble; whereas it is known that the common process of parting, is founded on the utter insolubility of gold when so alloyed.

Liebig alleges that there can be no doubt that the acetification of alcohol is of the same order, as the reaction by which the bioxide of nitrogen provokes the formation of sulphuric acid in the leaden chamber; in which process the oxygen of the air is transferred to sulphurous acid by the intervention of that bioxide ; since, in like manner, organic substances, associated with spirit of wine, absorb oxygen, and bring it into a particular state which enables two atoms of this element, to replace two atoms of hydrogen, simultaneously oxidized and removed.

But in the case thus cited, for every equivalent of acid formed, an equivalent of the bioxide combines first with an equivalent of oxygen, (perhaps with two,) and in the next place with an equivalent of the sulphurous acid, forming a compound which is decomposed by water into sulphuric acid, and the regenerated bioxide. There appears to me to be no analogy between this process, and that of the influence of matter existing in no equivalent proportion, and which cannot be shown to form a definite chemical compound, either with acetyl or hydrogen.* It is not represented that in the vinous fermentation, any union, either transient or permanent, takes place between the elements of the sugar and those of the ferment; on the contrary it is alleged that the oxidation and precipitation of the yeast takes place independently, though it proceeds, *pari passu,* with the alcoholification.

As to all the processes referred to for illustration, as well as those of fermentation which they are alleged to resemble, it appears to me that Liebig and his disciples have been too sanguine of their capacity to give adequate elucidation.

Respecting changes of the kind above described as *catalytic*, Dr. Kane uses the following language :—" *The elements of a compound are retained together in certain molecular arrangement, because the affinities are there satisfied ; but it is natural to suppose that whilst the elements remain the same, their affinities for each other might be just as completely satisfied by a different molecular arrangement.*" This language might be held more reasonably, were this variation in arrangement accompanied by no concomitant acquisition of chemical properties ; but is it reasonable to consider the difference between sugar, and the alcohol and carbonic acid into which it is resolvable, as arising merely from molecular arrangement? Can

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* The reader is presumed to know that agreeably to Liebig, alcohol, $C_4 H_5 O + HO$ the hydrated protoxide of ethyl, is converted into acetic acid, the hydrated *tri*-oxide of acetyl, $C_4 H_3 O_3 + HO$, by the substitution of two atoms of oxygen for two of hydrogen. By these means it is inferred that the alcoholic base, the protoxide of ethyl, $C_4 H_5 O$ is converted into the trioxide of acetyl, $C_4 H_3 O_3$, an atom of water being present in the one no less than in the other.

the active influence of alcohol upon the animal nerves be due merely to the situations occupied by its three ultimate ponderable elements, carbon, hydrogen, oxygen, relatively to each other? Admitting that the union of oxygen with the ingredients of gluten could, by imparting any consequent mechanical impulses, cause the hydrogen and oxygen of an atom of water to unite with the elements of sugar, and to separate into alcohol and carbonic acid, as above mentioned, how can that movement, or the consequent rearrangement of the ponderable particles, explain the acquisition of new properties, of which the combining atoms, or the compounds previously containing them, were destitute? Liebig infers, that a body in the act of decomposition or combination, may communicate a movement to the atoms of an adjoining compound, so that gluten in the state of oxidation, in which it is called yeast, induces sugar, $C^{12} H^{11} O^{11}$, existing in the same liquid, to unite with the elements of water, making $C^{12} H^{12} O^{12}$, and consequently to be resolvable into four equivalents of carbonic acid and two of alcohol.

Adopting the same views as Liebig, Dr. Kane alleges, "that the slow decomposition of diastase communicates to the molecules of many thousand times its weight of starch, the degree of motion necessary for their rearrangement, and the appropriation of the elements of water requisite for the formation of starch sugar."

It is perfectly evident that the particles of the catalyzed substance are in some way so affected by the catalyzing body, as to be put into a state of reaction, which had not otherwise ensued; but that this is accomplished merely by imparted motion, appears to me to be a surmise destitute of plausibility. The fact that the weight of the diastase requisite to saccharify starch is so very small, as is alleged by Dr. Kane, evidently renders it extremely improbable that it acts by creating any mechanical disturbance. Yet this respectable chemist is so completely carried away by this idea, that he proceeds to make the following remark: "*This law, of which the simplest expression is that were two chemical substances are in contact any motion occurring among the particles of the one, may be communicated to the other, is of a more purely mechanical nature than any other principle yet received in chemistry, and, when more definitely established by succeeding researches, may be the basis of a dynamic theory in chemistry, as the law of equivalents and multiple combination expresses the statical condition of bodies which unite by chemical force.*"

I perfectly agree in opinion with the author of these suggestions, as to the *purity of the mechanical attributes of the principle on which they are founded*, but cannot on this very account deem them competent to explain the chemical phenomena on which he conceives them to bear.

As the mechanical influence of the motion of bodies is as the weight multiplied by the velocity, is it conceivable that any movement in the particles of one part, by weight, of diastase, can be productive of analogous movements in two thousand parts of starch?

The idea that yeast might owe its power to animalcules, suggested itself to me more than thirty years ago, and seems to have some support from the fact, that fermentation only thrives within the range of temperature compatible with animal life. Latterly, its activity has been ascribed by some observers to the agency of extremely minute vegetables. Kane, while admitting the existence in yeast of "*a vast number of globular bodies, possibly animalcules,*" treats the idea as untenable, because the weight of the alcohol and carbonic acid is greater than that of the sugar employed. But if the union of water with the elements of the sugar can add to the weight of the products *without* the assistance of animalcules, wherefore should *their agency* be inconsistent with an augmentation from the same source? It seems to be overlooked that there has been much reason to infer, that the conversion of cane sugar into grape sugar (glucose) is of necessity precursory to the vinous fermentation, wherever the saccharine matter is not naturally in that state. But when grape sugar is fermented, the disparity between the weight of the sugar and its products no longer exists; the weight of the resulting alcohol and carbonic acid, are just equal to that of the sugar out of which they are generated.

Independently of any agency of this kind, which seems even more probable in the case of some species of infection than in that of fermentation, I conceive that the present state of our knowledge does not allow of our comprehending the means by which bodies, whether organic or inorganic, are endowed with the powers ascribed to catalysis; but that we have great reason to believe that these powers, as well as all the properties which ultimate elements acquire by diversity of association, as in compound radicals, are due to the same source as the phenomena of galvanic electricity.

It is well known, that although pure zinc is not susceptible of oxidation by exposure to dilute sulphuric acid, yet that, when containing minute proportions of other metals, as in the case of commercial zinc, it becomes liable to rapid oxidation by the same reagent. This Faraday has explained by the electro-chemical influence of the comparatively electro-negative metallic particles distributed throughout the mass of the zinc, which he conceived to be productive of as many local galvanic circuits with corresponding electrolytic currents. This explanation has, I believe, been universally sanctioned, and was consistent with the previous discovery of Sturgeon, that when, by amalgamating the surface with mercury, a metallic communication was made between the electro-positive and electro-negative particles, so as to prevent the formation of electrolytic currents through the oxidizing liquid, the zinc became nearly as insusceptible of union with oxygen, as when in a pure state.

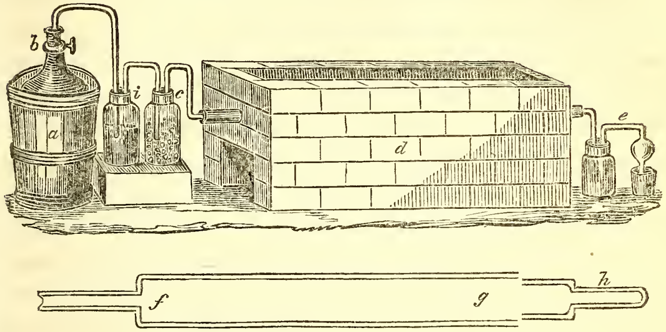
Nevertheless, either when pure, or when amalgamated, the zinc was found oxidizable by diluted sulphuric acid, provided it were made the element of a galvanic pair.

The facts above mentioned, having been recalled to the attention of the scientific reader, I beg leave to inquire whether the electrolytic influence thus ascribed by Faraday to the metallic particles, has not a greater analogy with that of a ferment, than those which have been brought forward by Liebig, Kane, and others, with a view to explain the influence of that class of agents upon mechanico-chemical principles? Wherefore, may not the distribution of a nitrogenized substance, throughout a mass of inorganic matter, operate as do the metallic impurities in commercial zinc? The existence of a powerful voltaic series in the gymnotus and other electrical fishes shows that the proximate elements of animal matter, are, when duly associated, as capable as metals of forming the elements not only of simple, but of complex galvanic circuits.

The efficacy of water in exciting fermentation may be referred to its ability to promote electrolysis, and until we are enabled thoroughly to understand the part which it performs in this process, we shall vainly attempt to explain that species of catalysis to which the presence of moisture is indispensable.

ART. II.—REMARKS ON THE REDUCTION OF IRON BY HYDROGEN.

BY WILLIAM PROCTER, JR.



a, *b*, a self-regulating reservoir for generating hydrogen.
i c, arrangement for washing and drying the gas.
d, furnace with reduction tube enclosed.
f g, sectional view of the reduction tube.

As there has been an increased demand for "*prepared iron*," or iron reduced by hydrogen, which has chiefly been supplied from abroad at a high price, it has been thought that the publication of a few practical remarks on the apparatus and process, based on a repetition of the operation many times during the past year, will be attended with advantage, notwithstanding that a valuable paper on the same subject by M. M. Soubeiran and Dublanc was transferred from the *Journal de Pharmacie* to the 17th volume of this work.

It need hardly be stated that the "prepared iron" of pharmacy is metallic iron in that minute state of division which it presents when its oxide at a red heat has been deoxidized by a current of hydrogen gas. The elements of the process of manufacture, therefore, consist of means for generating and purifying hydrogen gas, and for containing and heating the oxide of iron during the passage of the gas and in contact with its particles.

1st. Instead of the flask used by the chemists above-named, and which cannot be well regulated, I have used a self-regulating gasometer, *a b*, which has several advantages. Though best made of lead, yet for practical purposes it may be constructed of two kegs, one small enough to slip within the other, with tight joints. The smaller keg which replaces the leaden vessel *b* has its open end downward, and into the centre of its head a gas stop-cock is screwed, opening into its interior, and which constitutes the exit for the gas generated within, over which control is given by the cock. As a much larger quantity of hydrogen is consumed than is requisite to combine with the oxygen of the oxide, the amount of zinc used is proportionally great. The solution of two pounds of zinc in diluted sulphuric acid will yield about as much hydrogen as is requisite to deoxidize the same weight of sub-carbonate of iron, but in practice three or four times this amount will be required, as especially towards the last of the process a large amount of gas passes unused. About 6 lbs. of zinc scraps and 8 lbs. of oil of vitriol diluted with six times its bulk of water, are the proportions best adapted for decomposing two pounds of the sub-carbonate of iron.

2d. The jars *i*, *c*, which should be of three or four quarts capacity, contain water and lime; *i* is half-filled with water, and is connected with the stop-cock of the gas generator by a leaden tube which dips below the surface of the water. Another tube connects *i* with the jar *c* filled three-fourths full of fragments of unslaked lime, and reaches nearly to its bottom. A third tube connects *c* with the end of the reduction tube which passes through the furnace *d*, and a section of which is represented at *f*, *g*, *h*.

3d. The reduction tube that I have employed is made of wrought iron, is thirty inches long and four in diameter. One end is open, the other closed, with the exception of an orifice of one inch in diameter into which an iron tube 12 inches long is firmly screwed. The open end of the tube is closed by the hollow iron stopper *h*.

4th. The furnace consists of an oblong enclosure of bricks without mortar. After the first two layers a number of iron rods are placed transversely to support the fire, then two or three layers on this making the interior 9 inches wide, 36 inches long, and 6 inches deep to the grating.

5th. The arrangement *e* consists of a common half-gallon glass jar connected with the reduction tube on one side, and from the other a bent tube issues with a bulb near the extremity, the open end dipping in water. Having prepared the apparatus, the next step is to choose the form of of oxide of iron to be treated. MM. Soubeiran and Dublanc employed the anhydrous sesquioxide, and the suboxide obtained by calcining the oxalate. I have used the sub-carbonate of iron (precipitated carbonate) of the shops with perfect success, and this is the form most readily attainable. It should be absolutely free from saline matter, as sulphate of soda or potassa, because these salts are de-oxidized by hydrogen, and sulphurets of potassium and sodium formed, which even in minute quantity give a sulphurous taste to the iron as well as attract moisture.

Having the apparatus and oxide ready, a very important step consists in introducing the latter into the reduction tube in such a manner that it will expose a very large surface to the action of the gas. Soubeiran and Dublanc used a succession of flat shelves of wire gauze kept apart by small iron bars. This is inconvenient because of the small diameter and great length of the tube. A better plan is to provide pieces of wire gauze seven-eighths of the length of the tube, and from three to six inches wide, bent in a semi-cylindrical shape. The widest is then covered with a layer of sub-carbonate about a quarter of an inch thick; on this another gauze is placed, and likewise covered with the sub-carbonate, and gauze after gauze with iron intervening is thus built up until the pile assumes a size almost equal to the capacity of the tube; a gauze is then placed over the top—a few turns of annealed wire drawn around the whole, and the mass slipped carefully into the tube until it approaches within half an inch of the opposite end.

The iron stopper *h* is now covered externally with a soft lute composed of fine clay, lime and white of egg, and water, and inserted into its place about a line beyond the edge of the tube, and a few tacks driven between the stopper and tube to render it immovable; the whole end is then carefully luted and dried; as the luting cracks by drying, it is best to cover it finally with a mixture of clay and lime and water, with one-twentieth of borax, which forms a fusible coating. I have been thus minute in reference to the luting because of the inconvenience first experienced by the hydrogen issuing from the joint whilst in the fire, to the cessation of its escape at the terminal point of the apparatus thus depriving the operator of the only means of judging of the progress of the reduction.

The filled tube is now inserted in the furnace, its respective ends connected with the other apparatus, the joints well cemented with the lute before described, and all is ready to proceed:—the stopcock of the gasometer is opened, and the gas suffered to flow through the apparatus until all the air is displaced, the fire is then built around the tube with charcoal and anthracite, and as soon as the tube arrives at a dull red heat the gas is allowed to flow in rapidly. The success of the operation depends on the regulation of the heat more than on any other feature in it. If too little, the deoxidation is not accomplished; if too great, as a bright cherry red heat, the particles are conglomerated or welded together, and the quality of the product injured. A dull red heat, regularly kept up throughout the whole length of the tube is the best criterion to govern the operator.

The half-gallon jar in the terminal arrangement should be well refrigerated, which condenses the aqueous vapour and permits only the excess of hydrogen to escape, and the relative volume of the gas bubbles passing through the water in the washing jar, and that at the terminal tube, will give the best index of the consumption of the gas. Besides, the amount of water condensed is also a means of judging. Assuming the sub-carbonate of the Pharmacopœia to be in a hydrated condition, about 14 oz. of water should be evolved from 32 oz. of the sub-carbonate. When the latter quantity of material is operated on, the process is occupied from 5 to 8 hours. The current of gas should be kept up after the removal of the fire until the apparatus cools to the ordinary temperature, but in small quantity. This is necessary to exclude the air, because the reduced iron if exposed to the atmosphere whilst hot instantly takes fire and is converted into sesquioxide.

When cool, the stopper and luting is carefully removed, and the gauze drawn out on to a sheet of paper. What was a solid mass at first is now a series of pieces of wire gauze covered with the iron in pulverulent slightly cohering masses of an iron grey colour and occupying about one-eighth of the former space. The pieces of gauze are carefully separated and examined. If any part of the iron is black instead of *iron grey*, it must be separated from the rest, as it is not fully deoxidized, and is very insoluble in diluted sulphuric acid. When the iron is perfectly reduced and pulverulent, it effervesces like a carbonate when thrown into dilute acids; this, together with its light colour, and freedom from taste, are the best criteria for judging of its quality. When a small mass is struck with a smooth hammer on an anvil, it is compressed into a scale with a brilliant metallic lustre.

Some are impressed with the idea that this operation is attended with much danger, which is not true if the directions above given are followed. On two occasions I have had explosions resulting in the entire destruction of the jar containing lime, but this was before I was aware of the necessity of using so large an amount of zinc. In renewing the latter in the gasometer, notwithstanding the precaution was taken to close the orifice of the tube *i*, and subsequently to expel the air from the gasometer before attaching it to the washing bottle, yet sufficient air had made its way in to cause an explosive mixture when the current of hydrogen was re-established.

ART. III.—NOTE ON CUCUMBER OINTMENT.

By William Procter, Jr.

An ointment prepared from the juice of the common cucumber, has long been known in French pharmacy, and has recently been introduced into this city by our colleague Elias Durand, who has prepared it for several years past. It is employed as an emollient application, and when well made is a good preparation in all cases where the ung. aq. rosæ, is used, and an emollient ointment wanted.

The process of making cucumber ointment consists of three distinct operations: 1st, the extraction of the juice of the green fruit in the state of advancement that it is usually eaten; 2d, the preparation of a simple ointment; 3d, the impregnation of this ointment with the odorous principle of the juice.

Seven pounds of cucumbers are pared and rasped, or sliced and bruised, and the juice expressed from them in any convenient manner so as to exhaust the pulp, and the juice strained through muslin, or a fine seive.

Twenty-four ounces of the purest lard, and fifteen ounces of selected veal suet cut in pieces, are fused together in a suitable vessel by means of a water bath heat; a little rose water (4 oz.) is added and agitated with the melted fat, and the whole thrown on a muslin cloth, allowed to pass without pressure, and suffered to repose till cool, that the moisture may separate. The ointment thus prepared is placed in a deep wide-mouthed earthen vessel, so arranged as to keep the ointment in a soft semi-fluid consistence, and one third of the juice added and beaten with the ointment until the fats of the latter have extracted all or nearly all the odour from the liquid, which requires several hours. It is then allowed to stand until the fluid separates that it may be decanted, and another third of the juice added. This is beaten in like manner until exhausted, then decanted, and finally the last third added and similarly treated.

The ointment is now heated by means of a water bath for an hour in a close vessel, allowed to repose for 25 minutes, that the coagulated albumen of the juice may rise to the surface and be removed with a skimmer. The clear melted ointment is then carefully ladled out, so as not to disturb the sediment, and strained into glass or close-textured stone jars of moderate capacity and closely stopped.

This is the proper form to prepare it for long keeping, but before using it, a quantity to suit the demand of a month is placed on a warm mortar or other vessel, until softened, and then beaten with a wooden spatula until it assumes a perfectly white and creamy appearance. It is then again introduced into the jars without allowing any unfilled interstices, covered with rose water and stopped.

With these precautions cucumber ointment readily keeps from season to season. There are several formulæ for this preparation which vary in the proportion of juice, and the manner of incorporating its odorous principle, but the above embraces all the points essential to success.

ART. IV.—VALUE OF OPIUM IMPORTED AND EXPORTED FROM 1827 TO 1845.*

	VALUE IMPORTED FROM						VALUE EXPORTED TO					
Yrs.	England.	Turkey.	France.	Italy and Trieste.	Other places.	Total	Dutch E. Indies.	Gibraltar and Br. E. Indies.	China.	Asia.	Other places.	Total
1827	$12,984	$372,191		$664	$1,722	$387,561	$9,488	$81,859	$301,804	$400	$739	$394,290
1828	5,728	144,675	$2,982	9,713	432	163,530	1,521	515	135,605		2,158	139,799
1829	1,690	92,924	12,187		370	107,171	8,011		103,247	6,214		117,472
1830	1,623	132,222	467		5,284	139,596	17,625	5,532	69,392	9,766	470	102,785
1831	26,245	149,359	533		599	176,736	75,720		650	15,020		91,390
1832	1,466	234,473	3,905		4,040	243,884	52,568		1,558	41,984		96,110
1833		87,638				87,638	28,163		11,043	13,954	519	53,679
1834	5,150	99,700	2,580		2,570	110,000	29,188		16,548	14,764		60,500
1835	38,204	62,109	48;071	14,836	9,195	172,415	9,790		50,925	1,957		62,672
1836	33,178	420,911	6,451	3,507	5,849	469,896	147,176	3,725	118,470	13,616	2,625	285,612
1837	9,715	42,715	1,425	2,954	252	57,061	12,171		52,221	38,887	2,441	105,720
1838	12,833	64,969	1,450		4,474	83,726	9,933			6,720		16,653
1839	22,887	191,764	5,105	5,795	29,424	254,975	5,870			10,192	420	16,482
1840	3,018	26.692	414	7,747	3,003	40,874	4,533			4,850	3,275	12,658
1841	38.298	205,933	910	2,590	7,868	255,599	5,198			10,211	1,557	16,966
1842	17,677	19,836			965	38,478		960		8,215		9,175
1843	3,000	15,393				18,393			900	12,661		13,561
1844	7,062	53,055	920		3	61,040	5,296		7,321	6,232	3,538	22,381
1845	25,530	7,755	104	324	3,925	37,638		336		18,210	376	18,922
	$261,138	$2,434,614	$84,924	$48,130	$77,405	$2,906,211	$422,251	$92,927	$869,684	$233,853	$18,118	$1,636,833
Exported,	-	-	-	-	-	1,636,833						
Consumed and on hand,			-	-	-	1,269,378						
Average Annual Consumption,				-	-	66,809						

* Derived from the records of the Treasury Department at Washington, and communicated for this Journal by Dr. J. B. Biddle of this city.

ART. V.—ON THE PROPERTIES OF THE ASCLEPIAS CURASSAVICA, OR BASTARD IPECACUANHA.

By W. Hamilton, M. B.

Among the most frequent weeds which infest the pastures in most of the West Indian islands, Nevis and St. Kitts more especially, there are few more attractive to the eye, or more injurious to the cattle that feed upon it. than the Asclepias curassavica, known to the English inhabitants by the names of *Bastard Ipecacuanha* or *Redhead;* the former of these names being derived from the emetic property of its roots, and the latter from the colour of its umbel of flowers.

The Bastard Ipecacuanha is a plant with an herbaceous stem of from one to three feet in height, abounding in a milky sap, bearing umbels of bright red flowers to be met with at all periods of the year. Browne and Swartz both speak of a variety with white blossoms, common in the cooler parts of Jamaica. But I found an Asclepias with blossoms of this description growing in the immediate vicinity of Cape Henri, Hayti, which possessed characters sufficiently distinct from the Asclepias curassavica, and which appeared, as far as my experience went, to be invariably and unchangeably perpetuated from its own seed, a character not altogether consistent with the commonly received idea of a variety. Among other differences which must distinguish the Asclepias nivea from the Asclepias curassavica, independent of the colour of the blossoms and the general appearance of the plants, is the form of the leaves, which I have observed in the latter to be almost invariably *ovate lanceolate,* and in the former as invariably linear-lanceolate ; such at least was the remark entered in my notes at the time ; as, although the Asclepias curassavica with its red blossoms is a sufficiently common inmate of our collections in Europe, it has never been my fortune to meet a plant bearing the most distant resemblance to it, producing white blossoms, since I quitted Hayti. The Haytian plant appears in the form of its leaves to correspond with Plumier's *Apocynum Americanum Amygdali foliis longioribus, sp.* 2, *l.c.* 30. I met it in blossom in the months of June, July, and August; but while the Asclepias nivea is so abundant near the Cape, I experienced the greatest difficulty in obtaining a specimen of the Asclepias curassavica, which is so very common at Nevis and St. Kitts. Of the properties of the Asclepias with white blossoms, I can find no memorandum among my papers, but believe they were not regarded as different from those of the Redhead.

The root of this last contains an emetic principle, varying so much in the degree of its activity, as to render its operation dangerous and uncertain; and has hence occasioned its dismissal from regular practice. Among the poorer whites and blacks, however, it is occasionally employed as a cheap substitute for Ipecacuanha, the powdered root being administered, after having been previously infused in warm water and then dried, in doses of from one to two scruples. The same emetic property resides in the expressed juice, which is exhibited internally to the extent of an ounce or more.

The uncertainty which attends the emetic operation of this plant arises most probably from inattention to the proper season of gathering it: a similar uncertainty attending all the more active articles comprising our Materia Medica, which are derived from the vegetable kingdom; of which the Piscidia erythrina in the West Indies, and the Digitalis purpurea, and Colchicum autumnale in Europe, furnish familiar examples. The age of the moon also is another circumstance which demands consideration in connection with the season of the year; since whatever sceptics, whose range of observation has been confined within the limits of the temperate zones, may think, all who have a practical acquaintance with the perennial vegetation of the topics, are fully aware of the powerful influence which the lunar phases, in conjunction with the solar heat, exert over the circulation of the sap.

Might not the emetic principle be obtained in a detached form from the decoction or infusion of the root, or of the whole plant? or from the expressed juice? and if so, might it not be made a profitable object of trade with those islands in which it is found in such inconvenient profusion? These are questions calculated to repay the labour of solution.

But it is not for its emetic properties alone that the Asclepias curassavica is entitled to attention. It is a powerful astringent, and as such eminently serviceable in checking hæmorrhages; from which it has acquired, among the inhabitants of Jamaica, the name of the *blood-flower*. Dr. Barham illustrates this by the case of a gentleman who had been long suffering from hemorrhoidal hæmorrhage, for which all the ordinary routine of practice had been exhausted without effect, and his life was despaired of by his friends. "At last," as the doctor acquaints us, "he was advised to use this flower, which was immediately got (for they grow almost everywhere) and bruised, and the juice pressed out," which was injected by a syringe, and effectually arrested the progress of the bleeding.

He also found it equally effectual, as an internal remedy, in the cure of gonorrhœa; and mentions two cases in which he employed it with the most satisfactory results. In the first of these cases he had exhibited every remedy he could think of during a space of twelve months, without affording his patient the smallest relief. Baffled in all his attempts, he at length had recourse to the blood-weed, which he administered in the form of a decoction, made from the stems, leaves, and flowers, which was taken twice a day for about a week, when the discharge ceased, and never returned afterwards. In the second case, which from Dr. Barham's account, appears to have been one of seminal weakness, rather than virulent gonorrhœa, he recommended to his patient, an elderly gentleman, who had been labouring under this infirmity for years, an infusion of the blossoms of the Bastard Ipecacuanha, in place of his ordinary tea at the usual hours, for a month, at the expiration of which time he found himself perfectly recovered, and declared, to use the doctor's own words, "that it was worth its weight in gold," adding that "he believed if a man could make it known in Europe, he would get an estate by it." Dr. Barham speaks of having used it with equal success in a multitude of other cases of the like nature; and suggests a trial of it in leucorrhœa and other disorders of females.

A syrup prepared from the expressed juice, in doses varying from a teaspoon to a table-spoonful, is employed as a powerful vermifuge after other anthelmintics have failed. It operates frequently, as Grainger remarks, both as an emetic and a purgative, and he says, he has seen the most surprising effects from its exhibition. Dr. Wright also speaks favourably of its properties, and recommends the juice of the leaves, to the extent of from a teaspoonful to an ounce taken on an empty stomach, in worm cases; and says, that he can vouch for its powerful and salutary effect when administered in this manner. He objects, however, to the powdered root as unsafe, no doubt from the uncertainty of its operation and the difficulty of ascertaining, in consequence, the proper dose to produce the desired effect. This is an objection, however, which might perhaps be obviated in a great degree, if not altogether, by attending to the suggestions already given. Besides its emetico-cathartic operations in worm fevers, Dr. Wright says it acts on the urinary organs and the skin.

In the unpublished manuscripts of the late Dr. Anthony Robinson, the following instances of its styptic and antiseptic properties are given, and preserved by Lunan in his *Hortus Jamaicensis*, vol. 1., p. 65.

"Mr. Thomas Nicol, a practitioner in physic, informed me, upon my telling him of the styptic virtues of the Pseudo-Ipecacuanha, which Barham calls *blood-flower*, that a mule had, by some accident, been wounded in the thigh, from which a violent hæmorrhage of blood issued, which, after the ineffectual application of all the styptics in his shop, was stopped instantaneously by a negro applying a handful of the blossoms and leaves of this plant. Another time, by the use of the same plant, applied in the same manner, he saw an ass, with a large ulcerated wound, full of maggots, cured effectually: for it immediately killed the maggots, and then, cleansing the wound, healed it."

Such are the strong testimonials to the value of a plant which Heaven has bestowed with the most lavish profusion upon most of the islands composing the Archipelago of the West Indies, but which man, in the blind pursuit of unhallowed gain, contemptuously rejects, or ignorantly overlooks; and yet, when the hurricane has swept the cane from the grounds of the planter, or the drought has blighted his hopes of a profitable return, the lowly blood-weed might contribute its modest aid to lighten the burthen of his losses, and repair the ruinous effects of these fearful visitations.

The root of this weed, which calls for no care in its cultivation, and is exposed to but few casualties in its growth, which imposes no intolerable labour on the husbandman, and awakens little anxiety in the bosom of the planter, if gathered at the season of the year in which its properties are most active, and dried in the same manner as that of the Rheum palmatum, or, which may probably be a preferable mode, the alkaloid or other active principle on which its emetic quality depends, extracted on the spot, may yet furnish a valuable addition to the imports from our colonies, and contribute, in some degree, along with other hitherto neglected objects of industry, some of which have been already pointed out, to lighten the evils of bad seasons and the uncertainties of cane and coffee cultivation.

I regret much having omitted, while on the spot, to investigate the properties of the Asclepias nivea, which I too hastily assumed to be identical with those of the Asclepias curassavica. An examination of these properties, and a determination of the question, started by Browne and Swartz, at to their being but varieties of one species, and points worth the attention of those whose residence on the spot enables them to apply themselves to their solution.—*Lond. Pharm. Journ.*

ART. VI.—CONCENTRATION OF COMMERCIAL NITRIC ACID.

Mr. Redwood laid before the Pharmaceutical meeting a specimen of very strong nitric acid, obtained by concentrating the ordinary nitric acid of commerce. He observed that as an unusual demand had recently arisen for the strongest nitric acid, in consequence of its use in the preparation of *Gun Cotton*, he thought it might be acceptable to some of the Members of the Society, to be informed of an easy and economical method of making such an acid. Independently of the requirement of this acid for the purpose to which he had alluded, the Pharmaceutical Chemist was directed to use nitric acid of sp. gr. 1.5, in some of the preparations of the Pharmacopœia, and therefore ought always to be able to obtain it when required. Acid of this strength was not commonly met with in commerce. Some of the manufacturers had recently commenced supplying it; but, as it is very prone to undergo decomposition, especially if exposed to the light, and as the water of the decomposed portion is transferred to that which remains, it could not be kept for any length of time without becoming weaker that the specified strength, and therefore ought to be made in small quantities as required. The process which he recommended for concentrating commercial nitric acid, consisted in mixing it with oil of vitriol, and submitting the mixture to distillation with a gentle heat. If commercial nitric acid, sp. gr. 1.42, be mixed with its own volume of oil of vitriol, and distilled by the heat of a sand-bath cautiously applied, a quantity of acid, equal to two-thirds that of the nitric acid introduced, might be drawn over, and this acid would have a specific gravity of 1.514 to 1.52. This process had been recommended some years back by M. Millon, and it was the process alluded to in the last number of the *Pharmaceutical Journal*, in the paper on Gun Cotton. Millon and other chemists, however, had stated that the nitric acid thus obtained, was always contaminated with sulphuric acid. Had this been the case, it would have entirely precluded the adoption of the process for preparing nitric acid for pharmaceutical purposes, but he, (Mr. R.) had found, from repeated experiments, that if care was taken not to apply more heat than was necessary to bring over the nitric acid, and not to push the distillation too far, the distilled acid was quite free from sulphuric acid, and was in every respect as pure as that made by the process of the Pharmacopœia. In some respects, this process possessed advantages over that of the Pharmacopœia; the acid produced was stronger, and was less coloured by nitrous acid. His object, in alluding to the subject on this occasion, had merely been to direct attention to an easy and economical method of obtaining the strongest nitric acid that could be made, and at the same time to correct an error which had prevailed, to the effect that acid, so prepared, was not pure.—*Ib.*

ART. VII.—ON THE OIL OF MONARDA (HORSE-MINT.)

By A. E. Arppe.

The oil of *Monarda punctata*, which is officinal in the United States, separates readily into an elæoptene and stearoptene. The first forms a yellowish-red fluid, which possesses the odour of thyme, and passes over when distilled with water of a bright yellow colour. The oil, thus purified and freed from water, boils at 435° F., when it becomes of a darker colour. As it cannot be assumed that this oil, the boiling-point of which approaches so closely to that of the stearoptene, was obtained perfectly free from the latter, no safe conclusion as to its composition can be expected from the analysis, which yielded 86.41 per cent. C, 9.85 H, and 3.74 O. Exposed to the air, or placed in contact with substances containing much oxygen, it very easily changes to a resin, becoming brown and thick, and exhibits on analysis a considerable decrease in the amount of carbon.

The stearoptene forms large crystalline fragments, which are coloured yellowish by the adherent fluid oil, and the odour of which has a striking resemblance to that of thyme. It can be obtained perfectly colourless by pressure between blotting paper, and quite pure by distillation either alone or with water. When submitted alone to distillation, the product solidifies in the recipient immediately, and forms very distinct crystals of remarkable lustre, which retain the above-mentioned odour and have an acrid burning taste. It leaves on distillation a small quantity of a brown resinous mass, which is soluble in alcohol. When the crystals thus obtained are distilled with water, they melt to an oil, and appear to undergo some change, as during ebullition the oil floating on the water becomes brownish; however, it distils over entirely, and the residuary water, which is wholly destitute of smell, has only a faint brownish tint. The distillate floats as a colourless oil on the water, and exhibits the remarkable property of retaining its fluid state for a very long time; but congeals, on being touched with a hard body, immediately at the point of contact, and extending rapidly over the entire surface of the oil. The greater portion forms large regular crystalline plates, but a few drops change into small spherical tufts. The crystals or spheres thus produced are distinguished by their opacity and their decomposed appearance from those obtained by the distillation of the stearoptene alone. To render them transparent and lustrous, it is only requisite to melt them and allow them to solidify; but if melted frequently, the stearoptene passes into the non-crystalline state, without its being possible to state more precisely what conditions give rise to this peculiar behaviour. When the fluid stearoptene is touched with a hard body, the formation of crystals begins again, and the crystals are for the most part opaque; but in general it must have remained for some time in its fluid state before it can be thus brought to solidify. The stearoptene melts at 119°, and solidifies at 101°; when heated to 158°, it solidifies at 93°, when the thermometer rises again to 101°; heated to 221°, it congeals at 92°, upon which the thermometer ascends to 99°; heated at 284°, it solidifies at 88°, and the thermometer subsequently ascends to 96°; lastly, when heated to 338°, it solidifies at 81°, and the thermometer ascends to 95°. Its boiling point is 428°.

These numbers show that the point of solidification descends as the heating point rises, and that the liberated heat amounts up to 275° only to 7°, but at 338° it is already 14°. At this temperature, when more caloric is set free, its tension is greater and its escape easier, which facilitates crystallization; to which is likewise owing the circumstance, that the stearoptene, when distilled alone and consequently heated to 228°, cannot persist in the fluid modification; on the contrary, when distilled with water, all the conditions requisite to its production are given.

The stearoptene is very easily soluble in æther, and especially in alcohol, and separates in crystals from both solutions on spontaneous evaporation. The substance was purified for analysis by three distillations, and the combustion made in a current of oxygen. The author found—

Carbon,	79.77	79.88	80.00	10	80.00
Hydrogen,	9.25	9.50	9.52	7	9.33
Oxygen,	10.98	10.62	10.48	1	10.67

If we regard this stearoptene as an oxide $= C^{10} H^{7} + O$, we find such a relation between its composition and that of the elæoptene from which it separated, that it may assume in the elæoptene 3 atoms of the same radical combined with 1 atom of oxygen $=3C^{10} H^{7} + O$, with which the per centage composition found agrees tolerably well.

When dry muriatic gas is passed over the solid stearoptene, it very quickly becomes brown, and after removal of the excess of acid purple-coloured. The effect is the same whether the mass be warmed or heated to boiling; on cooling it separates in dark purple crystals, which however consist for the greater part of unaltered stearoptene, as was to be expected, since the total increase in weight did not amount to more than 2 to 3 per cent. On distilling the coloured crystals in a small retort, the stearoptene first passes over quite colourless, but the red compound likewise distils over unaltered. Caustic alkali turns the red colour to blue, and on the application of heat into emerald-green, both which colours gradually return to red on exposure to the air. The red mass yields a beautiful blue solution with hydrate of barytes. When carbonic acid is passed into this, the baryta is precipitated, and at the same time the colouring substance, which imparts a blue colour to the precipitate, which colour however subsequently becomes red. At last the entire precipitate is bright red and the precipitate colourless. The red colouring substance can be extracted with alcohol from the red baryta compound, and obtained in a solid state by evaporating the alcohol as a dark violet amorphous mass. It is volatilized by heat as a red gas, resembling indigo-blue, contains chlorine, and can be distilled without decomposition.—*Chem. Gaz. from Liebig's Annalen.*

ART. VIII.—ON THE PRODUCTS OF DECOMPOSITION OF GELATINE BY CHROMIC ACID.

By A. Schlieper.

The best proportions for oxidizing gelatine by chromic acid are those pointed out by Prof. Marchand, viz. 2 parts ordinary glue, 8 of bichromate of potash, 15 of sulphuric acid, and 50 parts of water. The amount of sulphuric acid may be somewhat diminished, but not increased, otherwise the operation would not succeed, and nothing but formic acid would be obtained. The glue is first allowed to swell in the water, and the sulphuric acid then added; when the mixture has cooled, it is poured into the retort containing the bichromate in the state of a fine powder; distillation is now commenced, taking care to cool well, and the operation discontinued when the mass begins to swell. The distilled product is turbid, has an acid reaction, and a strong odour of prussic acid, of which it contains a large quantity. It is redistilled over oxide of mercury, collecting only the first portions; as soon as the liquid which passes has lost its aromatic odour and is decidedly acid, it is tolerably certain that all the oily constituents have passed over. The product amounts to from one-fifteenth to one-twentieth of the whole. After having separated the oily portions, the recipient is changed and the distillation continued; a turbid liquid now passes, which contains the volatile acids in solution; it is neutralized with barytic water, and after evaporation the barytic salts decomposed by sulphate of soda, and the soda salts submitted to distillation with dilute sulphuric acid. The product thus obtained is a concentrated aqueous solution of the volatile acids; it has a strong smell of vinegar and cheese. To effect the separation of the acids, the liquid is saturated with carbonate of soda and evaporated to dryness, the dried soda salt reduced to powder and agitated with dilute sulphuric acid (1 part of acid to 3 of water) in a narrow cylindrical glass. The liquid separates into two strata: one is aqueous, and crystallizes in part; the supernatant one is oily. From the analyses of the author, it results that the latter is a mixture of *acetic* and *valerianic* acids; the crystallizable acid possessed the composition and all the characters of *benzoic* acid.

The *prussic* acid had remained in combination with the oxide of mercury in the form of a basic cyanide $= HgCy + HgO$, which has been described by Berzelius in his 'Manual of Chemistry,' vol. iii. p. 871.

The author has established the identity of the preceding bodies by analysis.

To extract the volatile oils produced by the action of the chromic acid, the aqueous portions which passed first were repeatedly rectified, each time collecting only the first portions which were then in their turn rectified. In this way there was finally obtained an aqueous liquid, upon the surface of which the volatile portion had separated in the form of an oil; the water was saturated with chloride of calcium, decanted, and rectified over fused chloride of calcium. This oil contains two peculiar bodies, which are separated by the difference in their boiling-point.

Valeronitrile is the least volatile oil, very fluid, limpid and colourless; it is lighter than water, and has a density of 0·81; it dissolves to some extent in water, and distils readily with the vapour of water; it is neutral, and possesses an acrid aromatic taste; its odour resembles that of oil of bitter almonds, or of hydruret of salicyle. It burns with a white luminous flame, and is composed of $C^{10}NH^{9}$. Hydrochloric and nitric acid have no action upon it, but sulphuric acid converts it into valerianic acid, which is set free, and into sulphate of ammonia. It is not altered by ammonia. It dissolves in alcohol and æther in every proportion, and it boils at 257°F. It is attacked by chlorine and bromine when exposed to the rays of the sun.

Valeracetonitrile is a volatile oil of a similar odour to the preceding substance, but more agreeable. It boils betwixt

154° and 158°F.; its density is 0·79; its taste is acrid. On analysis it was found to correspond to $C^{26}H^{24}N_2O^6$.

Ammonia, hydrochloric and sulphuric acids do not alter it, but concentrated sulphuric acid decomposes it in a similar manner to the preceding body, and there is formed sulphate of ammonia, while acetic and valerianic acids are set free.

When chlorine is passed into it the liquid becomes heated, and on cooling deposits beautiful crystals of a chlorinated compound. Bromine acts in the same manner, giving rise to two bodies, one crystallizing in small needles, the other liquid, and which violently attacks the eyes and olfactory organs.

Towards the end of the distillation of the crude product yielding the two preceding oils, the author obtained a heavy oil, which had the smell of cinnamon; but he was not able to investigate it more minutely, from want of material.—*Ibid, from Liebig's Annalen.*

ART. IX.—ON THE MALAMBO BARK OF THE PROVINCE OF CARTHAGENA, SOUTH AMERICA.

By W. Hamilton, M. B.

In the third volume of the *Pharmaceutical Journal*, page 169, I observed an interesting and instructive paper, by Mr. Ure, on the *Malambo* or *Matias* bark, of New Granada, with some notice of its sensible qualities.

Having, as far back as the year 1825, received a portion of bark, under the former of these names, from my indefatigable correspondent, Edward Watts, Esq., British Consul at Carthagena, accompanied by extracts from some of the Spanish writers on the natural history and productions of that province, detailing its medicinal properties, but without furnishing any clue to the localities in which it is to be found, or the botanical character of the tree from which it is obtained, I turned with some eagerness to Mr. Ure's paper, in the hope of meeting in it some portion of that information which I had failed to procure from other sources; but in this expectation I was disappointed.

It appears from Mr. Ure's paper, that a bark, known by the name of *Malambo,* was received in Europe at least nine years before the date of the letter which accompanied the specimens sent home from Carthagena by Mr. Watts, of which an analysis, made by M. Cadet Gassicourt, appeared in the 2d volume of the *Journal de Pharmacie,* and a second analysis, by the celebrated Vauquelin, is to be found in the 96th volume of the *Annales de Chemie,* from which, as Mr. Ure's paper informs us, the active constituents of the bark appear to be an aromatic volatile oil, a very bitter resin, and an extract soluble in water; but neither tannin, or any of the alkaloids of cinchona, were found, and only a slight trace of gallic acid.

But in the absence of a satisfactory description of the botanical characters, we are unable to determine the identity of the several specimens submitted to examination, and it remains as much a question as ever whether the tree which furnishes it belongs to the genus *Drymis,* as many botanists conjecture—to the genus *Quassia,* as M. Bonpland somewhat hastily concluded, or to some genus not hitherto submitted to botanical examination.

I regret my inability to throw more light upon this part of the subject than those who have preceded me; but, as connecting links in the medical history of a substance which, although known in Europe for upwards of thirty years, still slumbers in mysterious obscurity, and is far from being appreciated to the extent it merits, the following fragments of its local history may not be deemed wholly misplaced among the Transactions of the Pharmaceutical Society.

In a work, on the natural productions of the province of

Carthagena, by Don Jorge Lopez,* the date of which I unfortunately do not possess, that writer states:

> "Se dia, en la Provincia de Cartagena, un arbol de la misma altera de los *Quinos*, nombrada MALAMBO, cuja corteza, en mi concepto, tiene qualidades mas recommendables que le *Quina;* ella abunda de un *Aromatico* tan constante y penetrante que jamas lo pierde, y por supuesto abunda tambien de partes *gomosas* muy utiles, à mi ver, a la naturaleza; es indigena de esta Provincia, y *se encuentra con abundancia.* Su corteza es que hablo, y creo que si se dedicasen los facultativos à hacer uso de ella, *la Quino perderia su concepto.* En este pais la, aplican à diversos males con ventaja conocida, en particular yara los *pasmos*, *heridas*, *inflamaciones*, *males del estomago.* A mi ver produciria un efecto admirable en la *hydropesia* y *fiebres malignes;* por varias observationes que se han hecho, es eficax para las *asmas*, *rheumatismo*, *disenteria*, *supreciones de menstruas.* En fin, en el pais, y, en particular, en los campos, es un remedio general aplicado, con felix suceso, en todas las enfermedadas referidas."

"A tree exists in the province of Carthagena, of the stature of the cinchona, called the *Malambo*, whose bark, in my opinion, possesses qualities far superior to those of the cinchona. It abounds in an aroma, so durable and penetrating, that it is not impaired by any lapse of time, and must, therefore, I imagine, consist of gummy particles of great value to man. It is a native of this province, and very abundant. I speak of its bark, and were the faculty to employ it, cinchona would sink into disrepute. It is employed with known advantage in this country, in the treatment of various complaints, especially in spasms, wounds, inflammations, and disorders of the stomach. It would, I think, be highly beneficial in cases of dropsy and malignant fevers. Experience has proved its efficacy in asthma, rheumatism, disentery, and menstrual obstructions, in my own practice. In fine, here, and in the country especially, it is an universal remedy, employed with the happiest effect in all the above-named complaints." In another rare and

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* Don Jorge Lopez was an Apothecary, residing in the town of Carthagena, near the British Consulate, at the time Mr. Watts was there.

valuable Spanish work, in the possession of Mr. Watts, and from which that gentleman also favoured me with an extract, it is spoken of as follows:

"El tercero* es el Malambo, enja corteza aromatica es un antipasmodico eminente, de un amargo may activo, febrifugo, y astringente. Lo hay con abundancia en la Provincia de Santa Maria, donde la aplican para curar *pasmo*, *calenturas*, *intermittentes*, y la *dysenteria;* y tambien se encuentra en varios territorios de esta Provincia. Se hacen algunas extracciones de su corteza para la Habana, y alli lo usan con mucho suceso contra el *pasmo* àque son muy propensos los negros; y desde que tienen este specifico, casi no muero ninguno de el. Acqui no se aplica para nada, y hace pocos dias hemos, vista morir un joven apreciable, por no haberle dado en tiempo este remedio. Es un vegetal importantissimo, que merece la atencion del Gobierno por las virtudes, que dexamos expuestas, y aplicaciones que se hacen de el en Santa Maria, como por el color y olor de su corteza, tenemos razones para creer sea del genero *cusparia*, *ó quino de Angostura*, de que se compone parte de la receta del difunto Dr. Mutis, para curacion de la *dysenteria*, y no dudamos asegurar que, à falta de esta, puede suplir la CORTEZA DEL MALAMBO."

"The third is the MALAMBO, whose aromatic bark is a powerful antispasmodic, containing bitter febrifuge and astringent properties of great activity., It abounds in the province of Santa Martha, where it is employed in the cure of *spasms*, *intermittents*, *calentures*, and *dysenteries;* it occurs also in various parts of this province (Carthagena.) The bark is exported to the Havannah, where it is exhibited in the treatment of spasms (*tetanus?*) to which the negroes are very subject; and since the adoption of this remedy hardly any deaths arise from this complaint. Here we make no use of it; and very lately (in 1810, at Carthagena) we have witnessed the death of a valuable young man from the neglect of exhibiting this remedy in sufficient time. It is a most important vegetable production, meriting the attention of government from the valuable properties it possesses, and the use made of it at Santa Martha.

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*The other three are the Guayacan, Ariza, and Guarumo

Both from the colour and smell of the bark, it would appear to belong to the genus *cusparia*,* or the *cinchona* of Angostura, which entered into the composition of the prescription of the late Dr. Mutis for the cure of dysentery; and we have no hesitation in saying that the bark of the malambo may supply the place of that of the *cusparia.*"

I distributed the specimens of the bark received from Carthagena among my medical friends here, and sent a portion to Dr. Bostock, of Great Coram Street, London. From the former I was unable to obtain any report; from the latter I received a reply, of which the following is a copy, dated London, 11th December, 1825:

"SIR,—I regret that so long a time should have elapsed since the receipt of your letter. When it arrived I was from home; and have, since that time, been very particularly engaged. The account which is given of the bark is certainly very much in its favour, and its sensible properties are such as to render it probable that it may be an useful article of the Materia Medica. The only plan, however, to establish a point of this nature would be to send a quantity of the substance to some hospital or dispensary, where a number of trials might be made of it by any person in that kind of extensive practice. Its taste and odour would make one suppose that it may be found useful in affections of the stomach and bowels, as is the case with *Colombo* or *Angostura;* and even, if its properties were found to be very similar, still, it might be very important to have a variety of articles. As I have no connection with any medical charity, it will not be in my power to give you any assistance, and I think it will be your best plan to apply to some practitioner in your neighbourhood. I am, &c.

J. BOSTOCK."

Such was the abortive result of my endeavours to obtain a fair trial and full report of the value of this bark in practice. Since that time my specimens have been lost, and the subject was almost completely obliterated from my recollection, till the paper, to which I have referred, summoned it from the regions of oblivion, and induced me to

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* *Blonplandia trifoliata.* Had this conjecture been well founded, the resemblance must have struck Dr. Bostock, which does not appear from his letter to have been the case.

seek for further information in the faded records of past correspondence.

Had such a body as the Pharmaceutical Society been coexistent with the facilities for foreign and colonial correspondence which I then enjoyed, and of which I fully availed myself for the service of the public, the mystery which to the present moment involves the tree yielding this valuable bark would most probably have been long since cleared up, and botanists would not only be familiar with the characters of the inflorescence and fructification, but our Materia Medica might have been enriched by an elegant, agreeable and active tonic.

From the accounts given by the Spanish writers, Don Jorge Lopez and Don Ignacio de Pombo, the friend and companion of the lamented Mutis, in the extracts just given from their respective works, we learn that the MALAMBO is a tree of common occurrence in the forests of Santa Martha and Carthagena, and may no doubt be found throughout the whole of the littoral chain which stretches from Punta Paria, in the east, to the Gulph of Maracaybo, and thence westward through the provinces of Santa Martha and Carthagena to the Gulph of Darien; and as the Flora of Trinidad is but an extension of that of the continent, it is by no means improbable that the MALAMBO is also a denizen of those unexplored forests which wave in perennial verdure beneath the British flag. It were, therefore, much to be desired that some of our merchants residing at Santa Martha or Carthagena, the localities clearly indicated in the foregoing extracts, could be induced to procure well authenticated specimens of the bark, seeds, fructification, and inflorescence of the tree so highly spoken of by the writers already named, and transmit them for examination to the Pharmaceutical Society, the legitimate body for conducting such inquiries. The botanical characters being once clearly determined, it would be comparatively easy to ascertain its existence in the forests of Trinidad; or, if its value were found to correspond with the high character given to it, the seeds might be obtained and plantations formed in Trinidad and others of our islands, which would in process of time add much to the diversity and importance of their exports, and contribute somewhat likewise to the strength of the artillery which the medical practitioner employs to repel the assaults of mortality.—*Pharm. Jour.*

ART. X.—ON THE PURIFICATION OF COBALT FROM ZAFFRE.

By Mr. B. H. Paul,
Assistant in the Laboratory of the Pharmaceutical Society.

Having found that the process for obtaining a salt of cobalt from zaffre, by the use of oxalic acid, was attended with considerable inconvenience, and did not yield a pure product, I have endeavoured to ascertain whether some other more advantageous process might not be employed; and among others it occurred to me that the process adopted by Mr. Phillips for the quantitative separation of this metal from nickel, if somewhat modified, would answer for for the purification of zaffre. This process is founded upon the property possessed by nickel of being precipitated by potash from an ammoniacal solution of the two oxides, while cobalt is unacted upon.

The zaffre of commerce consists essentially of impure oxide of cobalt, obtained by roasting the sulpho-arseniuret of cobalt, or cobalt ore, and mixing the product with a quantity of sand; it contains, besides cobalt, iron, copper, bismuth, and nickel.

This is treated with hydrochloric acid, which dissolves al but the sand, and the liquid evaporated to free it from excess of acid; on the addition of water, a white substance remains undissolved, which contains so large a quantity of bismuth, as to render it worth preserving. The solution now contains cobalt, nickel, iron, copper, bismuth, and arsenic, and on passing sulphuretted hydrogen through it, copper, arsenic, and bismuth are precipitated; after driving off the excess of sulphuretted hydrogen by the addition of a little hydrochloric acid and boiling, oxides of nickel, cobalt, and iron are precipitated by ammonia, an excess of which dissolves the first two, and iron may be removed by filtration.

To the ammoniacal solution largely diluted with water, that has been well boiled to free it from air, potash is added, which precipitates nickel; it is then filtered, and sulphuretted hydrogen passed through it; this forms sulphuret of ammonium with the ammonia present, which, reacting on the oxide of cobalt, precipitates the sulphuret of cobalt. This, when well washed, may be treated with acids, to form any of the salts.

I have tried this process several times, and find it to answer perfectly; a pure salt may thus be obtained at a very moderate cost, and a considerable quantity of bismuth as a bye product. The objections to the use of oxalic acid are that the nickel cannot be separated thus, as its oxalate is as insoluble as that of cobalt, and that the product being an insoluble salt, requires to be reduced with heat, in order to make the other salts.—*Ib.*

ART XI.—PROCESS FOR PREPARING CANNABINE (?), OR HEMP RESIN.

By T. and H. Smith, Edinburgh.

The following method for the preparation of hemp resin, among several tried by us successively, is the one to which we give the preference; and, agreeably to promise, we now send the details for publication in the *Pharmaceutical Journal.*

The plant is, after being bruised, digested in repeated portions of moderately warm water, pressing out at each time till the water comes away colourless. It is then digested in a solution of crystallized carbonate of soda, using of this half the weight of the quantity of dried gunjah operated on. After macerating at a moderate heat for two or three days, the liquid is pressed out, and pure water substituted; and this is repeated till the water comes away nearly colourless. The washing is for the purpose of removing a large quantity of brown colouring matter, which we have found it difficult to remove in any other way than this. The alkali removes a further quantity of colouring matter, along with a large quantity of a fatty acid, *quite inert,* which may be got by adding an acid to the alkaline liquid after filtration. The plant is now dried till it ceases to lose weight, and then macerated or percolated with strong rectified spirit of wine. To the spirituous solution a milk of lime, as thick as cream, is added, containing one ounce of fresh burnt lime for every pound of the plant. The lime removes any of the fatty acid and chlorophylle which may have been left by the soda. After filtration, a slight excess of sulphuric acid is added to throw down in the state of sulphate the lime left in the liquid; for this purpose, one or two fluid drachms for every pound of the dried plant will be quite enough. A little pure animal charcoal is now also added, and shaken with the liquid for some time. We may mention that the decolourizing action of the charcoal is very limited; for, after acting with one portion and filtering, and repeating the process with another, the filtered liquid on comparison will not appear any lighter in colour than the first. The greater part of the spirit is now, by distillation, recovered from the filtered liquid, and the resin washed out with a small quantity of rectified spirit. Three or four times its bulk of water is then mixed with the liquid, and the dish (a porcelain basin) is set aside till the spirit has completely escaped by evaporation. The resin, being heavier than the watery liquid now left, remains at the bottom of the dish. The fluid is now carefully poured off, and fresh water used till it comes away free from any sour or bitter taste. The resin is now dried either spontaneously or by the aid of heat ; and to expedite the drying, it is spread out occasionally in a thin layer on the side of the dish.

The resin is brown in mass, but of a fawn colour, in thin layers. Heated on platinum foil it melts into a liquid, takes fire, burns with a bright white flame, and disappears entirely. Two-thirds of a grain acts upon ourselves as a powerful narcotic, and one grain produces complete intoxication. In this character it is quite analegous to alcohol, but in its hypnotic and soothing effects on the nervous system, its resemblance to morphia is very great. It contracts the pupil. It does not seem to have any spasmodic or paralysing action upon the bladder.

One experiment of ours shows that the peculiar action of hemp resin on the human system is not easily destroyed, and is retained with great tenacity. We heated in the open air a dose of the resin, spread out so as to cover nearly two square inches of the bottom of an evaporating basin, at a temperature of 180° Fahr., for eight hours continuously, notwithstanding which treatment it appeared to us on trial not to have suffered the least diminution of its energy. The resin contains the whole power of the plant, which we have proved by taking a quantity of the plant equivalent to a dose of the resin. We could observe no difference in strength of action. The dried gunjah yields from 6 to 7 per cent. of the resin.—*Ibid.*

ART. XII—.ON QUINOIDINE.

By Mr. Redwood.

Since the publication of the fact that the amorphous quinine, for which a patent has been taken out in this country, is neither more nor less than the substance which has long been known in commerce under the name of *Quinoidine* or *Chinoidine*, numerous inquiries have been made as to the difference, if any, *in quality*, between the patented preparation, and the quinoidine in the state in which it is met with in commerce. Most of the wholesale houses are now supplying quinoidine at one-fourth the price of the patented amorphous quinine, and there can be no reason why the former should not in all cases be substituted for the latter, if it be found to be equal to it in quality.

It has been already shown that quinoidine and the patented amorphous quinine, are both mixed products, containing several proximate principles, and that one part of these principles is soluble, the other insoluble in ether. Even the part which is soluble in ether, is found, on examination, to consist of two or three bodies, which, to a certain extent, may be separated by crystallization. No method, however, has yet been pointed out by which the whole of these bodies may be readily and completely separated from each other; indeed, the task would be nearly as difficult as that of resolving a specimen of extract of bark into its proximate constituents.

But although quinoidine and the patented amorphous quinine have no more title than some of the medicinal extracts to be classed among definite chemical bodies, yet we may judge of the qualities of different specimens of these substances, by the examination of their physical and chemical characters.

Quinoidine, it is well known, is obtained from the dark coloured mother-liquor remaining after the crystallization of the disulphate of quinine. In the evaporation of this liquor, similar changes no doubt take place to those which occur in the preparation of extracts; and the quinoidine which is precipitated by the addition of an alkali, will be subject to variations, according to the greater or less degree of heat, and of atmospheric action to which the liquor has been exposed. Again, if, instead of adding an alkali to precipitate the quinoidine, the liquor be simply evaporated to dryness, the product, will, of course, be very different; it will now be more or less soluble in water, in consequence of the presence of the acid. Some specimens of quinoidine are said to have been obtained in this way.

Thus quinoidine is liable to variations in quality and in composition, arising from two distinct causes.

In examining specimens of quinoidine, with the view of estimating their qualities, the following method may be adopted:

The specimen should be dried by the heat of a water-bath, until it ceases to sustain any further loss of weight.

(*a*) A weighed quantity of it is to be dissolved in distilled water acidulated with sulphuric acid, and ammonia added to the solution as long as any precipitate is formed. This precipitate is to be collected on a filter, washed, dried by the heat of a water-bath, and then weighed. The two weighings should correspond, if the specimen be good.

(*b*) A portion of the dried specimen is to be treated with rectified spirit, in which it should be perfectly soluble. Those specimens, the solutions of which have the lightest colour, are most free from smell, and in taste approach to a pure bitter, may in these respects be considered the best.

(*c*) A weighed quantity of the dried specimen is to be treated with ether as long as anything is dissolved by this menstruum, the solution being promoted by trituration in a mortar; the ethereal solution is to be submitted to spontaneous evaporation in a large porcelain dish, and the insoluble residue dried by the heat of a water-bath, and weighed. The insoluble part should not amount to more than thirty per cent. of the dried specimen. After the residue of the ethereal solution has stood for several days, it should be examined under a microscope, when it will be found to contain two kinds of crystals, one small and acicular—the other larger, in rhombic prisms. The former of these is quinine, the latter cinchonine, the proportions of which vary in different specimens.

I have met with no specimens, at present offered for sale in the London market, in which the presence of foreign matter was indicated by the tests (*a*) and (*b*). On treating different specimens with ether, as described (*c*), considerable difference is indicated. Some specimens contain as much as thirty-five per cent. of insoluble matter, while from one specimen that I have examined, there was only twenty-five per cent. of residue.

There is a difference in the appearance of the insoluble residue obtained from different specimens; in some cases it is much darker coloured than in others. The specimen yielding twenty-five per cent. of residue, is the best that I have met with; when reduced to powder, it is of a light brown colour; it forms a solution in spirit, or in water with the addition of an acid, which is not so nauseous in taste, as similar solutions formed from some other specimens, not excepting the patented preparation. Moreover, the portion insoluble in ether, is of a much lighter colour than that obtained from the other specimens. This specimen appears to have been less exposed than the others to heat and other decomposing agencies.

I understand that some amorphous quinine, prepared according to Liebig's process, by solution in ether, has been made; but this will not, probably, be offered for sale, until the specification of the patent has been filed, when it will be known what the patentee's process is, and how far it will affect the manufacture and sale of Liebig's preparation by other parties.

There can be no doubt, however that *quinoidine* may be made and sold as heretofore, without any reference to the patent; and it will be a question for the profession to consider, whether they will purchase it under its old and well-known appellation, and at its fair market value, or whether they prefer paying for the privilege of using it under a new, assumed, but false title.—*Ibid.*

Note.—In our October number, an article on Amorphous Quinia appeared from the pen of Baron Liebig, which exposed the fact that a large portion of the Quinoidine or precipitated extract of Bark of European commerce, was composed of the alkaloid Quinia in a peculiar condition isomeric with ordinary quinia, and capable of forming salts,—and is in fact the active agent in the black extract-like substance officinal in our Pharmacopœia of 1830, under the name of "Impure Sulphate of Quinia." Quinoidine is the matter precipitated when carbonate of potassa is added to the mother liquor that yields "impure sulphate of quinia" by evaporation. The London pharmaceutists and chemists have been thrown into a ferment, by the announcement that a patent had been granted to J. Lloyd Bullock, for the exclusive preparation of "Amorphous Quinia" on behalf of a foreigner;—and as this announcement was not made until after the publication of Liebig's paper, and the general currency of the facts contained in it, when the manufacturers of sulphate of quinia had prepared themselves to furnish the article, these gentlemen think themselves illy used. Liebig's name is not used in the patent, but the editor of the Pharmaceutical Journal and others suppose that he is the "foreigner abroad" for whom the patent was obtained, which has called forth some severe animadversions. From the above paper by Mr. Redwood, the so-called amorphous quinia is little more than the quinoidine of commerce, and if so the patent can hardly stand. An extract from the patent follows.

W. P. Jr.

ART. XIII.—EXTRACT FROM A PATENT FOR PURIFIED QUINOIDINE, AMORPHUS QUININE, AND BASIC EXTRACT OF BARK.

[The first part of the specification granting the powers, &c., is omitted.]

Preparation of Purified Quinoidine or Chinoidine.—I take three pounds of the residue of quinine manufacture, termed chinoidine (which should be soluble in alcohol and in dilute sulphuric acid, and insoluble in water.) Nine ounces by measure of concentrated sulphuric acid diluted with one gallon of water, and dissolving the chinoidine therein, I then pass sulphuretted hydrogen through the solution for nine hours, for the purpose of precipitating metallic matters and other impurities. The mixture is then to be filtered through paper or other suitable material, as is well understood by chemists; it is then boiled to drive off excess of sulphuretted hydrogen, and an alkali or alkaline carbonate added, to precipitate the chinoidine. I use commonly for the above named quantity, three pounds of carbonate of soda, dissolved in one gallon of distilled water. The precipitate obtained is then to be well washed with distilled water, and dried over a water-bath; towards the conclusion of the drying, and in order to dry it more effectually, I place it in a chloride of calcium bath, and heat it a few degrees higher than 212°. It is then reduced to powder, and kept in well-closed bottles. This purified chinoidine may also be kept in solution in alcohol or other vehicle, or made into saline compounds. I prefer to sell it in a state of powder, it being more convenient in that form. I also prepare various saline compounds of purified chinoidine, by taking at the rate of one-twelfth less than of the amorphous quinine hereafter explained, and mix it with acids as hereafter explained in respect to amorphous quinine. In some cases it is desirable to dissolve the purified chinoidine in alcohol before mixing with the acids. These saline compounds I prepare for sale, either in solution or by evaporating them to the solid state, and reduce them when they will allow of it, to powder. In all cases, the preparation should be kept in well closed bottles.

The preparation of Amorphous Quinine.—I take three pounds of chinoidine as before, or in the purified state as above described (for this purpose it is best to use it before it is fully dried) and mix it well with twice its weight of pure sand, and digest in nine parts of ether (commonly known as sulphuric ether.) The specific gravity of the ether I believe most suitable, being about 735; I stir up the mixture three or four times during the digestion, which should continue twelve hours, and pour off the solution. To the residue I add nine pints of fresh ether, and proceed as before; I mix the two solutions, and allow them to settle; when perfectly bright, I pour off the fluid from the sediment into a retort or suitable vessel, and distil off the ether by means of a water-bath. The substance left in the vessel is to be dried in the same manner as is directed for the purified chinoidine. To this residue I apply the term *Amorphous Quinine.* The saline compounds are prepared by taking one equivalent of an acid in solution, and dissolving in it an equivalent of the amorphous quinine, considering carbon 6, oxygen 8, hydrogen 1. I take one hundred and sixty-two parts of amorphous quinine to each equivalent of acid, all which is understood by chemists, and I form basic neutral or acid salts, in the usual way.

Basic extract of Bark.—The residue left upon treating chinoidine with ether, in order to extract the amorphous quinine, contains also valuable medicinal matter. I take any given amount of this product, and calculating the amount of dry substance it contains, treat it with six times its weight of alcohol, generally preferring it 56° over-proof. I decant the clear fluid, and evaporate it to dryness, in the same manner as with amorphous quinine. To this product

I apply the designation *Basic Extract of Bark*, or I prepare this as follows:—To three pounds of the dry residue, as above, I add nine ounces by measure of concentrated sulphuric acid diluted with one gallon of water, and dissolve the same; and through this solution I pass sulphuretted hydrogen, and proceed in the same manner as when producing purified chinoidine, and in making solutions and saline compounds therefrom.

Having thus described the nature of the invention and the manner in which the same is to be performed, I would have it understood that I do not confine myself to the details herein described so long as the peculiar character of either part of the invention be retained; but what I claim is,

First, The manufacture of what I have called "Purified Chinoidine," by purifying and reducing that matter to a state of powder, as herein described; and I also claim the making alcoholic and other solutions of such purified chinoidine, and also the producing saline compounds thereof.

Secondly, I claim the manufacture of what I have called "Amorphous Quinine" by separating the matter soluble in ether from other matters, as herein described; I also claim the preparing alcoholic, ethereal, and other solutions thereof, and I also claim the preparation of saline compounds of the same.

And, thirdly, I claim the manufacture of what I have called "The Basic Extract of Bark," by separating such product by ether from the soluble matter, and preparing such extract as herein described, and producing alcoholic and other solutions and saline compounds thereof.

In witness whereof, I, the said John Lloyd Bullock, have hereunto set my hand and seal this twelfth day of November, in the year of our Lord one thousand eight hundred and forty-six.

John Lloyd Bullock.

Ib.

ART. XIV.—ANALYSIS OF ALOES AND ALOETINE.

By M. Edmond Robiquet.

The specimen of the aloes examined, was obtained from M. Chevallier; it was found to contain the following constituents in 100 parts:

Pure aloes (*Aloëtine*)	85.00
Ulmate of potash	2.00
Sulphate of lime	2.00
Carbonate of potash Carbonate of lime Phosphate of lime	traces.
Gallic acid	0.25
Albumen	8

To obtain the *aloëtine* or *purified aloes*, commercial aloes, reduced to powder, was exhausted with cold distilled water, by which means none of the salts present, excepting the ulmate of potash, and a small quantity of sulphate of lime and carbonate of potash, are taken up. This solution was evaporated over a water-bath until reduced to one half, and an excess of neutral acetate of lead was then added, which threw down a light flocculent yellow precipitate, consisting of a mixture of gallate, ulmate, and albuminate of lead, and containing traces of carbonate and of sulphate of lead.

The solution now contained, in addition to the aloes, acetate of potash, and acetate of lime, resulting from double decomposition, and the excess of acetate of lead. On adding a sufficient quantity of ammonia, the precipitated oxide of lead carried down all the aloes contained in the liquor, forming a kind of lake of a pure orange-yellow colour, passing in a few minutes under the influence of the solar light, to a greenish-yellow. This lake, quickly separated and washed with boiling water, was decomposed by a current of sulphuretted hydrogen, atmospheric air being excluded. On the conclusion of this operation, the sulphuret of lead was covered by a perfectly colourless supernatant liquor, which, on being carefully decanted and evaporated *in vacuo,* afforded no crystals, but dried in scales, having the appearance of a kind of varnish, with a very slight tint of yellow.

I used the product thus obtained in my examination for the presence of nitrogen, and also in the analysis with oxide o copper. To distinguish it from the crude aloes I have called it *aloëtine.*

Aloëtine is obtained in the form of nearly colourless scales, if in the process air be as much as possible excluded. It is very soluble in water and in alcohol, little soluble in ether, and completely insoluble in the fixed and essential oils. On calcination in close vessels, a shining voluminous residue is left, which entirely disappears on incineration in the air. The aloëtine is not coloured by either the *per* or *proto* salts of iron; and it gives no precipitate with acetate of lead; in other respects its reactions are similar to those of socotrine aloes.

If the aloëtine be dried in contact with air, the scales, instead of being colourless, will have an intense red colour, due to a slight absorption of oxygen. With the exception of the difference in colour, it undergoes no modification in its chemical properties, and probably analysis would hardly detect any difference between that altered by the contact of air, and that prepared *in vacuo.* The process may therefore be rendered much more easy by drying the product over a water-bath, or by exposure to the heat of the sun, when it is not desired to obtain the aloëtine in a state of absolute purity.

Aloëtine possesses in a high degree the purgative properties and bitter taste of ordinary aloes. For medicinal use eight parts of aloëtine are equivalent to ten parts of socotrine aloes and fifty parts of Cape aloes.—*Ib. from Jour. de Pharm.*

ART. XV.—ON THE SOLUBILITY OF SOME PRECIPITATES WHICH OCCUR IN QUANTITATIVE ANALYSIS.

By R. Fresenius.

I. *Solubility of the Potassio-chloride of Platinum in Alcohol.—No free Muriatic Acid présent.—a.* An excess of perfectly pure recently precipitated potassio-chloride of platinum was digested with alcohol of 0.805 spec. grav. for 6 days, at a temperature of 59° to 68°, in a closed flask, with frequent agitation. 72.5 grms. of the perfectly colourless filtered solution, evaporated in a platinum dish, left 0.0060 grm. residue dried at 212°. Accordingly 1 part potassio-chloride of platinum dissolves in 12085 parts of alcohol of 0.805 spec. gravity.

b. The same experiment, made with spirit of 0.873, showed that 1 part of the salt required 3775 parts spirit of this strength for solution.

c. With spirit of 0.923, 1 part of the salt dissolved in 1053 parts.

In the presence of free Muriatic Acid.—Recently precipitated potassio-chloride of platinum was digested in the cold with spirit of 0.873 spec. grav., to which some muriatic acid had been added. 67 grms. of this solution, which was coloured yellowish, left 0.0146 grms. platinum, corresponding to 0.0365 grm. potassio-chloride of platinum; consequently 1 part of the double salt dissolves in 1835 parts of spirit, containing muriatic acid.

II. *Solubility of the Ammonio-chloride of Platinum in Alcohol.—No free Muriatic Acid present.*—The author found 1 part of this salt to require 26535 parts alcohol of 0.805 for solution, 1406 spirit of 0.873, and 665 parts spirit of 0.228.

In the presence of Muriatic Acid.—1 part of the double salt dissolved in 672 parts of acidified spirit of 0.873 spec. grav.

III. *Solubility of the Carbonate of Baryta.*—1 part of the recently precipitated salt dissolves in 14137 parts *cold* water, and 1542 parts *boiling* water.

A solution of chemically pure chloride of barium was treated with an excess of ammonia and carbonate of ammonia, heated gently, and set aside for 12 hours. The filtered solution remained perfectly clear on the addition of sulphuric acid; after standing for a very long time a scarcely perceptible precipitate had separated. 84.82 grms. of the solution, evaporated in a small platinum dish and gently ignited, left 0.0006 residue; consequently 141000 parts of the liquid, containing ammonia and carbonate of ammonia, had dissolved 1 part of the salt.

IV. *Solubility of the Silico-fluoride of Barium.*—1 part of the salt was found to dissolve in 3802 parts *cold* water and 3392 parts water, after being boiled with it, and then allowed to cool. In cold water containing muriatic acid the relation is as 1 part to 733; but on being boiled and then allowed to cool, the relation is as 1 to 640.

V. *Solubility of Sulphate of Strontia.*—In pure water at the ordinary temperature 1 part dissolves in 6895, and in 9638 parts of water at 212°.

In water containing muriatic and sulphuric acid, 1 part requires 11862 parts.

VI. *Solubility of Carbonate of Strontia.*—1 part of the salt requires, according to the author, 18045 parts water for solution; and in water containing ammonia and carbonate of ammonia, 1 part requires 36545 parts for solution.

When a solution of chloride of strontium is precipitated with carbonate of ammonia and ammonia, the filtered solution is not rendered turbid on the addition of alcohol by sulphuric acid.

VII.—*Solubility of Carbonate of Lime in Water.*—1 part of this salt dissolves in 8834 parts *boiling* water, and in 10601 parts *cold* water; and in water containing ammonia and carbonate of ammonia 1 part in 65246 parts.

VIII. *Solubility of pure Magnesia in Water.**—Perfectly pure crystallized sulphate of magnesia was dissolved in water, the solution precipitated with carbonate and caustic ammonia, the precipitate most carefully washed (it still contained nevertheless a perceptible trace of sulphuric acid;) it was dissolved in pure nitric acid, avoiding an excess of acid, again precipitated with carbonate and pure ammonia, and the precipitate most carefully edulcorated. The perfectly pure basic carbonate of magnesia thus obtained was ignited in the platinum crucible until its weight remained constant, then digested with distilled water (which left on evaporation not a trace of fixed residue, and was likewise perfectly free from chlorine) for 24 hours in the cold, being frequently agitated. 1 part of pure magnesia was found, on an average of three experiments, to dissolve in 55368 parts cold water. This solution of magnesia has a faint but distinctly alkaline reaction, which may easily be detected by means of slightly reddened litmus paper; it is not rendered turbid by alkaline carbonates either in the cold or on boiling; it likewise remains clear with phosphate of soda, but if ammonia be added it becomes turbid after slight agitation, and soon deposits a distinct precipitate of basic phosphate of ammonia and magnesia.

Pure magnesia, boiled with water, yields a solution which behaves in every respect like that prepared in the cold.

IX. *Solubility of the Carbonate of Lead.*—The author finds that 1 part requires 50551 parts of pure water at the ordinary temperature for solution; this solution is not in the slightest degree coloured by sulphuretted hydrogen.

In water which contained a little acetate of ammonia, and also carbonate and pure ammonia, 1 part of the salt dissolves 23450 parts; the solution was slightly coloured by

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* The very different results formerly obtained are undoubtedly owing to an imperfectly pure magnesia having been employed in the experiments.

sulphuretted hydrogen, and after long standing deposited traces of sulphuret of lead.

Water, containing much nitrate of ammonia besides carbonated and caustic ammonia, dissolves, judging from the colour produced in the filtered solution by sulphuretted hydrogen, somewhat more of this salt than in the preceding experiment.

X. *Solubility of Oxalate of Lead.*—A dilute solution of acetate of lead was precipitated with oxalate of ammonia and ammonia; the liquid filtered from the precipitate after long standing exhibited, on the addition of sulphuretted hydrogen, a faint brownish tint when viewed from above.

XI. *Solubility of Sulphate of Lead.*—1 part of this salt requires 22816 parts of pure water at 52° for solution. In water containing sulphuric acid, 1 part of the salt requires 36504 parts; and in water containing ammoniacal salts and sulphuric acid, no perceptible colour is produced by the addition of sulphuretted hydrogen to the filtered solution.

XII. *Solubility of the Basic Carbonate of Zinc.*—1 part of the salt was found to require 44642 parts water for solution.

XIII. *Solubility of Chloride of Barium in Absolute Alcohol.*—1 part of the salt requires 8108 parts of cold alcohol of 0.795 spec. grav.; and on boiling and then allowing to cool, 1 part dissolves in 6685 parts; but when filtered boiling, 1 part was found to have dissolved in 4857 parts of the boiling alcohol.

XIV. *Solubility of Chloride of Strontium in Alcohol.*—1 part of the salt dissolves in 116.4 parts of cold alcohol of 0.795 spec. grav., and in 262 parts boiling alcohol.—*Chem. Gaz., from Liebig's Annalen.*

ART. XVI.—ON THE CHANGE WHICH TINCTURE OF IODINE UNDERGOES WITH KEEPING.

By M. Guibourt.

Extracted from the Bulletin de l' Academie de Medicine.

I wish to direct the attention of the Académie to the variations which the alcoholic tincture of iodine presents in its constitution and therapeutic effects, according to the length of time which has elapsed since its preparation.

I will commence by taking a retrospect of the use of iodine since Coindet proposed it as a remedy for goitre. The alcoholic tincture was at that time prescribed in doses of four, six, or eight drops two or three times a day, in some aqueous liquid. But the iodine is precipitated on adding the tincture to water, the solid particles of iodine being held in suspension in the liquid; and these being deposited on the coats of the stomach, caused active irritation, and probably small local ulcerations. Thus it was found that persons attacked with goitre, but who in other respects were in good health, after commencing the tincture of iodine, experienced pains in the stomach, loss of appetite, bad digestion, and wasting, which gave rise to the opinion, prevalent at that time, that iodine could not be used for reducing goitre, without its producing, at the same time, a general emaciation; that it diminished, in particular, the breasts; and that when prescribed for young females, it retarded the development of those organs designed for them by nature. Coindet, with the view of obviating these objections to the remedy, substituted for the alcoholic tincture, a solution of iodine in iodide of potassium, which giving no precipitation of iodine when added to water, acted as a mild and uniform stimulant to the stomach, and thus improved the digestive functions. Thus from that time, not only have all the objections which were previously urged against the use of iodine ceased to exist, but on the other hand, it has been found, that weak and debilitated patients improved in appetite and condition, and young females acquired improved colour, increased developement of the breasts, and regularity of the natural economy, in proof of the beneficial action of the medicine. I have taken a review of these circumstances, which must be in the recollection of most medical men, in order to establish the great difference which exists between the action of iodine when administered in the solid state, and in the state of perfect solution. I now pass to the examination of the mixture employed by M. Velpeau in the treatment of hydrocele.

I will first consider the case of tincture of iodine recently prepared, such as that which I present to the Academy, which was made three days ago, according to the directions of the Codex, by dissolving, without heat, one part of iodine in twelve parts of spirit, sp. gr. .848. If this tincture be mixed with twice its weight of water, the iodine will be almost entirely precipitated in the form of black particles, easily separating by repose, and the supernatant liquid will be almost colourless. In what way should this liquid be taken? If the clear and transparent part only be taken, it would probably produce only a slight stimulating effect, due principally to the spirit. If, on the other hand, the liquid be shaken up before taking it, the solid particles of iodine would be deposited on the coats of the intestinal canal, and would produce a degree of irritation that may not be free from danger.

I will now consider the case of tincture of iodine which has been prepared four or five months. The following is the change which has taken place during this interval of time. One part of the iodine takes hydrogen from the alcohol to form hydriodic acid, which unites with another portion of iodine to form ioduretted hydriodic acid, which gives no precipitate with water. On the other hand, the alcohol probably replaces the lost hydrogen by iodine, forming another compound not precipitated by water. It is found, therefore, on mixing this tincture, four or five months old, with twice its weight of water, that there still is a precipitation of iodine, but that the precipitate is three or four times less in quantity than that afforded by the recently made tincture. The supernatant liquor, in this case, however, will be much more highly coloured than in the other, and it is unquestionable that the effect of the mixture, whether it be given clear or with the precipitate, would be different from those of a similar mixture made with the recently prepared tincture.

Lastly, if we take tincture of iodine that has been prepared for a year or a year and a half, it will scarcely cause any precipitation with water, and its medicinal effects will be different from those of the tincture in either of the cases previously considered.

I conclude from these facts, to which I have long had my attention directed, that the alcoholic tincture of iodine is a medicine liable to variations in its composition and in its effects, and that it ought to be replaced by a somewhat similar mixture, which should be made extemporaneously. Such, for example, as the following, in which the whole of the iodine would remain in solution, forming a homogenous mixture:

℞ Iodine, 5 parts.
Iodide of potassium, 6 parts.
Rectified spirit, 50 parts.
Distilled water, 100 parts.

Triturate the iodine, iodide of potassium and part of the water in a mortar; then add the spirit, and the remainder of the water.—*Pharm. Jour., from Journ. de Pharm.*

ART. XVII.—ON ACHILLEÏNE AND ACHILLEÏC ACID.

By B. Zanon.

M. Zanon obtains the active principle of this plant,* which is used in the south of Europe as a substitute for sulphate of quinine in intermittent fevers, by boiling 2,000 grammes of the dried plant with 16 lbs. of rain water for about two hours. The residue is again boiled twice with smaller quantities of water, and the filtered solutions are mixed. These are then clarified with white of egg, and evaporated at a gentle heat until a whitish pellicle is formed on the surface. After twenty-four hours the cold liquid deposits a mass, consisting for the most part of vegetable fibre, green coloring substance, with some coagulated albumen, extractive matter insoluble in alcohol, lime salts, and traces of silica. The filtered bitter and acid liquid is treated with an excess of hydrate of lime, which produces a white precipitate; upon this the liquid is treated with acetate of lead as long as any precipitate is formed. This is collected on a filter, and the solution saturated with sulphuretted hydrogen, after which it still possesses a yellowish colour and a very bitter taste. On evaporation it yields nearly 150 grammes of dry extract, which, as well as the previously filtered sulphuret of lead, are exhausted with alcohol. The two, mixed and evaporated, yield 130 grammes extract, which the author calls achilleïne. As the author found that substance thus obtained still contained some acetate of lime, resin, &c., he modified the above process, and treated the neutralized decoction with animal charcoal, evaporated to dryness, and extracted with boiling absolute alcohol. In this way the formation of acetate of lime was avoided and time saved. Achilleïne can be freed from the slight trace of resin by solution in water. The colour of achilleïne is in-

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* Achillea millifolium—Yarrow.

stantly destroyed by chlorine; it is not precipitated by tincture of galls nor acetate of lead, but it is thrown down by basic acetate of lead; it is soluble in ammonia, and the solution, when exposed to the air until the ammoniacal odour has disappeared, deposits brown flakes, which are less soluble than achilleïne. From all its properties it should undoubtedly be ranked with the bitter extractive substances.

To obtain the acid to which the decoction of the yarrow owes its acid reaction, the author treated it with acetate of lead as long as a precipitate resulted, and this was suspended in water and decomposed with sulphuretted hydrogen. The liquid obtained was very acid, and still contained some green coloring substance and lime; it was, therefore, supersaturated with carbonate of potassa (which precipitated the lime) and then treated with animal charcoal. The potassa-salt was precipitated with acetate of lead, and the precipitate decomposed with sulphuretted hydrogen.

Achilleïc acid is not volatile at 212° F.; its solution can therefore be concentrated by evaporation in the water-bath. The greatest concentration to which it can be brought is 1.014825. In this state it is perfectly colorless, but on further evaporation it becomes straw-colored. Exposed to the air in a glass or porcelain dish, it crystallizes in perfectly colorless quadrilateral prisms. The crystallised acid requires at 56° F. two parts of cold water for solution; the solution is very acid, makes the teeth rough, has no odour, and strongly reddens litmus paper Added by drops to a clear solution of acetate of lead, it it does not render it in the least turbid; but in a solution of basic acetate of lead it immediately produces a white precipitate, which is very slightly soluble.

Achilleäte of potassa is obtained when the acid, diluted with only a little water, is poured into a solution of carbonate of potassa, so as to neutralize it; the liquid is then filtered, evaporated, and set aside to crystallize. This salt separates in very minute prisms, which can only be seen with a microscope; it has a saline taste, which resembles that of chloride of sodium, it is less soluble in alcohol than in water; exposed to the air it is not altered, but its motherley acquires under the same conditions a yellowish tint.

Achilleäte of soda is prepared with carbonate of soda in the same manner as the potassa salt. The taste of this salt very much resembles that of the preceding, as also its solubility in water and alcohol, but its crystalline form is very distinct from that of the potassa salt; a clear concentrated aqueous solution yielded very beautiful rhombic crystals, which could be perceived with the naked eye.

Achilleäte of ammonia may be prepared by mixing achilleïc acid with ammonia; the liquid becomes pale yellow when evaporated to a syrup. By exposure to the air for several days it slowly evaporates to a saline mass, which has a similar taste to the potassa and soda salts. It is soluble in water and insoluble in pure alcohol.

Achilleäte of lime crystallises in irregular scales or needles: it is obtained when lime is treated for some hours with slightly diluted achilleïc acid, filtered and set apart to crystallize; it is insoluble in absolute alcohol.

Achilleäte of magnesia is difficult to obtain in the crystalline form; when its solution is allowed to evaporate in the air, a yellowish, solid, transparent, gummy mass, more soluble in water than in alcohol, is obtained. It is prepared in the same way as the salt of lime.

Achilleäte of quinine.—Quinine dissolves in slightly diluted achilleïc acid by allowing the substances to act for several days on each other, stirring them frequently until the liquid no longer reddens litmus-paper. Upon this it is filtered, and some alcohol added; it is heated nearly to boiling, and allowed to cool. Nearly the whole liquid is converted into very beautiful radiate-grouped prismatic crystals. The salt has a very bitter taste, and is readily soluble in water and alcohol. On account of its great solubility, the author considers that it will be found better adapted than sulphate of quinine for medical purposes.—*Chemist, from Liebig's Annalin.*

ART. XVIII.—EFFECT OF MATICO-LEAF IN A CASE OF OBSTINATE HÆMORRHAGE.

The patient was a boy between four and five years old, who, in falling had bit his tongue, the consequence of which was an oozing of blood which, when the child was brought to Mr. Hamilton, had continued for two days, to the great alarm of his family, as his brother had died from hæmorrhage occasioned by a slight injury of the nose, and the boy himself had before nearly bled to death from some slight wound about the mouth. Actual cautery first, and then a ligature, applied by means of a sewing needle, had each but a temporary effect, and finally the hæmorrhage was stopped by persuading the child to keep sucking a piece of alum for an hour or two. It was long before the child recovered his strength.

The child was brought a second time to Mr. Hamilton, having again bit his tongue three days before, during which time a continual oozing of blood had gone on, causing a perfectly blanched appearance, notwithstanding that nitrate of silver had been applied, and a piece of alum had been sucked as before. After in vain trying pressure, Mr. Hamilton took a piece of matico-leaf (Piper angustifolium) and applied the lower surface to the bleeding point, and retaining it there as long as the child would keep the tongue quiet, which was not half a minute. He then found that the blood had ceased to flow, and that the small spangle of matico-leaf adhered to the tongue. It fell off in half an hour, when there was scarcely any appearance of bleeding; a second piece was applied, and the hæmorrhage completely stopped.—*Ibid, from Dublin Hospital Gazette.*

ART. XIX.—THE TANNATE OF IRON IN THE TREATMENT OF CHLOROSIS.

By Benedetti.

This substance, according to our author, excels all other medicines in the treatment of chlorosis. In evidence of this he cites cases from his own, and from the practice of Majocchi, affirming that the treatment by the tannate of iron is successful in from twelve to twenty-five days, according to the severity of the case. It is to be administered in doses of from eight to thirty grains in the day. It acts more rapidly in persons of sanguine temperament. The mode of preparation, as described by M. V. Gaddi, is as follows:—A very pure sulphate of iron is made by the action of dilute sulphuric acid on iron filings; from this sulphate, by means of carbonate of soda, a carbonate of iron is precipitated, which is washed several times, and then dried on the stove. It is now pulverized and thrown by small portions at a time into a boiling solution of very pure tannic acid in a porcelain vessel—the proportions used being very nearly five parts of the carbonate to one of the acid—or 440 parts of the carbonate to 90 of the tannic acid. The fluid is to be stirred constantly till the effervescence ceases. It is afterwards exposed to a heat equal to the boiling point of water, till it acquires the consistence of thick soup. It is then withdrawn from the fire and poured on porcelain plates, and dried with the assistance of heat. The tannate of iron thus obtained is of a crimson color, insipid, insoluble, uncrystallized, though before being dried it appears in long needles. It may be administered either suspended in syrup, or still more conveniently in the form of pills.

ART. XX.—ALTERATION EXPERIENCED BY THE HYDRATED OXIDE OF IRON UNDER WATER.

By Dr. G. C. Wittstein.

A solution of sulphate or hydrochlorate of iron yields with ammonia a very voluminous flushy brownish-red precipitate of Fe^2O^3+3HO, easily soluble in cold acetic acid. These facts are well known; but it is scarcely, if at all, known that a similar precipitate, which has been allowed to remain some time under water, and, consequently, which has never been dried, loses entirely, or in great measure, its power of solution in acetic acid, just as though it had been dried. Other organic acids, moreover, which, under ordinary circumstances, dissolve undried oxide of iron with great facility, as, for example, tartaric and citric acids, take up a much less quantity of oxide thus prepared. I have already remarked in this journal, vol. 92, sec. 290, the circumstance alluded to, having found that in the preparation of citrate of oxide of iron the freshly prepared oxide was necessary to the effect. Since that period I have investigated the cause of this peculiar behaviour, and with a fortunate result.

If a portion of the precipitate recently thrown down be washed, and then examined microscopically, no trace of crystalline structure, properly so called, is observable, the particles consisting merely of little amorphous bodies. If, however, a portion of the oxide which has been allowed to remain under water be examined, it is found to be crystalline throughout. The little crystals are of a dark yellow colour, and moderately transparent. How long a period of aqueous submersion is necessary to effect this crystalline change I am unable to say—my crystalline deposit, which I microscopically examined, was more than two years old; it is, however, exceedingly probable that the peculiar change alluded to occurs much sooner, because I remember that a portion of oxide which had been allowed to remain half a year under water, presented an alteration of external appearance, having become more compact.

Not only does this alteration of microscopic structure take place amongst the particles, but the more insoluble compound only contains half the original quantity of water, its formula being $2Fe^2O^3+3HO$. Consequently the diminished solubility of the altered oxide depends on two causes—its altered constitution in regard to water of combination, and its altered microscopic condition.

Perhaps it is not an indifferent matter whether as an antidote for arsenious acid the hydrated oxide have been long standing under water or the contrary; at any rate, of two preparations of this oxide the more recent should have the preference; and it would be prudent to recommend that the store of hydrated oxide should be renewed every half year. The old preparation having given place to the new should not be thrown away, but redissolved in hydrochloric acid, and again precipitated by ammonia, when its original properties are renewed.—*Chemist, from Buchner's Repertorium.*

NOTE.—The reader is referred to page 29, vol. 14th of this Journal. In the article referred, to the results obtained now by Dr. Wittstein were then arrived at, and under similar circumstances. The summary of that paper says—"That hydrated peroxide of iron, even when kept under water, gradually decreases in its power of neutralizing arsenious acid," and "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.*" The microscopic observation of Dr. Wittstein in reference to this change is corroborative of that statement. W. P., JR.

ART. XXI.—ON A NEW PREPARATION OF IODINE.—SYRUP OF IODIDE AND CHLORIDE OF IRON.

By Samuel Battley.

As iodine is at present so extensively employed, and maintains so high a character as a remedial agent, it appears rather singular that some of its most efficient combinations are still so little used. Amongst these the iodide of iron is one which has not yet attained that rank in professional estimation that its merits claim. This seems in part owing to the process by which the London Pharmacopœia directs it to be prepared, its great tendency to decomposition, and the difficulty of its preservation. The iron possesses a greater affinity for the oxygen of the atmosphere than for iodine, in consequence of which the latter is set free, and when the preparation is exhibited in such a state, the stomach is frequently incapable of bearing what might otherwise prove a valuable tonic. This tendency to oxidation in the iron, and liberation of free iodine, is indeed prevented by using the syrup, the sugar in which has the property of preventing protoxides, protiodides, and protochlorides, from absorbing oxygen, and passing into peroxide, in which state iron exerts but little action on the system.

Practical men, however, have remarked, that the iodide of iron, even when given in the best form, has sometimes failed to produce that speedy and decisive chalybeate influence on the system that other salts do, though in other respects an agreeable and elegant form. This observation is readily explained on reference to the constitution of the salt, in which the amount of iron is less than one-fourth of that of the iodine, the combining proportion of the former being 28, while that of the latter is 126. As iodine is incapable of entering into combination with a greater proportion of iron, in order to increase the quantity we may substitute another salt of iron, isomorphous in its crystal, and analogous in constitution to the protochloride. These two salts may be mixed in any proportion without decomposition, and thus present an elegant and powerful preparation of iron, while the iodine, by its action on the glandular system and secretory apparatus, tends to prevent that cerebral plethora which the salts of iron, when given *per se*, so frequently induce.

The syrup of the iodide and chloride of iron, which it is the object of the preceding remarks to introduce to the notice of the profession, is prepared by first forming a solution of iodide of iron. This is effected by diffusing iodine in three or four times its weight of cold distilled water, and agitating for ten minutes with half the quantity of iron filings, added cautiously and gradually, when the colour changes from dark purple to a deep green, as combination takes place. The protochloride of iron is next formed, by acting upon iron filings with hydrochloric acid, specific gravity, 1.160. A copious disengagement of hydrogen gas ensues, and continues for several hours, during which the chlorine combines with one equivalent of iron, the fluid becomes neutral to test paper, and we obtain a solution of a green colour, also with a shade of blue. The two solutions are now mixed together, and so much refined sugar added as will form a syrup.

The syrup ought to be of a pale green, representing the protosalts of iron. The proportion of the salts in solution are so adjusted, that each fluid drachm of the syrup contains three grains of combined iodine and nearly four grains of iron, united partly with the iodine and partly with the chlorine. The following formula may afford an eligible mode of exhibition:—Syrup of iodide and chloride of iron, two drachms; syrup of orange-peel, four drachms; infusion of cascarilla, four ounces. Mix for four draughts, one to be taken twice daily.

The syrup of iodide of iron, and syrup of chloride of iron, may be made and kept separately, when they can be mixed in any proportion, according to the amount of iron or iodine the practioner may wish to administer.—*Chem. from Lan.*

NOTE.—The author has not been sufficiently explicit. The following formula may be used by those desirous of making the preparation :

℞	Iodine,	384 grains, Troy
	Hydrochloric acid, sp. gr. 1.16	4¼ ounces, "
	Sugar, in powder,	12 " "
	Iron filings	
	Water, of each a sufficient quantity.	

Mix the Hydrochloric acid with an ounce and a half of iron filings, free from oxide, and allow it to stand, with occasional agitation, until the acid is neutrallized, then filter. Next mix the iodine with three ounces of water in a flask, add half its weight of iron filings, agitate until all the iodine is combined, and filter also. Finally, mix the two solutions, add the sugar, and as much water as will make the whole measure a pint. The pure sugar is readily dissolved by agitation without heat.

The resulting syrup contains 29 grs. of protodide and 72 grs. of protochloride of iron in each fluid ounce, and each fluid dram 3 grs. of iodine and 4 of iron. W. P., JR.

ART. XXII.—ON THE EFFICACY OF PYRO-ACETIC SPIRIT IN GOUT AND RHEUMATISM.

BY JOHN HASTINGS, M. D.

IT is nearly four years since I called the attention of the profession to the remedial powers of pyro-acetic spirit, or medicinal naptha, in phthisis. It occasioned a great deal of discussion at that period, and many who questioned its value then have since acknowledged the truth of my views; and I believe many more would have done so, but unfortunately the symptoms of early phthisis are not sufficiently precise to satisfy the minds of those disposed to be sceptical. The opinions I then advanced, I have had frequent opportunities of confirming.

However, it is gratifying to perceive that it is attracting attention on the other side of the channel; and I also find that a book has been recently published by Renshaw, written by an M. R. C. S., on the treatment of this disease, in which pyro-acetic spirit is put forth as the great curative agent; but this is without a single mention of my name in its pages.

I have now to deal with another class of diseases, about the diagnosis of which there is no room for either cavil or doubt: I mean, gout, acute and chronic rheumatism. For upwards of twelve months I have employed pyro-acetic spirit in these affections, and my treatment has been attended with a success quite extraordinary, far exceeding the results usually obtained by colchicum, &c. I have not yet seen a case of gout or acute rheumatism which has not rapidly disappeared under its use, at the same time that it brings about a very improved condition of the general health. Chronic rheumatism requires a more lengthened treatment for its removal; indeed, it has less power over this affection than the two preceding.

I should have forwarded a report of cases, with further observations on this treatment, but from my conviction of it value, I thought it better to make this general statement, and also to assert my claim to having been the first to employ this agent in a class of diseases hitherto so intractible, and defer the other for a future occasion.—*Chemist, from Lancet.*

ART. XXIII.—OBSERVATIONS ON NICOTINE, WITH A DESCRIPTION OF A METHOD FOR DETERMINING ITS AMOUNT IN LEAF AND MANUFACTURED TOBACCO.

By M. Schloessing.

The following is the most advantageous method for preparing nicotine. Tobacco is treated with water, and the solution concentrated; the extract is dissolved in alcohol, which after decantation is likewise concentrated; this last extract is now treated with potash, then agitated with æther, which dissolves the nicotine and also some foreign substances, which are got rid of by precipitating the alkaloid in the state of oxalate. This precipitate is washed by agitating it with æther, then treated with potash, again dissolved in æther, and submitted to distillation. The residue of the distillation is coloured but limpid, and contains, besides nicotine, water, æther and ammonia; a temperature of 284° maintained for 12 hours, and assisted by a current of dry hydrogen, suffices to expel these three bodies, so that the nicotine passes pure and colourless, when the temperature is subsequently raised to 356°. 2 lbs. of good tobacco, grown in the department of Lot, is capable of yielding by this process from 50 to 60 grms. of nicotine.

The formula for nicotine, $C^{20} H^{14} N^{2}$, proposed by M. Melsens, is confirmed by my analyses; its equivalent, 1012.5, appears however to require doubling, for an equivalent of sulphuric acid neutralizes twice 1012.5; and nicotine is a powerful base, which precipitates the oxides of manganese, iron, and silver; it is therefore not very probable that its sulphate, which is neutral towards litmus paper, is in reality a subsulphate. The above view is also confirmed by the following fact:—If some nicotine is placed in a solution of a salt of lime or baryta, and an excess of carbonic acid passed into the solution, 1 equiv. of carbonate of lime or baryta is precipitated for every 2025 of nicotine.

Nicotine must exist in the tobacco in the state of a salt; for the aqueous, alcoholic and æthereal solutions of this plant behave precisely as if they contained a salt of nicotine. Nicotine absorbs moisture from the atmosphere, but it may be completely deprived of water, æther, and ammonia by placing it over mercury in a bell glass full of hydrogen, by the side of a capsule containing concentrated sulphuric acid.

The amount of nicotine in leaf or manufactured tobacco may be accurately ascertained by a simple and easy process. 10 grms. of tobacco are exhausted with ammoniacal æther in a continuous distillatory apparatus, the ammoniacal gas expelled from the nicotine solution by boiling, then decanted, and, after evaporation of the æther, neutralized with a solution of sulphuric acid of known strength. This process will be applicable, with some slight modifications, to most of the organic alkalies. Its accuracy was proved by ascertaining,—1st, that the displacement of the nicotine by ammonia and the exhaustion by the æther are perfect; 2d, that merely boiling the solution of nicotine suffices to expel the ammoniacal gas dissolved; 3rd, that during this boiling no nicotine is lost; 4th, that a proportionality is found between different weights of nicotine, and the quantities of normal liquid required for their neutralization; 5th, that there is no other substance besides the nicotine capable of absorbing the acid; 6th, that if the tobacco contained any other bases than nicotine, they would not interfere; lastly, nearly the whole of the nicotine contained in 10 grms. of Lot tobacco was extracted, purified, weighed and analysed; the weight was 0.766, and should have been, according to the test with the normal solution, 0.796.

The following amounts of nicotine were indicated by testing in this manner various French and American tobaccos:

Lot,	7.96	per cent	of the	dried tobacco.
Lot et Garonne,	7.34	"	"	"
Nord,	6.58	"	"	"
Ile et Vilaine,	6.29	"	"	"
Pas de Calais,	4.94	"	"	"
Alsatia,	3.21	"	"	"
Virginia,	6.87	"	"	"
Kentucky,	6.09	"	"	"
Maryland,	2.29	"	"	"
Havanna, less than	2.00	"	"	"

It will be seen from this table that those tobaccos which contain the most nicotine are also the best suited for the manufacture of snuff.

The above method of determining the amount of nicotine applied to snuff indicated as a mean 2.04 nicotine per cent. of the dried powder; whence it is concluded that about two-thirds of the nicotine contained in the mixed leaves destined for the manufacture of snuff is destroyed by the fermentation. The ammonia exists in the snuff in the state of a salt; the nicotine, partly in a free state, and partly as a neutral salt, or altogether in the state of a subsalt. It is to these two salts that snuff owes its property of exciting the mucous membrane of the nose.

This memoir is the first part of an investigation on the composition of tobacco leaves and on the fermentation of tobacco, begun in the laboratory of the *Manufacture des Tabacs*, under the direction of Mr. Fremy.—*Chem. Gaz., from Comptes Rendus.*

ART. XXIV.—RELATION BETWEEN NITRIFICATION AND THE FERTILIZATION OF SOILS.

By F. Kuhlmann.

Animal substances exert their salutary influence upon vegetation only when by their decomposition there is a development of carbonate of ammonia. I have adopted the same view for the nitrates employed as manures; I have generally regarded their influence to be effectual only when, by the deoxidizing action of putrid fermentation, their acid is converted into ammonia. To show that this conversion was probable, I was led to examine whether, in operating upon liquid products, it would be possible to obtain results analogous to those arrived at in 1838, with the aid of spongy platinum, in acting upon mixtures of gases or vapours. In the same year I showed that the production of ammonia, by the action of weak nitric acid upon tin, was not an isolated fact, but that it resulted from the action of this acid upon all the metals capable of decomposing water, and consequently the ordinary result of the contact of nascent hydrogen with nitric acid. MM. Fordos and Gelis have confirmed the correctness of my results, to which they have added several other facts, especially that of the decomposition of sulphurous acid by the action of nascent hydrogen.

The following are the results of some further experiments in support of the conversion of the nitrates into ammoniacal salts. When some fragments of nitre are thrown into a mixture of zinc or iron and sulphuric acid, or, what is preferable, weak hydrochloric acid, the disengagement of hydrogen is stopped or retarded until the whole of the nitric acid of the nitrate is converted into ammonia.

Nascent sulphuretted hydrogen occasions a similar conversion, at the same time depositing sulphur.

When a nitrate, the metal of which is precipitated by zinc, nitrate of copper for instance, is placed in presence of a mixture of zinc and hydrochloric acid, for every equivalent of zinc dissolved there is one equiv. of copper precipitated, and one equiv. of the nitric acid of the nitrate is converted into one equiv. of ammonia, the whole without any liberation of hydrogen.

By passing a current of sulphuretted hydrogen through a solution of chloride of antimony mixed with a nitrate, the acid of this latter is converted into ammonia. Similar metamorphoses are effected by the contact of nitrates with a solution of sulphuret of arsenic in potash, or with the hydrated protoxides of tin and iron.

I think that, after the announcement of these facts, no doubt can remain relative to the decomposition which the nitrates experience in the soil under the influence of putrid fermentation. It is known that this fermentation, considered as a deoxidizing agent, is capable of overcoming the strongest affinities.

If the fertilizing agent must be presented to the plant principally, if not exclusively, in the state of carbonate of ammonia, serious inconveniences arise from the volatile nature of this salt: for it is no sooner confided to the soil to fertilize it, than a large portion is removed by the air to be diffused over the earth.

We have now to examine what influence nitrification has upon vegetation. It is conceivable that the mode of fertilization by the ammonia of the atmosphere may suffice for certain countries, and not for others; the more we approach the meridional countries, the less necessity is there for manures.

If I entertain the conviction that the nitrates do not act generally as fertilizers, except after having experienced, at a certain depth in the soil, a decomposition which yields carbonate of ammonia, I am not the less satisfied that the fertility of the soils likewise depends on an inverse reaction, which is opposed to the volatilization of the ammonia; I mean the conversion of ammoniacal salts into nitrates, which occurs in the superficial portions of those soils which present a suitable chemical composition, and are placed under the most favourable conditions of moisture and temperature.

With respect to the conversion of ammonia into nitric acid, I proved satisfactorily in 1838 that this furnishes the most simple and conclusive explanation of the formation of the nitre beds. My opinions on this subject are at present admitted by the majority of chemists; but if any doubt should still exist, the following results will suffice to remove them. When a mixture of bichromate of potash, concentrated sulphuric acid and sulphate of ammonia is heated in a retort, a large quantity of nitric acid distils over. On heating a mixture of peroxide of manganese or peroxide of lead or minium and weak sulphuric acid in the presence of sulphate of ammonia, the ammonia of the sulphate is equally converted into nitric acid, which passes over.

In investigating the conversion of ammoniacal gas into nitric acid by its contact at a high temperature with the peroxide of manganese, I found that we possessed in this oxide a valuable agent for transferring *indefinitely* the oxygen of the atmosphere to the ammonia. MnO^2 by a first oxidation passes into the state of MnO, which the contact of air immediately converts into $Mn^3\,O^4$, which is again susceptible of oxidizing the ammonia.

If we now compare the slow progress of nitrification in the northern provinces with the rapidity with which it results in meridional countries, it will be conceived how much greater the expense in ammonia or in nitrogenous manures must be in the north than in the south.

The Academy will probably attach some interest to the result of the experiments I have made in support of my opinion respecting the influence of nitrification upon the fertilization of soils; it will perhaps also recognise that the facility with which I have succeeded in converting ammonia into nitric acid will serve, in case of any future continental blockade, to render Europe more independent of India and Chili in regard to its supplies of nitrates or nitric acid; that, under other circumstances, by an inverse reaction, we shall find in the nitrates of India and Chili abundant sources of ammonia, turning to advantage the hydrogen, and especially the sulphuretted hydrogen, which at present is lost in many operations of the arts, and moreover proves of considerable injury to the public health.

In conclusion, I may mention that the various reactions, the results of which are noticed in this article, have led me to the two following applications:—1st, I have based a new process for determining the amount of nitric acid and for the analysis of the nitrates, upon the property of these bodies of being entirely converted into ammonia or into ammoniacal salts under the influence of nascent hydrogen; 2d, by submitting to the action of nascent hydrogen various binary or saline combinations of metals, I have completely reduced a large number of these insoluble or sparingly soluble compounds in weak acids.

By operating upon native crystalline compounds, such as zigueline, azurite, malachite, carbonate of lead, oxide of tin, &c., the metal obtained preserves the crystalline form of the combination in which it existed.—*Ibid, from Comptes Rendus.*

MISCELLANY.

Some Experiments on Assafœtida. By H. Reinsch.—An ounce of finely pulverized assafœtida was mixed with an equal weight of hydrate of lime, and then stirred into a thin paste with a sufficient quantity of water. On submitting this to distillation, a colourless oil passed over with the water, and at the same time some ammonia was disengaged. The oil possessed a burning taste, and an odour differing from that of assafœtida. The residue in the retort was collected on a filter, and washed with hot water until this passed through colourless. A portion of the filtered solution was supersaturated with dilute sulphuric acid, when some brown flakes separated, which united on warming to brown drops, while upon the surface of the liquid some oil collected. On distilling this mixture, some traces of sulphuretted hydrogen, a slightly acid water, and some drops of oil passed over. Neither valerianic nor angelicic acid could be detected in it. The residue left in the retort was brittle, dissolved readily in ammonia, æther and alcohol, from which it separated as a grayish powder. The alcoholic solution of the resin has a faintly acid reaction. When heated on platinum it melts, and then burns with a bright flame; heated in a glass tube, it disengages white vapours, and subsequently drops of a green oil; at the same time the odour of horse-radish is perceptible. Concentrated sulphuric acid dissolves it with a brown colour, from which it is precipitated by water. Precipitated from the lime solution by muriatic acid, the resin forms a greenish powder, which does not cohere, but in its other properties it agrees with that precipitated with sulphuric acid. When the lime residue with which the assafœtida has been treated is exhausted with spirit, a yellow tincture is obtained, which has the taste of assafœtida, but is not bitter like the above resin. If the tincture be mixed with an acid, a resin separates, which possesses the peculiar odour of assafœtida.—*Chem. Gaz. from Jahrb. fur Prakt. Pharm.*

Observations on Glycerine. By F. Rochleder.—The fats are, as is well known, decomposed by the action of strong bases or acids into a fatty acid and glycerine. The following is a new method of preparing glycerine:—When castor oil is dissolved in absolute alcohol, and a current of dry muriatic gas passed through the warm liquid, the fat is decomposed. If, when the muriatic acid gas has acted sufficiently long, the liquid be shaken with water, an emulsion is obtained, which soon separates into an oily supernatant, and into a strong acid aqueous layer. The latter was separated from the layer of oil by means of a siphon, and evaporated in a platinum dish in the water-bath. At first a large quantity of muriatic acid passes off, and there finally remains a yellow syrupy mass. When this is treated with æther, a portion dissolves, while the remainder is not acted upon by the æther. After the evaporation of the æther an oily substance remains, which consists of the combinations of the fatty acids of the castor oil with oxide of ethyle; the substance insoluble in æther forms, after drying *in vacuo*, a slightly yellowish syrup, which has all the properties of glycerine. The oxide of glyceryle of the fats contained in the castor oil has consequently been replaced by oxide of ethyle, while it has combined with the water which the alcohol parted with on its conversion into æther.—*Ibid, from Liebig's Annalen.*

Mode of ascertaining whether Olive Oil has been sophisticated with Rape or Poppy Oil. By M. Diesel.—Pure olive oil is coloured green by ordinary nitric acid. On the other hand, 1 drm. of olive oil, sophisticated with rape oil and mixed with 12 drops of nitric acid, exhibited a strong yellowish-gray colour. Comparative experiments with various mixtures of oil showed that this reaction was still perceptible even with the addition of one-tenth. The adulteration with poppy oil is likewise easily detected with nitric acid, but the mixture then becomes yellowish-white, and not brownish as in the previous case. Pure nitric acid exhibits the reaction in a far less degree. Dr. Bley adds, that the samples must be judged of in the course of 12 hours after the addition of the nitric acid, as pure olive oil is likewise coloured more or less brown after a longer interval.—*Ibid, from Archiv. der Pharm.*

Test for Strychnia. By Mack.—Marchand has shown in the *Journal de Pharmacie et de Chimie* (1843, Sept., p. 200) that when strychnia is rubbed with peroxide of lead and sulphuric acid containing some nitric acid, it is immediately oxidized and a blue pigment formed, which becomes violet, then gradually red, and, after a few hours, yellow. This test is so delicate that $\frac{1}{1000}$th of a grain of strychnia can be discovered by it. But as peroxide of lead is not usually found in chemists' shops, Mack substituted peroxide of manganese, and obtained similar results. With this test strychnia can be detected in powdered nux vomica. If diluted nitric acid be applied to the powder or to strychnia, and to these be added some finely powdered oxide of manganese and afterwards a few drops of oil of vitriol, a dark-blue colour is instantaneously produced; but it soon changes to violet, then to pink, and at last to yellow. On heating the mixture the phenomena occur much more rapidly. With brucia, morphia, narcotina, and quina no change was produced; and with strychnia, the blue, violet, and red colours could not be produced when chlorate of potash was substituted for peroxide of manganese; because, probably, the chlorine effects other changes in the organic matter, not oxidizing, but rather dehydrogenizing it.—*Pharm. Jour. from Buchner's Repertorium.*

Test for Strychnine.—Instead of the brown peroxide of lead, Prof. Otto recommends a *very minute* quantity of a solution of chromate of potash. This immediately produces, when added to the solution of the strychnine in concentrated sulphuric acid, the splendid violet colour, which is far more distinct and beautiful than on the addition of the brown peroxide of lead.—*Chem. Gaz.*

On the formation of Lactic Acid. By H. Wackenroder.—The author had previously announced that he had succeeded in converting sugar of milk into lactic acid by means of vegetable albumen; he returns to the subject in the present notice, in which he also describes the use of animal albumen for the same purpose. The conversion of milk sugar by other proteine compounds than caseine is interesting in many respects; but this question would acquire far more importance were it to change into certainty the presumption that every kind of sugar is susceptible of being converted in the same manner into lactic acid, and that this acid is generated whenever the alcoholic fermentation of the sugar or the conversion of the gum, principally of the dextrine, has failed. The author thinks that the free acid of beer, which is generally considered to be malic acid, is lactic acid; and according to the researches in which he is at present engaged, this acid not only occurs in the beers which have done fermenting, but the fresh wash, and even the malt itself, contains a certain quantity.

To ascertain the action of vegetable albumen on milk sugar, the juice of several plants separated from the chlorophylle was placed in contact for several weeks with milk sugar, and some powdered carbonate of lime, at a temperature of about 68° F., stirring it frequently. In all these experiments lactate of lime was obtained, which was very easily purified.

The resemblance of animal albumen to vegetable albumen induced the author to employ also the former, in order to effect the metamorphosis of the milk sugar; he first took the white of a fresh egg, dissolved it in distilled water, and followed the process described above, but the sugar underwent no alteration. He then placed the coagulated white of egg for some weeks in contact with water, and when it had become acid he added to it some milk sugar and carbonate of lime. After standing for six weeks in a warm chamber, the greater portion of the milk sugar had changed into lactic acid, and very beautiful groups of crystals of lactate of lime were obtained from it. M. Wackenroder concludes from these experiments that the albumen of the white of egg is not able to convert the milk sugar into lactic acid until after its coagulation and passage into acid fermentation; and that the negative result, obtained with the fresh white of egg, should probably be attributed to its alkalinity.— *Chem. Gaz., from Archiv. der Pharm.*

On the Composition of Sugar of Gelatine. By A. Laurent.—The author has examined some sugar of gelatine in very beautiful crystals, and found 32.10 per cent. C, 6.66 H, 18.92 N, whence he deduces the formula $C^4 H^5 NO^4$; this gives $C = 32.0$, $= H\ 6.66$, $N = 18.66$, $O = 42.68$. According to this, sugar of gelatine would be isomeric with urethylane. When 1 equiv. water is added to hippuric acid, we obtain $C^{18}H^9 NO^6 + HO = C^{14}H^6 O^4 + C^4 H^5 NO^4$.—*Ib. from Comptes Rendus.*

On the Composition of the Oil of Ben.—By P. Walter.—The oil of ben does not yield, on saponification, any volatile fat acid, but four fixed fat acids; viz. stearic, margaric, and two new acids, which the author calls *benic* and *moringic* acids.

The benic acid occurs in very small quantity in the oil of ben; it consists of $C^{30}H^{30}O^4$, and consequently belongs to the homologous series RO^4, being situated between myristic and ethalic acids. It crystallizes from its alcoholic solution in very voluminous tufts, and fuses at 126°—127°. Benic æther is very soluble in alcohol, and is deposited from the solution as a crystalline mass, but not in distinct crystals; it melts at a very low temperature, even by the heat of the hand, and contains $C^{34}H^{34} O^4$; it is isomeric therefore with margaric acid.

The other new acid, obtained by the saponification of the oil of ben, has been called moringic acid, from the name of the plant (*Moringa aptera*) which yields the oil. It is liquid, colourless or somewhat yellowish, and contains $C^{30}H^{28}O^4$, that is to say, 2 equivs. of hydrogen less than benic acid. From its composition it appears to be homologous to oleic acid. It would be interesting to ascertain whether, like the last, it would be decomposed under the influence of fusing potash into two acids of another homologous series. Its density is 0.908, its taste insipid and irritating, its smell faint; it reddens litmus paper, and is very soluble in ordinary spirit even in the cold. It solidifies at 32° F. It is decomposed by sulphuric acid on the application of heat.

M. Walter has verified the composition of this new acid by an analysis of the æthers it yields with alcohol and wood spirit.—*Ib., from Comptes Rendus.*

Experiments on the Absorption of Arsenic by Plants. By Dr. HERBERGER.—The experiments were made in the summer of 1843 in a loamy and in a sandy soil containing very little humus, with seeds of *Triticum spelta* which had been steeped in white arsenic. Although all the parts were examined both before the formation of stem, before flowering, and also just before ripening, not a trace of arsenic could be detected. In each experiment at least 250 grms. of the substance were carbonized with sulphuric acid, and then immediately tested according to Marsh's process, as well as by the method of Reinsch.—*Ibid., from Jahrb. für Prakt. Pharm.*

On the Purification of Mercury. By M. ULEX.—In the distillation of mercury we are not only exposed to a very great loss, but the mercury is also not perfectly purified by it. This object is obtained, it is true, by digesting it with acids and perchloride of mercury; but it requires considerable time, as these agents are merely in contact with the surface of the mercury, and can only act upon all its particles by frequently repeated agitation. A solution of perchloride of iron alone possesses the property of dividing mercury to a very great extent. When, for instance, 1 lb. of mercury is treated with 3 drms. *Liquor ferri muriatici*, and the same quantity of water, and well shaken for half a minute, the entire mass is converted, with evolution of heat, into a dark gray mass. The perchloride of iron is reduced to the state of protochloride, while a portion of the mercury is converted into calomel, which latter prevents the globules of mercury running together. If the mercury contain any foreign metals in solution, they are more easily attacked by the chlorine than the mercury, and are either dissolved or precipitated in a pulverulent form. To see whether mercury is contaminated with foreign metals, for instance with tin or lead, merely shaking with air suffices. Chemically pure mercury does not deposit any black powder in this operation, nor does it coat the sides of the glass vessel with a pellicle of mercury. The latter occurs even with $\frac{1}{40000}$th lead; with $\frac{1}{3000}$th, the mercury deposits, even after shaking it for three minutes, a black powder; with $\frac{1}{1000}$th lead such a mass of the black powder is obtained, that the surface of the mercury is no longer perceptible. With 4 per cent., and even with 2 per cent. of lead, a solid crystalline compound is obtained. In general the amount of lead does not exceed 1 per cent. In order to effect the purification of the mercury by protochloride of iron, 2 lbs. of mercury are triturated together with 2 oz. of *Liq. ferr. mur.* of 1.48 spec. grav., and as much water for ten minutes; then the solution of iron removed by decantation and washing with water, and the mercury deprived of its humidity by gentle heat. On trituration, the greater portion of the mercury runs together; by suitable treatment with muriatic acid, the calomel may be separated from the mercury in the gray powder, and decomposed with protochloride of tin and muriatic acid. If the amount of lead exceed 1 per cent., the operation should be repeated.—*Ibid, from Archiv. der Pharm.*

Preparation of Uric Acid from Guano. By Dr. Bensch.—The guano is well boiled for several hours with common potash, slaked lime and a sufficient quantity of water; the solution separated from the residue by a conical bag, evaporated until it forms a thick paste, and thrown whilst hot upon a linen cloth and pressed. The pressed mass is diffused through water, decomposed with common muriatic acid, and the coloured impure uric acid washed with water. The washed uric is dissolved in dilute solution of potash, and evaporated until the boiling fluid assumes the consistency of a thick paste, thrown upon a linen bag, and strongly pressed. The pressed urate of potash is boiled with 2 vols of water, constantly shaken, then rapidly pressed, and this proceeding repeated three or four times; this causes the mass to swell considerably; hence constant agitation is requisite top revent its being burnt. If a portion, when dissolved in potash and precipitated by muriatic acid, does not yield a perfectly colourless uric acid, the urate of potash is again completely dissolved in solution of potash, and treated as above.

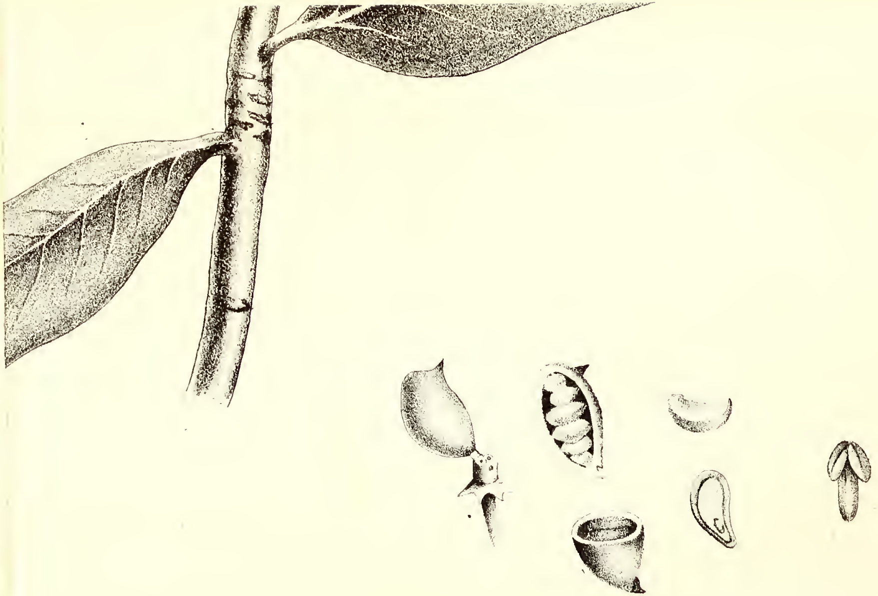
Lastly, the perfectly white uric acid is dissolved in hot water, to which a little solution of potash is added; the clear hot solution, when poured into muriatic acid, yields colourless uric acid.

The mother-liquors are evaporated and treated as above, the purer solutions of potash being used to dissolve the potash salt in the more impure.

By this method I obtained 2½ lbs. of pure uric acid from 100 lbs. of guano.—*Ibid, from der Pharm. und Chem.*

DRIMYS CHILENSIS.

R. P. SMITH, 144 CHESNUT ST PHILᴬ



RIMYS CHILENSIS.

THE

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ART. XXV.—DRIMYS CHILENSIS. *De Candolle.* The Winter's Bark of Chili.

By Joseph Carson, M. D.

The genus *Drimys* belongs to the natural family of Magnoliaceae, sub-order *Winteraceæ;* and to Polyandria, Polygynia of the Sexual System. The name *Drimys* was given to the genus by Foster, and has been adopted by De Candolle after Lamarck.

Generic Character. Carpels congested, baccate, many-seeded; filaments thickest at the apex; cells of the anthers separate.—*De Candolle.*

The *essential characters* consist in a *calyx* splitting unequally, the numerous *petals,* club-shaped *stamens,* with terminal two-lobed anthers, no style, berries superior and aggregate, and seeds several in a double row.

Specific Characters. *Leaves* oblong, obovate, glaucous beneath; *peduncles* crowded, one-flowered or arising from a common peduncle; *petals* six to nine, oblong subobtuse. *Berries* oval, sub-compressed, obtuse. *De Candolle,* Prodrom, vol 1, p. 78.

Dr. Lindley, in his Medical Flora, has confounded this plant with two other species—the D. *winteri* and D. *granatensis;* the former found in the neighborhood of the straits of Magellan, and the latter in the northern parts of South America.

This *shrub* appears to be common in the marshes of Chili, whence Mr. Dombey procured specimens.[a] It was separated and made into a new species by De Candolle from the specimens examined by him in the Museum of Paris.

Similar specimens were sent to this country by Dr. Styles of Valparaiso, in 1836, some of which were deposited by me in the Herbarium of the Acadamy of Natural Sciences of Philadelphia. The leaves correspond to the description given by De Candolle; they are three or four inches long, and one wide. The flowers are axillary or terminal, from three to five together, in umbellated panicles which are an inch and a half or two inches long. The calyx in three distinct ovate sepals; the corolla somewhat stellate in form and constituted of at least twelve oblong ovate unequally sized petals. The germs are five in number, around which the shorter stamina are inserted on the receptacle.

The difference between this and the D. *winteri* consists in the character of the leaves, the calyx, and the number and form of the petals. The flowers, instead of being simple, are clustered.

The bark of this plant has the same aromatic and tonic virtues as the Winter's Bark, and is used for similar purposes.

Merat and De Lens state that the specimen of D. *winteri* which is in their possession came from Chili, and was sent by Dr. Bertero. Was it not the present plant? As no description was given, this question, can only be answered conjecturally. D. *magnoliæfolia*, the bark of which is called Canelo in Chili, is the same species.

The plate represents the Drimys Chilensis in flower. The fruit and inflorescence are those of the D. *granatensis.*

ART. XXVI.—ON FLUID EXTRACT OF VALERIAN.

By Evan T. Ellis.

(*An Inaugural Essay.*)

There is sufficient reason to believe, that valerian as a remedial agent has been much undervalued, at least in this country, and that it has consequently fallen into unmerited neglect. The causes which have contributed to produce this, may be traced in part to that ever fluctuating popularity from which some of our best remedies are not exempt; to the peculiar influence which soil and climate have upon this plant; and especially to the want of a preparation of it of uniform strength, possessing in a concentrated form the entire virtues of the root, and not liable to undergo any change. Little doubt exists that it possesses inherent properties, which might prove of decided advantage in neuralgic affections, when other remedies are either inadmissible or have failed to give relief.

The discovery of an organic acid in this root, has, like the alkaloids of Cinchona, directed attention to the subject, and opened a new field of research, as shown by several valuable communications already before us.

Valerianic acid presents to us an interesting aspect, existing as it does in combination with an essential oil, and separated by the oxidation of the latter. Recent experiments have shown us, that this oxidation can be accelerated by means of other substances, and results in the formation of a much larger proportion of acid, than if simply produced by the action of air alone; hence it is more readily and economically obtained, and thereby its use will be greatly extended. We have seen this acid advantageously combined with oxide of zinc, of iron, and with quinia, exhibiting in the class of salts called valerianates, the excellent properties of two valuable therapeutical agents—the one an acid, the other a base. It seems highly probable that it is to this acid, that the peculiar medical properties of valerian are chiefly due.

A preparation holding in solution valerianic acid must therefore possess the activity of the root, especially if the combination present the other valuable properties of the plant, divested of all that is inert and useless. A convenient form for administering a remedy, smallness of dose, and a facility of preparation by every skilful pharmaceutist, are not unimportant recommendations for a preparation of this kind; and such we believe will be found combined in the fluid extract of valerian.

Care is necessary on the introduction of a new preparation, that it may not be inferior to those already in use; for although novelty may induce a trial, its future employment must depend upon its efficacy.

Of the preparations of valerian now in use, we find all more or less objectionable. The tincture, on account of the small amount of root to the proportion of spirit. The volatile tincture of the Edinburgh College owes its properties almost wholly to the aromatic ammonia. The infusions in hot water are objectionable from their perishable nature, and containing, as they must, matters of no medicinal power. The solid extract must, from the nature of the article, be an inert preparation. The syrup prepared from the cold infusion has been advantageously used, but its value as a remedy, chiefly depends upon the care exercised in its preparation; it is mild and often inadmissible. The distilled water noticed, is without doubt the best of existing preparations, excepting the one we are about to notice, but is liable to variation of strength by age.

The class of remedies of comparatively recent date, termed fluid extracts, possessing, as they most undoubtedly do, in many cases, numerous advantages over other preparations of the same article, have obtained a degree of popularity commensurate with their superior excellence, and their introduction may justly be regarded as a new "era in pharmacy."

They mostly contain, as it is well known, a variable amount of sugar; but the term may, I conceive, be with more propriety applied to those, where, as in the case of the solid extracts, this ingredient is wanting.

Of the fluid extracts now in use, the most common, as those of sarsaparilla and senna, will not materially suffer by the action of heat in concentration, but in the present instance we have a volatile principle to extract, therefore the mode of procedure must be adapted to the peculiar subject under consideration. The first point is, what is worthy of extraction in the root. Secondly, the adoption of a standard of strength so important to prescriber and apothecary. From the best analysis of this root, viz: that by Trommsdorf, we have the volatile oil containing the acid, resin, bitter extractive, and other matters of no importance in a medicinal preparation. The oil and acid are very readily and effectually taken up by ether—resin by alcohol—and bitter extractive by water—hence the three menstrua are employed.

The form of apparatus best adapted, is the common displacement funnel, having the top secured by bladder, and a receiver fitted so as to prevent as much as possible the escape of the ether whilst acting on the root.

The standard of strength I have adopted, is eight troy ounces of the root to the fluid pint of the extract; it was my original intention to have given a recipe, in which the strength of an ounce of the root would be represented by a fluid ounce of the extract; but owing to the destructive influence of heat on evaporation, without which the fluid seemed incapable of retaining so large an amount of substance in solution, I was induced to abandon it, and think the above strong enough for all cases. The medium dose is a teaspoonful, containing, in solution, the active principle of thirty grains of the root.

In making this, as all other preparations of valerian, the selection of a prime article of root is a point of great importance, and of all that reaches our market the fresh English is decidedly to be preferred. The whole operation should be conducted with all those precautions so necessary in the proper management of displacement.

The proportions I have adopted are as follows:

Rad. Valerian. offic.	℥viij.	Troy.
Spt. Vin. Rect.	f.℥viij.	
Ether. Sulph.	f.℥iv.	
Aquæ	q.s.	

Having finely bruised the root, place it in the instrument. As the alcohol and ether do not interfere in their action, mix and obtain by careful percolation as strong a tincture as can be made, which may be determined by the liquid ceasing to acquire additional colour or taste; remove the last portions by water, and set the solution aside in an open dish in a warm room to evaporate, which it is allowed to do until all the ether and half of the alcohol are gone. The remainder then amounts to f.℥iv., is of a greenish colour, oily, containing all the acid, consequently having, in a high degree, the well known taste and odour of the root.

We then proceed with water, and if the first portion is mixed with any of the preceding menstruum, it should be submitted to gentle heat in order to expel it. The first f.℥viij. of cold infusion free from spirit are set aside, because if any of the volatile principles which may be left in the root are soluble in cold water, they will be taken up, and the concentration may be practised on the remainder without danger to the extractive. The root is finally exhausted with cold water, which is to be determined mainly by the taste; the colouring principle, continuing, as in the case of Krameria, after all the bitterness is extracted. Evaporate this by a water bath or steam-heat to f.℥iv., and finally mix all these solutions, and if a slight turbidness be observable, which has always been with me very trifling, it may be readily clarified by passing a few times through some of the exhausted dregs left in the displacement filter.

The product then is sixteen fluid ounces from the eight ounces of root, is of a dark brownish colour, limpid, having in a high degree the characteristics of the plant, of which it may be considered as an exact representative in an eligible form; the proportion of spirit is of course one-fourth. It has a specific gravity of about 1.215, is acid to litmus, and causes copious precipitates with nitrate of silver and subacetate of lead.

Having a simple extract, we may combine with aromatic or narcotic tinctures, so as to suit particular cases or views of the medical practitioner in its therapeutic employment.

With regard to its medical properties, I shall not of course be expected to say much. It may with safety and confidence be exhibited in all those cases which would indicate an anti-spasmodic or nervous sedative ; cases of wakefulness; nervous irritability—individuals accustomed to the use of opium and its preparations; also in neuralgic diseases attended with dyspepsia. I have received flattering accounts of its success in some of the above cases, a notice of which is out of place here.

The dose as before stated, is about a teaspoonful; it would probably be best to commence with a small dose, and increase until its effects on the system are fully developed. It may be readily swallowed in a little sweetened water.

Before closing this article, it is proper to remark, that an article prepared by Smith & Perry, of Boston, who we believe were the first to introduce it, is before the medical public. It is entirely different from the article prepared by the formula submitted above. The composition we are entirely ignorant of, but judging from the sensible properties should infer it was a compound extract.

ART. XXVII.—ON UVA, URSI OR BEARBERRY.

By J. Curtis C. Hughes.

(*An Inaugaral Essay.*)

The Uva Ursi is a low evergreen shrub, with long trailing stems. The leaves are short, oval, oblong, cuneate, smooth, shining, of a dark green colour on the upper surface. On the under surface they are of a lighter colour, and traced with veins of net work. When fresh, they are void of smell, but when dry and bruised they have the odour of hay. The flowers are of a reddish white colour. The fruit is a round berry. It is green at first, but when ripe it becomes red. The leaves are used for tanning, and would form a good substitute for sumac. This shrub inhabits northern Europe, Asia and America. It flourishes in a cold and barren soil. Our market is supplied from New Jersey.

Medical Properties.

Uva Ursi is an astringent tonic and diuretic. As an astringent it is applicable to all the purposes for which the vegetable astringents are used. The principal use of this medicine is in chronic affections of the bladder and kidneys. It has been used with success in strangury, with discharge of mucus; and also in gravel, by a direct action on the kidneys, and by giving tone to the digestive organs, in diabetes, gleet, fluor albus, menorrhagia, and pulmonary consumption. The dose of the powder ℈i. to ʒj. Of the decoction f.℥i. to f.℥iij. made by boiling 1 oz. of Uva Ursi with a pint and a half of distilled water to a pint. Of the extract grs. v. to grs. xv.

Chemical History.

1st. Two oz. of Uva Ursi in powder were treated by displacement with six fluid ounces of alcohol. The resulting tincture was of a dark green colour, and when evaporated to the consistence of a syrup, globules of a fixed oil floated on its surface, and on the sides of the dish a brownish matter was deposited, consisting of tannin, extractive and resin. After removing the fixed oil, the extract was treated with water, which dissolved the tannin, and extractive, leaving an undissolved portion, consisting mainly of resin and chlorophylle; soluble in alcohol and ether, and insoluble in acids. The watery solution of the extract was largely precipitated by tincture of muriate of iron.

2d. Uva Ursi when treated with ether by displacement, affords a deep green tincture, which leaves a greenish extract by evaporation, composed of tannin, chlorophylle, resin, and fixed oil. The extract, treated with water, is deprived of tannin, and the filter absorbs the oil, leaving the resin coloured with chlorophylle on the filter.

3d. Two ounces of Uva Ursi were macerated with acidulated water for twelve hours. The liquor was then strained and the residue boiled for twenty minutes three successive times in a pint of water. It was then displaced with water until it passed off nearly colourless and tasteless, and afterwards with alcohol until it ceased to remove any portion. It was then dried and weighed one oz., showing about fifty per cent. of lignin. This was without taste or odour, very brittle, readily decomposed with sulphuric acid, forming a thick black mass.

4th. Six oz. of Uva Ursi having been bruised and macerated in water for six hours, were then transferred to a retort placed in a sand bath; a solution of common salt was added, and a receiver adapted. The distillation continued for five hours. There was about a pint condensed in the receiver during the operation. The liquid in the retort was of a dark brown colour, but that which passed over was colourless; a light coloured oil collected in globules on the surface of the distilled liquid, having a very pleasant odour.

5th. An infusion was made of two oz. Uva Ursi with a pint of water. The infusion was precipitated with a solution of gelatin, forming tannate of gelatin, and the infusion was filtered. To a portion of the filtered liquid a solution of subacetate of lead was added; it produced a dull white precipitate. With lime water, a yellow, showing the existence of gum. To a second portion of the liquor a few drops of protochloride of tin were added, producing a white precipitate; with nitrate of silver a brown one denoting the presence of bitter extractive. To a third portion a few drops of tincture of muriate of iron were added; it turned black, proving the existence of gallic acid. Starch could not be detected with tincture of iodine.

Ashes of Uva Ursi were tested and found to contain potash and lime.

6th. One pound of Uva Ursi was macerated in water for twelve hours and displaced until two quarts of liquor were obtained. The tannin was precipitated with a solution of gelatin, and filtered. The liquor was evaporated to dryness, the extract remaining dissolved in strong alcohol, and treated with purified animal charcoal for twenty-four hours. It was then filtered, evaporated, redissolved in absolute alcohol, and treated with purified animal charcoal for twenty-four hours; filtered and crystallized by spontaneous evaporation. The crystals were pressed, redissolved in absolute alcohol, treated with animal charcoal, filtered and crystalized by spontaneous evaporation. This substance crystallizes in transparent, colourless needle-shaped prisms, soluble in alcohol, ether and dilute acid. It will not dissolve in essential and fixed oils. Its aqueous solution is precipitated by subacetate of lead and carb. potash; lime water, and tincture muriate of iron do not affect it. It is neutral to test paper, and combustible. One grain acted as a powerful diuretic.

From the experiments here detailed, it may be inferred that Uva Ursi contains tannin, gallic acid, gum, resin, bitter extractive, volatile and fixed oils, lignin, and a peculiar principle, which, as it embodies the diuretic power of the leaves, may be called *Ursin.* This principle is worthy of a further investigation, particularly as to its chemical relations and medicinal powers. If it should prove to possess, in full, the useful properties of the plant, it may become a valuable agent in the hands of the practitioner.

ART. XXVIII.—REMARKS ON THE OINTMENT OF PRECIPITATED CARBONATE OF ZINC, AS A SUBSTITUTE FOR THE CERATUM ZINCI CARBONATIS, U. S. P.

By Thos. S. Wiegand.

About a year since, having need to replenish my stock of prepared Carbonate of Zinc, an article was supplied, with which, on account of its colour, I was dissatisfied. Previous to this time, a paper (published in the American Journal of Pharmacy for 1844, page 182,) which stated that a coloured sulphate of baryta was extensively substituted for calamine, had attracted my attention: supposing the subject worth examining, I concluded to test the quality by chemical reagents; the result of this examination was that there was no zinc present.

Despairing of success in obtaining a pure calamine, I determined to prepare the carbonate artificially, which may be readily affected in the following manner:

Take of crystallized sulphate of zinc, 1 lb.
" carbonate of soda, "

The salts are to be dissolved in separate portions of water, and the solutions mixed; when the precipitate shall have subsided, the supernatant liquor is to be drawn off, and the precipitate washed till the washings no longer give a precipitate with a solution of chloride of barium ; when operating on three pounds of sulphate of zinc, this usually requires three days.

To secure an elegant preparation—it is necessary that the sulphate of zinc should be free from iron ; if not pure, it should be rendered so by boiling with a carbonate as recommended in the Amer. Jour. of Pharmacy, for 1846, page 242. When dry, it can be very easily reduced to a powder, which resembles in appearance calcined magnesia.

It was reasonable to suppose that a cerate made with a precipitated carbonate of zinc would be more efficacious than one made from a dense powder, as the minute division of the former would favour its activity, if its efficacy depend, as I suppose none will deny, upon the extent of surface exposed to the action of the fatty materials.

The cerate is prepared according to the formula of the United States Pharmacopœia, substituting the precipitated carbonate of zinc for the calamine. It has a white colour very slightly tinged with blue, and remains the same in appearance for several months.

It has been employed in all cases where the usual calamine cerate would have been used, and, in the opinion of the surgeon of the institution, with fully equal, if not greater advantage.

U. S. Naval Hospital, N. Y. Station, April 13*th,* 1847.

ART. XXIX.—PHARMACEUTICAL NOTICES.

By William Procter, Jr.

Donovan's Solution.

The formula for Donovans's solution, as published by its author, and of which a copy is found in the United States Dispensatory, presents so complex an appearance in the way of fractions of a grain, that many apothecaries, not possessed of a delicate balance and weights are deterred from making it.

Another objection is that a loss of iodine is occasioned by the exposure rendered necessary during the trituration of the three elements with the alcohol during the time that elapses before the combination is effected. The mercury rapidly acquires its dose of iodine, whilst the arsenic, which combines less readily, is liable to all the deficiency occasioned by vaporization. That this occurs is evident from a small quantity of arsenic left undissolved by the distilled water. The proportions in Donovan's formula are 6.08 grains of arsenic, 14.82 grains of mercury, and 49 grains of iodine, which are not exactly in atomic relation. In order that the preparation should be composed of one equivalent of each iodide, the numbers should be 5.5 arsenic, 14.82 mercury, 46.09 iodine, so that there is one-tenth of an equivalent of the arsenical iodide in excess. It is hardly probable that any sensible variation would be observable in the medicinal action of the solution if the iodides were used in equivalent proportion; and as their combining number is the same, the preparation of the solution may be much simplified.

The aggregate of the solid contents of half a pint of Donovan's solution is 70 grains, which is composed of $33\frac{1}{3}$ grains of biniodide of mercury and $36\frac{2}{3}$ grains of sesqui-iodide of arsenic. If the formula was made to require 35 grains of each iodide, and half a pint of water, it would be greatly simplified, and could be made extemporaneously. The addition of hydriodic acid to the solution is unnecessary in this case, and its design in the formula of Donovan is doubtless to supply any deficiency due to loss of iodine in the operation.

The following formula, closely resembling that of Donovan in the proportions, avoids the fractions of a grain:

Take of Sesqui-iodide of arsenic, 36 grs:
" Biniodide of mercury, 34 "
" Distilled water, half a pint.

Triturate the two iodides with half an ounce of the water until they combine and dissolve, and then add the rest of the water, and filter.

The sesqui-iodide of arsenic is easily prepared. One part of metallic arsenic is reduced to an impalpable powder, intimately mixed with five parts of iodine by trituration, then introduced into a small flask or thin vial, and the mixture very gently heated until liquefaction occurs. The vessel should be nearly full, so as to prevent the formation of much iodine vapour, and enable the operator to bring the fused iodide in contact with all parts of it, and include any iodine that may have sublimed on the sides. If, on cooling, the contents of the vial assume a reddish yellow colour and crystallize on the sides of the vial, and no iodine odour is apparent, the operation is finished. The vessel is then fractured and the iodide removed.

If the arsenic and iodine are pure and the process skilfully conducted, nearly the whole of the arsenic is combined, and the compound is quite pure enough for making Donovan's solution without sublimation.

The metallic arsenic should be bright and lustrous, and the iodine crystallized and free from water. The ordinary cobalt or fly stone, which is metallic arsenic, is often pure enough for pharmaceutical use.

Atropia.

The activity of good extract of belladonna, leaves little to desire on the part of the practitioner in the internal exhibition of this drug, the dose being quite small, yet in its external application, with a view to the dilatation of the pupil of the eye or as an application in neuralgia, the extract is so disagreeable an application that several European surgeons have sought to avoid the staining effect on the skin by resorting to the active principle, atropia, in an isolated condition. In the February number of the *Journal de Pharmacie et de Chimie*, it is stated that "among the new remedies employed by M. Berard in the treatment of diseases of the eye, *atropia* should be placed in the first rank. This alkaloid, which can now be obtained from some pharmaceutists, possesses incontestable advantages in certain cases over belladonna itself.

"The greatest of these advantages is certainly the extreme rapidity with which it effects the dilatation of the pupil even in very minute quantity, as for instance by a solution containing one grain in one hundred grains of distilled water.

"Another advantage appreciated by the patient is the fact that the use of atropia avoids all the smearing and staining of the face, so characteristic of the ordinary mode of applying the extract; and which creates so great a repugnance to its use."

According to the Dublin Quarterly Journal (November, 1846, page 553,) "Dr. Wilde of that city employs the solution of atropia of these strengths:

No. 1. Atropia grs. j. distilled water f.ʒj. diluted alcohol gtts. iij.
No. 2. Atropia grs. ij. distilled water f.ʒj. diluted alcohol gtts. iij.
No. 3. Atropia grs. iij. distilled water f.ʒj. diluted alcohol gtts. iij.

The alkaloid is rendered soluble by a drop of nitric acid, and the spirit is added to make the solution keep.

A single drop of No. 1 placed on the conjunctiva of the lower lid causes dilatation of the pupil in a healthy eye in from five to fifteen minutes."

The best process yet published for atropia is that of Mein, noticed in the United States Dispensatory, and in which the root is the subject of treatment with alcohol, lime, etc. As we cannot get belladonna root here, the only available source is the best extract, which, independent of the large amount of inert matter to get rid of, is too expensive to be employed with that view. Those who incline to make the experiment, however, may proceed by treating the extract with warm water until all the soluble portion is dissolved, filtering out the chlorophylle and albumen, evaporating the solution to a syrup, dissolving this in alcohol, and filtering if necessary, and then proceeding as in Mein's process with lime, acid, etc.

Belladonna leaves contain a large quantity of dark colouring matter, which renders the recent juice claret coloured, and is the chief cause of the staining. A solution of extract of belladonna precipitated with subacetate of lead, the excess of lead carefully with sulphuric acid, and the solution filtered from the sulphate of lead, carefully evaporated to four times the weight of the extract, no doubt would answer all the purposes of the solution of atropia.

Syrup of Orange Peel.

Those who are in the habit of preparing the syrup of orange peel according to the United States Pharmacopœia, know that it is strongly disposed to fermentation, and rapidly loses its agreeable qualities in warm weather. When made by the following formula it is more aromatic and preserves readily.

Two ounces of recently dried peel of the sweet orange is reduced to powder and lixiviated with a mixture of two parts of alcohol and one of water, until six fluid ounces are obtained. This tincture is then poured over and mixed well with 32 ounces (av.) of sugar in coarse powder, and spread on paper until the alcohol has evaporated. When this is accomplished, the aromatized sugar is made into syrup with 16 fluid ounces of water, merely carrying the heat to ebullition in a covered vessel, straining and bottling hot. Prepared in this way, syrup of orange peel has a fine amber colour, and the orange taste in a marked degree.

ART. XXX.—ADHESIVE PLASTER EXEMPT FROM LEAD.

By M. Pettenkofer.

With the design of obviating the accidents that are occasioned under some circumstances by the absorption of soap of lead, and the irritant properties of the oleo-resins; in a word, to prevent the inconveniences arising from the employment of adhesive diachylon in medical practice, M. Pettenkofer proposes the therapeutical employment of the following preparation : mix eight parts of soap of lime, four of resin of turpentine, and one of suet ; boil the mixture with a sufficiency of water until the whole enters into a homogeneous fusion, and then malaxate it in water as usual. If any undissolved particles of lime soap remain, it should be strained through linen. Lime soap does not melt in boiling water when alone, but with the resin its fusion is easy and complete.

As to the lime soap, it can readily be made either by saponifying olive oil with hydrate of lime, or, better, by adding a solution of a soluble salt of lime to an aqueous solution of olive oil soap. In the first case, an ounce and a quarter of recently burnt lime is slaked with six ounces of water, and reduced to a homogeneous consistence, then heat six ounces of olive oil in a tinned copper basin to some degrees above the boiling point of water, and add the milk of lime to the hot oil and maintain the mixture at the temperature of boiling water, stirring constantly, until a small portion removed and cooled ceases to adhere to the fingers, and is friable. It is necessary to replace the water, as it evaporates during the boiling.

The soap of lime which furnishes the most beautiful plaster, is obtained by decomposing a solution of oil soap with one of chloride of calcium. The precipitate should be washed, expressed and dried; pulverized with half its weight of resin, (Térébenthine cuite,) and melt the mixture in boiling water with one-eighth of suet. This adhesive plaster resembles very closely in its consistence and exterior aspect that of lead employed at present, and it is very adhesive.—*Jour. de Pharm. from Repertorium für die Pharmacie.*

ART. XXXI.—ON THE EXTRACTION OF STRYCHNIA.

By M. J. F. Molyn.

The extraction of the vegetable alkaloids often presents considerable difficulty, because these active principles are found combined with acids, or mixed with other principles which accompany them in the different parts of the plant, and from which it is often very difficult to separate them. Nux vomica, which is used for the extraction of strychnia, in preference to St. Ignatius's beans, its commercial value being less, consists of a very hard horny substance, not easily penetrated by liquids; it contains a large quantity of gummy matter, which when the seeds are treated with water, dissolves together with the igasurate of strychnia. On adding lime to this solution, to decompose the salt of strychnia, the mucilage is precipitated with the alkaloid, forming a very abundant deposit, which requires a large quantity of alcohol to deprive it of the strychnia which it contains. If to avoid this gummy matter, the seeds be directly treated with alcohol, the process becomes very expensive, in consequence of the large quantity of alcohol that must be employed to dissolve the whole of the strychnia.

The objections which apply to the above means, have induced me to try the effect of fermentation, which does not at all affect the active principle present. The gummy and saccharine matters of the seeds are decomposed, carbonic acid is disengaged, while the lactic acid which is produced, decomposing the igasurate of strychnia and brucia, forms with these alkaloids very soluble lactates.

Availing myself of those improvements which have been suggested by authors who have directed their attention to the extraction of strychnia, and adding such modifications as my experience proved to be useful, I have fixed on the following process, which, in addition to its being economical affords a good result.

Mix nine pounds of nux vomica in coarse powder with water, so as to form a thin paste. Keep this at a temperature of from 68° to 78° Fahr. for several days, when fermentation will manifest itself by the disengagement of a large quantity of carbonic acid. The mixture is to be daily stirred, so that the whole of the powder may be exposed to the fermentative process. I think that when the washed seeds are previously boiled for two or three hours, so as more completely to dissolve the gummy matter, the process is abridged. The fermentation is completed in eighteeen or twenty days, and is indicated by the cessation of the disengagement of gas. The mixture is then passed through a hair sieve and pressed. The residue is boiled two or three times, according to the quantity of water employed. The liquids are left to become clear by deposition, and are then evaporated to about three gallons. Add nine ounces of quick-lime in powder, well stirring the precipitate; let it stand for six or eight hours, then separate the precipitate, and submit it to strong pressure. Heat the liquid to the boiling point, and add a slight excess of sulphuric acid; sulphate of lime is formed, which is allowed to subside, and the supernatant liquor is evaporated to about four pints; to this, one ounce of powdered quick lime is added, and the process above described, repeated. The precipitate resulting from this process, is pressed and added to the former; they are then dried and reduced to powder; this powder is digested in about ten pints of proof spirit, with a gentle heat. The spirit dissolves the brucia, the colouring matter, and a little of the strychnia, which may be recovered by evaporating the liquid, and allowing it to crystallize. The precipitate thus freed from brucia and colouring matter, and reduced to powder, is digested at twice, in ten pints of spirit of wine, sp. gr. 823. The solutions, which will be nearly colourless, are filtered, and four-fifths of the spirit recovered by distillation. On allowing the remaining solution to cool and stand for a day, the strychnia will be found at the bottom of the vessel, in the form of a white crystalline powder in a yellowish supernatant liquor. The liquor is to be decanted off, and the strychnia washed with proof spirit, which removes any remaining portion of brucia, and renders it chemically pure by one crystallization.—*Pharm. Journ. from Journal de Pharmacie d'Anvers.*

ART. XXXII.——ON THE SYRUP OF IODIDE OF IRON

By MESSRS. T. AND H. SMITH, Edinburgh.

MOST of the processes for syrup of iodide of iron which have hitherto come under our notice, appear to us unnecessarily tedious and complicated; although in the whole range of preparations included in the compass of the Pharmacopœias there is not, perhaps, a single one in which such a state of matters should be more carefully avoided. Consistently with correct adherence in the constitution of the resulting compound to the recognised formula, every effort should be made to render the operation simple, easy, and, above all, of speedy execution. The solution of iodide of iron before combination with the sugar in the form of syrup, is decomposed with such rapidity, that the eye can easily trace the changes of colour and appearance by which the decomposition is accompanied. The liquid from being quite transparent and almost colourless passes through deeper and deeper shades of green to brownish red, and in an amazingly short time is entirely decomposed and quite muddy from an abundant ferruginous precipitate. After a sufficient quantity of sugar has been dissolved in the solution to form a syrup, these changes are almost entirely arrested; so that even in an open vessel many days intervene before any striking alteration of colour can be remarked.

The process used by us for the syrup of iodide of iron is a modification of the formula of the Edinburgh Pharmacopœia, and, as we have by repeated trials long proved its value, it is here given for the use of the readers of the Pharmaceutical Journal.

Let a solution of iodide of iron be made in a flask with six hundred grains of iodine, two hundred grains of pure iron filings, and six ounces of *cold water*. The action being finished, after smart agitation for a few minutes, let the liquid, while yet hot from the intense chemical action, be boiled over a gas flame, or in any other more convenient way, till its brown colour has disappeared, which is easily known by the froth becoming white. Let the liquid be now at once filtered through a small filter into a bottle, which has previously been marked by pasting on the outside of the bottle a small slip of paper at the level of eighteen fluid ounces, and containing thirteen ounces and a half of refined sugar, broken down into pieces about the size of peas. When the solution has all passed through, which fortunately takes place with unusual rapidity, let the filter be washed with boiling water, a further quantity of which must also be poured into the bottle till the liquid reaches the level of the mark. Let the bottle then be introduced into a hot-water bath and briskly shaken at short intervals, till the sugar is quite dissolved; and having adjusted the level of the syrup to the mark by the addition of water, after again shaking the bottle, let the syrup, without a moment's delay, be bottled into small phials, and secured as much as possible from contact with the air and light, by careful corking, and covering the bottles with some dark-coloured paper. These are the proportions adopted in the Edinburgh Pharmacopœia, and the syrup contains one grain of the iodide in twelve minims, or five grains in one drachm; but as the syrup first proposed by Dr. A. T. Thomson is weaker by two-fifths, containing three grains to the drachm, and which we believe is the strength of the syrup used in England, it is evident that the proportions must be varied accordingly. They will therefore stand thus :—

252 grains iodine
100 grains iron filings
2½ oz. cold water
10 oz. pure sugar.

Let the syrup, when finished, measure twelve ounces and a half, the level occupied by this quantity having been marked off on the bottle before-hand. It is advisable that the bottle used in the preparation of the syrup should not have a capacity more than about a third above the quantity to be made.—*Pharm. Journ.*

ART. XXXIII.—ON MARKING INK, FOR MARKING LINEN, &c. WITHOUT THE USE OF A MORDANT.

BY MR. REDWOOD.

THE practice of marking linen and other similar fabrics employed as wearing apparel, or for domestic use, with a preparation of silver, commonly called *Marking Ink*, has prevailed for many years, and has now become almost universal. The preparation first introduced for this purpose consisted of a solution of nitrate of silver, thickened with gum arabic and coloured with sap green; but in using this solution it is necessary previously to apply to the article to be marked, a *preparation* or *mordant*, consisting of a solution of carbonate of soda.

The following formula has been very generally adopted in the preparation of this kind of marking ink:

℞. Carbonate of Soda ℥ss.
Distilled Water ℥iv.
Mix, and sign "*The preparation or Mordant.*"

℞. Nitrate of Silver ʒj. ℈ij.
Gum Arabic ʒij.
Sap green ℈j.
Distilled water f.℥j.
Mix, and sign "*The Ink.*"

The ink made from the above, or a similar formula, which, I believe, almost every druggist through the country has been in the habit of preparing and selling, when used according to the usual instructions, produces a result which is subject to no objection that does not equally apply to any other marking ink having silver as its basis.

Within the last few years, however, the marking ink made as above, has been to a great extent superseded by the introduction of a new kind of ink, which does not require the use of a *mordant* or *preparation.* This ink appears to be generally preferred to the other;—it is in one bottle, which occupies but little space, and its use is considered to be attended with less trouble and inconvenience than that of the other.

My attention has recently been directed to this subject, as I was desirous of introducing a good formula for *marking ink to be used as a mordant* into the new edition, now publishing, of Gray's *Supplement to the Pharmacopœia.* Several formulæ have been published in the Journals, for the preparation of this ink, but none of these have given complete satisfaction.

The following appear to be the principal requisites in this kind of ink:

1st. That it shall flow freely from the pen, and form a well defined mark without running or blotting.

2d. That it shall not require a very strong or long continued heat to be applied, by holding the article that has been written on to the fire, or passing a hot iron over it, in order to develope the black mark required.

3d. That the mark produced by it, when developed by the application of heat, or by exposure to light, shall be perfectly black.

4th. That it shall not destroy the texture of even the finest cambric.

After several experiments, I have succeeded in making a marking ink, which I think will be found to realize all the above conditions; it is thus prepared:—

℞. Nitrate of Silver ℥j.
Carbonate of Soda, crystallized, ℥iss.
Tartaric Acid ʒij. ℈ij.
Strong Liquor Ammoniæ f.ʒij. or *q. s.*
Archil f.℥ss.
White Sugar ʒiv.
Powdered Gum Arabic ʒxij.
Distilled Water *q. s.*

Dissolve the nitrate of silver and carbonate of soda separately in distilled water: mix the solutions: collect and wash the precipitate on a filter; introduce the washed precipitate, still moist, into a Wedgewood's-ware mortar, and add to it the tartaric acid, rubbing them together until effervescence has ceased; add *liquor ammoniæ* in sufficient quantity to dissolve the tartrate of silver; then mix in the archil, white sugar, and powdered gum arabic, and add as much distilled water, if required, as will make f.℥vj. of the mixture.

It will be observed that the essential difference between this formula and those which have been already published, consists in the use of tartrate of silver, instead of nitrate of silver.—*Pharm. Journ.*

ART. XXXIV.—ARTIFICIAL ULTRAMARINE: ITS COMPOSITION AND CHEMICAL PROPERTIES.

Ultramarine, whether native or artificial, always consists of silica, alumina, sulphur, and a little oxide of iron; but no two specimens contain these substances in the same proportions. Native ultramarine is procured from the lapis lazuli,—the artificial kind, according to Robiquet's process, is made by heating to low redness a mixture of one part of porcelain clay, one and a half of sulphur, and one and a half parts of anhydrous carbonate of soda, in a covered crucible so long as vapours are given off. When opened, the crucible is usually filled with a spongy mass of a deep blue colour, containing more or less ultramarine, mixed with the excess of sulphur employed, and some unaltered clay and soda. The results are, however, by no means uniform. The price of the native ultramarine was formerly five guineas an ounce, the artificial is sold at a few shillings an ounce, and is equally durable.

The colour of both is destroyed by nitric acid, or by a long-continued full red heat. Hence the difficulty in preparing the artificial variety. The destruction of the colour by nitric acid renders it easy to detect the admixture of cobalt, or Prussian blue, with ultramarine. The presence of indigo would be found by the use of sulphuric acid, which destroys the ultramarine and dissolves the indigo unchanged in colour. Strange as it may appear, even the artificial ultramarine is now largely adulterated. A specimen, lately examined by M. Chevalier, was found to contain forty per cent. of blue carbonate of copper. This is decidedly injurious, because the blue colour of copper, under exposure to air and light, slowly becomes green.

The discovery of artificial ultramarine was accidentally made by Vauquelin, in 1814. It was found on pulling down a soda factory, where sulphate of soda had been fused with charcoal, that some parts of the walls had a rich blue colour. This intelligent chemist examined the substance, and ascertained that it was identical in composition with ultramarine. Prizes were offered in France for a chemical process for its preparation; and the result was that methods were discovered about the same time by M. Guimet, Paris, and M. Gmelin, of Tubingen. The process of Robiquet above given, is an improvement upon those first devised, and all that is now wanted is to discover the conditions for *constant* success. Here is a field for the "young chemistry" of England, if it can be induced to withdraw itself for a short time from the discovery of organic bases.

The essential constituent of ultramarine appears to be sulphuret of sodium; yet on what does the splendid colour depend?—the arrangement of matter! As in the case of the brilliant scarlet biniodide of mercury, which is formed of a white liquid metal and an iron grey crystalline solid, it is impossible to explain the cause of the colours by reference to the existence of any colouring principle. For a long time ultramarine was supposed, like the lapis lazuli, to owe its colour to the presence of iron. Clement and Desormes, however, prepared it without a trace of iron, and, what no one up to that time had suspected, they proved that it contained twenty-two per cent. of soda.

Ultramarine, whether native or artificial, is a most durable colour, and has great solidity; it undergoes no change from the lapse of time, probably from its being already in the state of sulphuret. It is equally blue by daylight and in the yellow light of a candle, while in artificial light cobalt is violet, and other blues appear more or less green, unless admixed with lake or crimson to counteract the effect of the yellow rays. Ultramarine does not appear to have been known to the ancients, although the Egyptians, unaided by chemical science, had discovered a most durable blue, now as bright on their mummy cases, as when first laid down three thousand years ago! Upon the composition of this and the other colours used by the ancients we shall probably make some remarks on a future occasion.—*Pharm. Journ. from Med. Gaz.*

ART. XXXV.—PREPARATION OF CARMINE.

The following processes for the preparation of *carmine*, are taken from the 8th volume of *Dumas' Traité de Chimie, appliquée aux Arts*, which is just published.

Carmine, prepared with white of egg.—The carmines known under this name are made in the following manner:

℞. Cochineal, ℔j. ℥iv.
Carbonate of soda, gr. cxv.
Soft or river water, Cong. iv.

Boil these together for twenty minutes in a vessel, the depth of which is double its diameter, and which is furnished with two handles and a lip to facilitate the pouring out of the liquid. This boiler should also be furnished with an outer rim, which serves to support it over the furnace, so that the bottom alone is exposed to the fire. It should be heated with a wood fire, as the combustion of coal is found to be injurious to the quality of the carmine.

After boiling for twenty minutes, the boiler is to be removed from the fire, and ʒvj. of alum, and ʒj. of cream of tartar added. The mixture is to be stirred for a few minutes; the pan is then to be inclined so that the liquor may be easily decanted, and then left to itself. By degrees the refuse of the cochineal is deposited—the solution, which was of a violet colour, assumes a rose tint, then a bright red. The liquor is at this time slightly turbid, and evidently contains the carmine in suspension, but in such a fine state of division that it cannot be separated by filtration.

After standing at rest for about a quarter of an hour, the liquor is decanted, and passed through a very fine silk sieve. It is received into another pan, left at rest for a few minutes, and then decanted again, when a slight brownish deposit is left.

The white of two eggs, well beaten up, is then added, and the liquor well stirred. Sometimes the carmine separates immediately in a flocculent form, and of a beautiful scarlet colour. Sometimes the separation does not immediately take place; in this case the pan must be placed on the fire, and left there until the flocculent carmine floats on the surface, which always occurs before the commencement of ebullition. The pan is then taken off the fire, and the floating carmine made to deposit by submerging it with a brush; it is then allowed to stand for ten minutes, and carefully decanted. The liquor becomes transparent, and the deposited carmine is afterwards separated, washed with three or four pints of water and collected on a strainer.

It is dried in a stove at a temperature from 82° to 86° Fahr. If dried in the open air it would become mouldy.

The carmine thus prepared, will be in the proportion of five or six drachms to the pound of cochineal used; but two or three drachms more, almost as good as the former, may be obtained, by boiling the decanted liquor, and treating it with white of egg as before.

This carmine is well suited for the use of confectioners, perfumers, artificial-flower-makers, and manufacturers of red ink; but it cannot be used by artists, as it is too granular, and does not work well under the brush.

Carmine, prepared with Isinglass.—The following is the process for preparing this kind of carmine:—

℞. Cochineal, in powder, ℔j.
Subcarbonate of potash, ʒiijss.
Alum, in powder, ʒviij.
Isinglass, ʒiijss.

Boil the cochineal and carbonate of potash, in a boiler containing five pails of water. After boiling for a few minutes, take the boiler off the fire and place it on a table, inclined to one side so as to facilitate decantation. Add the alum in powder, and stir the solution. The liquor changes colour and assumes a more brilliant tint. After a quarter of an hour, the cochineal will have deposited, and the liquor have become as clear as if it had been filtered. It contains the carmine in suspension. The liquor is then decanted into a similar pan, and placed on the fire, adding the isinglass dissolved in a considerable quantity of water and strained. At the moment of ebullition the carmine rises to the surface, and a coagulum forms as in clarification with white of egg. The pan is then removed from the fire, and the liquor stirred with a spatula. After a quarter of an hour the carmine will be deposited, when the liquor is to be decanted and the deposit drained on a strained filter, and dried in the manner already described.—*Ibid.*

ART. XXXVI.—ON ARTIFICIAL AVENTURINE.

By Messrs. Fremy and Clemandot.

Although the manufacture of coloured glasses has been but recently introduced into France, it has recently been brought to such great perfection, that the gems produced by our manufacturers will, in many cases, bear comparison with those of Bohemia.

There is nevertheless a production of this class which had not as yet been manufactured in France; we allude to the artificial aventurine, which has hitherto only been made in Venice, and the manufacture of which is kept a profound secret. Fine specimens of Venitian aventurine are very scarce, and are sold at as high a price as 200 francs the kilogramme.

We were anxious to discover the mode of making this gem, and of giving the benefit of the discovery to our glassworkers.

After numerous experiments which have been conducted at the glasshouse of Clichy, we have been fortunate enough to obtain results, which although not brought to the highest degree of perfection, are, notwithstanding, of a nature to induce a belief that in future aventurine will be manufactured in France.

As we wish to supply to our manufacturers, as soon as possible, the deficiency which has existed with reference to this product, we hasten to make known our process for the manufacture of aventurine, hoping that they may bring it to that perfection which practice alone can give it.

The chemical analyses, made principally by MM. Wöhler and Barreswil, have proved that Venetian aventurine is composed of a soft glass holding in suspension metallic and crystallized copper. It appeared, then, that aventurine should be obtained by crystallizing copper in melted glass, and having the mixture in such a state that the metallic crystals shall remain disseminated through the vitreous mass.

But knowing the tendency of copper to oxidation, and its fusibility, and appreciating all the circumstances opposed to its crystallization, and the equal diffusion of these crystals through the fused glass, it will be easy to understand the difficulties we had to surmount.

The choice of the composition which, by the action of heat, should afford metallic copper, was not less difficult. We found it necessary to reject those bodies which, in producing copper, would require a temperature either too high or too low; in the first case the metal would become agglomerated before the fusion of the glass; in the second, it would fuse, separate from the glass, and collect at the bottom of the crucible. Neither could we admit of those reactions, which, in producing metallic copper, would give rise to an abundant disengagement of gas, or the deposition of a coloured or insoluble deposit in the glass. A composition had to be found which, at the temperature of the fusion of glass, would produce metallic copper.

After trying without success the action of different metals on glass coloured by oxide of copper, we have been led to examine the reduction which oxides at the minimum of oxidation are capable of effecting on protoxide of copper, and our attention was principally directed to the action in this way of iron scales.

We have found that, under the influence of heat, iron scales quickly reduce the protoxide of copper to the metallic state, passing itself to the state of peroxide of iron. This reaction appeared well suited to fulfil the end we proposed; it produces pure copper, and has the advantage of forming a metallic oxide, soluble in the glass, and giving it only a slight yellow tint. The formation of a silicate of peroxide of iron is a fortunate circumstance, for, by increasing the density of the glass, this silicate would naturally oppose the deposition of the metallic crystals. We, therefore, with confidence tried to produce Venitian aventurine by heating a mixture of glass, protoxide of copper, and iron scales. The experiment confirmed our anticipations.

On heating for twelve hours a mixture of 300 parts of powdered glass, 40 parts of protoxide of copper, and 80 parts of iron scales, and then allowing it to cool very slowly, we obtained a vitreous mass, containing, in abundance, crystals of metallic copper.

The most difficult point in the manufacture of aventurine, namely, the production of a glass containing brilliant crystals of copper, uniformly diffused through the mass, has, therefore, been completely resolved.

The specimens of aventurine which we now present to the Academy, have a certain degree of opacity which destroys the brilliancy of the metallic crystals, and these crystals also are not so large as they should be; but the experiments we are now making lead us to hope that we shall soon have specimens completely satisfactory.

To convince ourselves of the identity of our aventurine with that made at Venice, we have examined them with an excellent microscope, and we find that in both the copper is crystallized in regular octahedrons.—*Pharm. Journ. from Journal de Pharmacie.*

ART. XXXVII.—ON THE CONSTITUTION OF BEBEERINE. By

DOUGLAS MACLAGAN, M. D., F. R. S. E., AND THOMAS G. TILLEY, ESQ.
Professor of Chemistry in the Queen's College, Birmingham.

BEBEERINE is the name given by Dr. Rodie, of Demerara, to an organic base, of which he pointed out the existence in the bark of a tree of that colony, known by the name of *Bebeeru* or *Green Heart.* This tree has recently been examined botanically by Sir Robert Schomburgk, and found to be a species of *Nectandra,* which, in compliment to Dr. Rodie, he has named *N. Rodiei* (*Hooker's London Journal of Botany*, December, 1844.)

The general properties of the alkali, and the preparation of its sulphate for medicinal use were further described by one of us in a paper read before the Royal Society of Edinburgh, in April 1843, (*Transactions*, vol. xv. part iii.) In this memoir an account was given of the preparation of bebeerine, in what was regarded as a state of chemical purity, and of its separation by means of æther from what was believed to be another alkaline matter, sipeerine; but as the substance is neither crystallizable nor colourless, it could not decidedly be affirmed to be chemically pure until its constitution had been determined by ultimate analysis. This desideratum it is proposed to supply in the present paper.

The chief difficulty in preparing the pure alkali arose from the troublesome process required to free it from adhering tannin, considerable loss being experienced in the methods then adopted. This has subsequently been accomplished with greater facility by the following process, which may be applicable to the purification of other organic bases.

The sulphate prepared for medicinal use, which is always more or less impure, is precipitated by ammonia; and the alkaline matter thus separated, is, after washing with water, triturated with about an equal weight of freshly precipitated and moist hydrated oxide of lead. The magma thus formed is then dried over the water-bath, and the alkali is taken up by absolute alcohol. On distilling off the spirit, the organic base is left in the form of a transparent orange-yellow resinous mass, as described in the paper above quoted. This, on being dried, pulverized, and treated with successive portions of pure æther, is in great part dissolved in this fluid. The dissolved portion, on distilling off the ether, is obtained in the form of a translucent, amorphous, but homogeneous resinous-looking substance, of a pale yellow colour, and possessed of all the properties of an organic alkali. This is pure bebeerine, as described in April, 1843.

Bebeerine thus obtained does not crystallize. It is very soluble in alcohol, less so in ether, and very sparingly in water. Heated, it fuses; and the heat being continued, it swells up, giving off vapours of a strong peculiar odour, and burns without residue. Subjected to the action of oxidizing agents, it gives with bichromate of potash and sulphuric acid, a black, and with nitric acid a yellow resin. It forms with acids salts which are all uncrystallizable; with perchloride of gold, mercury, copper, iron and platinum, it gives precipitates which are soluble to a certain extent in hot water and alcohol, but which on the solution cooling, are not deposited from it in a crystalline form.

When precipitated by ammonia from its solution in acids, it is obtained in the form of a very pale yellow powder. This was examined with a view to determine whether or not it was a hydrate of the alkali. It was washed, dried *in vacuo* over sulphuric acid, and heated in an oil-bath. At 108° Fahr. it began to soften, and at 370° it fused into a transparent brown resinous mass. It did not sensibly lose weight during the process, and had undergone no change in properties from exposure to this temperature, as it retained its perfect solubility in acids, and formed with them the usual bright yellow solution.

The results of several ultimate analyses of two different specimens of bebeerine give the following as its composition, $C^{35} H^{40} N^2 O^6$.

It appears to have been sufficiently established by the experience of medical practitioners, that bebeerine possesses marked properties as a remedy for periodic diseases, (Maclagan, *Edinburgh Medical and Surgical Journal*, April, 1845.)

On comparing its composition with that of other vegetable alkalies possessed of similar remedial powers, such as quinine and cinchonine, it is not a little remarkable that it differs from them in atomic constitution, and that it is isomeric with morphia, which acts as a pure narcotic. The atomic constitution of morphia, calculated from the formulæ deduced by Liebig and Regnault from their analyses, agrees perfectly with that given above for bebeerine. The composition of the two bases is, in fact, identical.

This is the first instance of isomerism occurring in substances belonging to the class of organic bases.

One very interesting conclusion regarding the action of medicinal substances appears to be deducible from these results, that similarity of physiological properties does not depend upon similarity in the proportions of their constituents. It seems probable that the mode in which their atoms are grouped has an important share in modifying their physiological actions; for in the present instance we have the same number of atoms both in morphia and bebeerine, but in the one producing a white crystalline body of narcotic qualities, in the other a yellow amorphous resinous-looking substance, acting as an anti-periodic. The difference in their physical properties in fact proves that their elements are differently arranged.

We have not been enabled to examine *sipeerine*, the substance left behind when pure bebeerine is dissolved out by means of æther. It occurs in a very minute quantity, and requires a very tedious repetition of the treatment with ether to free it from the last traces of bebeerine. There seems, from some trials which we have made, good ground for believing that it is a distinct alkali, but it has not been obtained in sufficient quantity to enable it to be subjected to ultimate analysis.*—*Pharm. Journ. from Proceedings of the Chemical Society.*

ART XXXVIII.—NOTE ON THE FRUIT OF THE MYROXYLON TOLUIFERUM.

By M. Leroy.

It is about a year since M. Méneir made known a species of fruit imported recently into France, and which was stated to be derived from a tree called by De Candolle, *myroxylon* or *myrospermum* toluiferum, and which belongs to the family Leguminosæ.

It is a pod, three or four centimetres long, two to three wide, inflated near the middle, furnished with a membranous wing at one of its sides, which gives it the aspect of the profile view of a caputchin, and presenting occasionally near the centre a depression, owing to the fact that the fruit sometimes contains two kernels, and sometimes but one.

The colour is dirty yellow, with black spots of various sizes, and which increase so much in some specimens as almost to hide the yellow colour. The surface is wrinkled longitudinally and a section of the peduncle presents numerous nerves which correspond with the wrinkles on the fruit.

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*See vol. 8th, page 199 of this Journal for an account of the Bebeeru tree, etc.—*Ed. Am. Jour. Pharm.*

Most generally this fruit contains but one kidney-shaped thick kernel, and terminated at each end by a hemispherical surface; but in those cases where there are two kernels, the ends that are in contact are modified by pressure in the act of growing in contact.

The texture of the fruit is fibrous, and on each side of the kernel a cell filled with a resinous substance is observable which does not contain a particle of benzoic acid.

The kernel developes a very decided odour analogous to that of the Tonka bean. When chewed, it presents a biting acid taste at first, which is not persistent.

Heated in a small retort with an alcohol lamp, it carbonizes, and a blackish liquor, having a very disagreeable empyreumatic odour, passes into the receiver.

Treated by strong alcohol, it gives a tincture but little coloured, which, by slow evaporation in a moderately heated stove, deposited needle shaped crystals impregnated with an oily matter emitting a strong odour of coumarin.

These crystals present altogether the peculiar characteristics of the crystalline matter of Tonka bean and Melilot; they are heavier than water, not soluble in that liquid, entirely soluble in alcohol, less so in pure sulphuric acid. The solution diluted with water is precipitated in light flocks. They have no action on tincture of litmus and syrup of violets. These different properties place this crystalline matter among the proximate vegetable principles, and are sufficient evidence of its identity with *coumarin;* and that the fruit of the *myroxylon toluiferum* is the third substance in which this principle has been observed.—*Journal de Pharmacie.*

ART. XXXIX.—ON THE DETECTION OF POISON IN THE URINE.

By H. Letheby.

The author briefly referred to the experiments of Wöhler and Steyberger, Tiedemann and Gmelin, Orfila and others, in showing that many mineral, animal, and vegetable poisons are admitted into the circulation, and eliminated by the action of the kidneys.

These facts led him to inquire whether the various poisons might not be disposed of in a similar manner; and if so, whether their existence in the renal secretion might not furnish a hint for the treatment of cases of poisoning; and, also, whether their detection in the urine would not supply evidence of a very valuable character for the guide of the medical jurist.

With these objects in view, he analysed the urine of persons under the influence of the various poisons, and tested his results by experiment upon the lower animals.

He succeeded in detecting the following poisons:—sulphuric, muriatic, nitric, phosphoric, and oxalic acids; of the alkalies, he had discovered the presence of potash, soda, and ammonia; of the neutral salts, he enumerated nitrate of potash, iodide of potassium, sulphate of magnesia, the red and yellow prussiates of potash, and chloride of barium; of the salts of the other metals, he had recognised those of antimony, arsenic, lead, mercury, copper, iron, and silver.

With the view of detecting the organic poisons, the author instituted another class of experiments, the object of which was to ascertain if the vegetable poisons would, after their administration, endow the urine with any special physiological power over the system of another animal; and the conclusion to which he came was, that the active principles of many organic poisons, such as opium, belladonna, hemlock, aconite, &c., would, in part, pass through the system, and appear in the urine unchanged.

With respect to the second question, as to whether their detection in the urine might not furnish a hint for the treatment of cases of poisoning, the author showed, from experiment upon animals, that diuretics were of great service in getting rid of poisons which had been administered to them, and thus helping them very considerably in their recovery.

The third question embraced by the paper, viz., whether the detection of the poisons in the urine might not supply evidence of a very valuable character for the guide of the medical jurist?—was proved to be an important one, inasmuch as the urine might be the only fluid or product at the disposal of the chemist; 2ndly, the evidence deduced from it might be of a positive, and, therefore, satisfactory kind; 3rdly, those poisons are recognised with more ease in this secretion than they are in the tissues; and 4thly, they may exist there to a larger amount than in any other part of the body.

A few other questions were referred to as having an important bearing on this subject, as—

1st. Whether every poison makes its way to the urine, and what are characters by which it is to be recognised?

2ndly. What is the smallest amount of each of the poisons capable, after its administration, of being detected in the urine?

3rdly. What is the earliest period at which the different poisons may be recognised, and what the latest?

4thly. Whether any relation existed between the quantity discovered in the urine, and the quantity administered?

5thly. Whether there are any circumstances which may increase the facilities for their elimination, and whether there are any which may diminish them?

These were questions which the author of the paper hoped to determine at some future period; at present, he believed that the facts, as they stood, warranted the following conclusions:—

1st. That many poisons are absorbed into the circulation.

2ndly. That those poisons are eliminated by the kidneys, and may be detected in the urine, either by their chemical or physiological reactions.

3rdly. That these facts, together with others from experiment, point to the value of diuretics in the treatment of cases of poisoning.

4thly. That it is possible to obtain, from an examination of the urine, some of the most valuable and certain evidences regarding the administration of a poison.

5thly. That we should not omit to examine this secretion in every case of suspected poisoning.

In the course of the paper, the author alluded to the presence of an excess of phosphates in the urine of persons occupied in the manufacture of lucifer matches, and referred it to the inhalation of phosphoric and phosphorous acids generated by the slow combustion of the phosphorus. He proposed a very simple remedy, that of exposing shallow vessels, containing turpentine, in different parts of the building, but especially in those situations where the phosphorus was most liable to oxidation: by this means he found that the vapour of turpentine would become diffused through the atmosphere, and so check that slow combustion of the phosphorus which was the source of all the mischief to the workmen.

Dr. Golding Bird remarked that the paper just read contained some points of great interest; the most interesting, however, being, probably, the least novel. Thus it was long ago demonstrated that the kidney carried from the circulation all effete and injurious matters that were held in the blood in solution, either in a changed or an unchanged condition. This latter law was of universal application, whether it related to saline or vegetable matters.

One of the facts mentioned in the paper confirmed the experiments made by Donne and himself, (Dr. Bird) that when oxalic acid was taken into the stomach, either as a medicine or as it exists, combined with potash, in sorrel, it was afterwards found in the urine, forming crystals of oxalate of lime. Dr. Letheby had found it in combination with urea. The experiments on the mineral acids were evidences of the remarkable depurating action of the kidneys, as mentioned by German writers; but before we could judge of the value of these experiments, the data upon which they were made must be examined. He had no doubt of the accuracy of these researches, for it must be remembered that sulphuric and muriatic acids existed in the urine; the former becoming greatly increased if the person ate mustard or other articles containing sulphur. He had been a little surprised to hear that the mineral acids in a free state were so soon detectable in the urine; for though it was mentioned in books as possible, he had repeatedly tried to detect it, and had been vexed to find how different were the results to those he had expected. He might, indeed, observe, that he had never succeeded in making urine acid by the exhibition of the acids, except by the benzoic. He had given the sulphuric and nitric acids in cases of alkaline urine for weeks together, but had never succeeded in making that fluid acid. One of the facts stated in the paper was of a startling character, viz., that from three to five grains of arsenious acid might be safely taken into the stomach if the kidneys were stimulated to diuresis, as it would be carried off by this channel. He could not understand how this could be, unless, indeed, there was some short road to the kidneys not at present known; for the arsenic, before it reached these organs, must be absorbed into the circulation. It was difficult to understand how escape from the poison was effected. The experiments respecting the absorption of the metallic poisons confirmed the experiments of the best French chemists. His experiments, also, respecting the presence of antimony in the urine, from poisoning by that agent, confirmed the views of others.

Dr. Snow said that the difficulty of removing an alkalescent state of the urine, by the administration of the mineral acids, was no proof that these acids did not pass off by the urine; for in nearly all cases of alkaline urine it became alkaline after its secretion, from the decomposition of the urea, and such an amount of ammonia was produced in this way as it would be almost impossible to neutralise by any quantity of mineral acid which could be safely administered as a medicine.

Dr. Letheby observed, that the remarks of Dr. Snow had rendered it unnecessary for him to answer Dr. Bird, as far as regarded the detection of the mineral acids in the urine. He might observe, however, that in these experiments, the urine had been in the normal state, when, in fact, it was slightly acid, not when the phosphates were thrown out, as as these would, of course, neutralise the acid given by the stomach. After giving these acids, the urine became more acid, the acids being formed either in combination with their base or not; but this did not affect the question. He could not explain, any more than could Dr. Bird, in what way diuretics acted in cases of poisoning, but he had merely mentioned the facts which he had observed.

Dr. Copland, in 1821, had published a memoir on chemical remedies, and their mode of elimination from the system; and, in 1824, had experimented with the mineral acids and camphor. These experiments would be found in a forthcoming number of his "Dictionary." One circumstance which he had noticed in relation to these acids was, that the sulphuric was more easily detected than either the nitric or muriatic acids; but this he had supposed, at the time, to arise from the circumstance of the two latter acids being decomposed. He had found the same difficulty as had the author, in detecting vegetable substances in the urine, as turpentine, camphor, and other volatile substances were sooner carried off by the mucous membrane of the respiratory organs, than by that of the urinary. The depurating power of the kidneys had not been overlooked by

British writers, who had done as much in this respect as the Germans; the latter, however, had great tact in taking hints from us, and, as the Methodists would say, "enlarging" upon them. One fact might be mentioned in reference to the action of diuretics in stimulating the kidneys in cases of poisoning, viz., that often the excitement in the circulation was so great that the secretion of urine was altogether arrested. We should, in consequence, fail in the exhibition of diuretics, unless we first got rid of the congested state of the kidneys by depletion and diluents.—*Chem. from Royal Med. and Chir. Soc.*

ART. XL.—ON A NEW METHOD OF ESTIMATING NITRIC ACID.

By M. Gossart.

The examination of the oxidizing action of nitre under the influence of sulphuric acid has proved to me that, in a great number of cases, the products of this action may be rendered constant, and so furnish a large number of processes for the accurate estimation of nitric acid and the nitrates. In the following method I have been guided by the principle applied by M. Pelouze to the estimation of copper. In analysing crude nitre I employ as reagents,—1st, an acid solution of the protosulphate of iron;* 2nd, a very dilute solution of the red ferrocyanide of potassium.

I pour into a flask with a long neck 50 cubic centimetres of sulphuric acid of 1.704 spec. grav., and 25 of a solution

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* The solution of the protosulphate which I have usually employed was strongly acid and nearly saturated.

of saltpetre containing 10 grms. of refined saltpetre in a demilitre; I then add, with a graduated burette, some drops of the solution of the protosulphate of iron, and agitate gently; the mixture becomes brown, suddenly clears again, and acquires a more or less deep straw colour. I then continue to add in drops a normal solution, the strength of which I wished to ascertain, waiting each time until the liquid brightens; when these changes of colour become less rapid, I apply a gentle heat; and when they are no longer perceptible, I examine whether, on taking a few drops with a pipette, they still yield a blue colour with the red ferrocyanide of potassium. When this blue colour appears, and no longer disappears on boiling the liquid, I note down the total number of the divisions employed. A second examination, in which a large number of the trials may be dispensed with, will yield an accurate result.

Let N be the number of divisions of the normal solution requisite to saturate completely 25 cubic centimetres of the solution of refined nitre; I weigh off 10 grms. of the saltpetre to be examined, which I likewise dissolve in a demilitre of water, and determine, in the same manner as was done for the solution of refined saltpetre, the number N^1 of divisions of the protosulphate of iron required to saturate completely 25 cubic centimetres of this solution; and the fraction $\frac{N^1}{N}$ gives the strength of the saltpetre under examination with great accuracy.

The process, which is applicable to the estimation of nitric acid, and of all the nitrates in general, may be employed for determining the quantity of nitric acid contained in gun-cotton. For this purpose, the whole of the cotton is oxidized with a mixture of sulphuric acid and peroxide of manganese; the liquid is filtered, and decolorized with a few drops of protosulphate of iron, which decomposes the whole of the sesquioxide of manganese before acting upon the nitric acid. In this manner a solution is obtained containing the whole of the nitric acid which existed in the pyroxyline, and the amount of which may be readily estimated.—*Chem. Gaz., from Comptes Rendus.*

ART. XLI.—ON THE CONDITION OF THE APOTHECARIES IN THE INTERIOR OF AFRICA, according to the Verbal Information communicated by an Empirical Physician from Kartum. By X. Landerer, of Athens.

The condition of the Apothecaries in the interior parts of Africa, is truly miserable. In these persons, ignorance, cunning, and avarice are conjoined with charlatanry. They are called *Speziarides*, and their shops *Speziaria*. They are generally Jews, Armenians, and Turks, who have for some time, in Constantinople, assisted in a Chemist's shop, or lived with a *Hekim* (Physician.) or practised as *Serahs* (Surgeons) in an hospital. No particular permission by the authorities is required for opening a *Speziaria;* the whole license consisting in the possession of 2000 or 3000 piasters. The shop consists of a more or less spacious wooden moveable booth, in which medicines are exposed to view on wooden shelves in glass vessels, boxes, and sacks. Immensely large white glass bottles with glass covers, on which usually are fixed oil-lamps, in which the oil swims on two or three kinds of differently coloured liquids, contain the best samples of indigenous and exotic products, such as senna, gums, tamarinds, cassia, sarsaparilla, corrosive sublimate, sulphate of copper, corallia, margaritæ, spongiæ, lapides spongiarum, &c., &c. In the middle of the shop stands a little table, on which is a small standing pair of scales, with some small hand-scales hanging up. There are also some *Argelledes*, or Turkey tobacco-pipes, with elastic tubes, for the Hekims or Serahs, who come there either to wait for their patients or pass their time in chatting and smoking. They generally come very early, and spend almost the whole day in the shop, sitting cross-legged. As weights, grains of sesamum, or of wheat, and date-stones, are used. The arrival of a patient often serves as a bone of contention and quarrel among the Serahs, each of whom tries to obtain the custom of the patient, who not unfrequently selects him who offers to undertake the cure for the smallest sum. The fee is a quarter of a ducat for a consultation and prescription at the Speziaria; but when the Hekim goes to the house of the patient, he receives, in the case of a wealthy man, from three to five or ten gold pieces, which a servant presses into his hand. The Speziaris, or Apothecary, who has an understanding with the Hekim, charges not much less for the medicine. If the disease requires longer attendance, a contract is made between the physician and patient at the first visit for attendance and medicine; and half of the sum agreed on is paid down immediately, while the other half remains until the cure is completed. In chronic diseases, some thousands of piasters are asked. An Arab assured the writer of this, that he had to pay 8000 (?) piasters for being cured of jaundice, besides the medicines, which, being prepared of gold, cost him 5000 (?) piasters more. If the patient dies, the Physician obtains nothing more, but must be content with what he received in advance. In cases where a patient has been cured of a very dangerous illness, the Hekim receives, besides his fee, additional presents, consisting of costly confectionaries, tobacco-pipes with amber mouthpieces, aloe-wood, horses with beautifully and richly ornamented trappings, &c. &c. In particular cases, and in the night, a horse is sent with from five to ten servants to fetch the Physician, who frequently receives for such a visit thirty ducats.

All compounded medicines are imported by the Apothecary from Alexandria, Cairo, and Constantinople; but the more simple ones he prepares according to his own pleasure, or after a *kital, i. e.*, a manuscript which goes down from father to son. A great many objects of natural history are also to be seen in the Apothecary's shop; for example, ostrich-eggs, serpents, ichneumons, crocodiles, lobsters, river fish, elephants'-teeth, sea-shells, coral stones, sponges, pearl-shells, &c., from all of which substances costly medicines are prepared. Thus, from the eggs of the ostrich, perfumed balsams are prepared as antidotes against corrosive sublimate and arsenic; and also a *matsun* (electuarium) against dysentery and rheumatism. From embalmed serpents and toads, tinctures are prepared for strenghtning the nerves, and in these gold and silver leaves are floating, thus proving that the medicine is prepared from pure gold and silver. From the bones of the ibis a mass is prepared, which is formed in brass moulds, and sold as amulets against the bite of serpents. From the ichneumon is prepared with oils a very strong smelling ointment, which is used for wounds produced by the crocodile. In large glasses, bleached camel's-hair is preserved. This is employed to stop hæmorrhage from wounds, by strewing the finely cut hairs in the wound. Furthermore, the Speziarides prepare from pearls a tincture for contagious diseases, and as a proof that it is actually prepared from pearls, undissolved pearls are seen floating about in glasses filled with some red coloured liquor. The different bezoars form in these countries important articles. Bezoars of the serpent, the crocodile, the buffalo, and the camel, are to be seen of extraordinary size, set in gold, and ornamented with pearls, in the most beautiful glasses, or hanging about in the shop.

The *matsuns* (electuaria) form, among the Africans, one of their principle forms of medicines; and accordingly we find that for each disease there is a particular matsun. Thus, they have matsuns of dates and of bananas against dysenteries, complaints of the chest, &c.

The minor surgical operations, such as bleeding, opening of abscesses, &c., are performed by the Speziarides, and that in the open street, in order to attract the attention of the passers by, who often collect around the Serah or Speziaris and his patient in great crowds, amongst whom there are not unfrequently hired spectators, who cry up the skill of the operator.

Chemical operations are also publicly performed; for example, the distillation of the *liquor Hoffmani,* or some aromatic spirits, &c.

It is very difficult, for foreign physicians (*i. e.* Europeans) to establish themselves in these parts; for they are persecuted by the natives in every possible manner. The latter exert all their power of persuasion to convince the higher classes that European Physicians are not acquainted with the climate, and that they effect the cure by the assistance of Satan, or that they employ poisonous substances, which do indeed possess the power of temporarily checking and apparently curing the disease, but that this, in a short time, breaks out again with augmented virulence. When an European Physician is patronized by one of the European Consuls, and is recommended by him to some of the higher families, whose confidence he contrives to gain, he may succeed in amassing, in a few years, a large fortune; but otherwise he is often scarcely able to gain his daily bread. —*Pharm Journ. from Buchner's Repertorium.*

ART. XLII.—ON CHINESE PHARMACY.

The drug shops of China are large, and are commodiously fitted up. They have a great array of drawers and jars arranged much in the same way as in England; glass vessels are very rare. Different departments are allotted to separate classes of medicaments; care is taken to keep things in order; and there is a degree of neatness and method in their appearance which would not be discreditable to a London laboratory. They do not seek notice by party-coloured bottles and cabalistic signs, which make so great a figure in the windows of some English medicine venders, but are rigorously plain, and, as far as mere appearance is concerned, appropriate.

On examining the contents of the drawers, boxes, &c., few things were observed identical with, or similar to, the medicinal substances employed in Europe. Camphor, rhubarb, and liquorice, were conspicuous among recognised articles; but our familiar friends in the shape of purging salts, calomel, tinctures, &c., were nowhere found. Even opium, of which so much is used as a luxury, does not appear to be admitted in the materia medica; at least it could not be traced in any form in the drug-shops. Cinnabar, or a substance much resembling it, is a favorite remedy in many external diseases, and it consequently is a prominent article in every collection.

On the Druggists' counters are ample boxes containing preparations for such purposes as these—to arrest cholera instantly, to communicate strength directly, to infuse courage, to excite love, and to confer the faculty of being loved, and so on, in proportion to the wants and wishes of individuals. This is sufficiently ridiculous, but is not more so in reality than the pretensions to similar efficacy constantly put forth in more enlightened places, and is probably much less mischievous. The Chinese panaceas, hero-making mixtures, philtres, and medicated charms, are believed to be generally harmless, which is more than can be predicated of many of the compounds so much vaunted and consumed in England under the name of antibilious, antidyspeptic, antinervous, *antiomnia mala* medicines.

For a small fee, not equal in value to a shilling, the Chinese physician, after examining the pulse, exhibiting great interest in the welfare of the patient, and profound knowledge of his case, writes a recipe, which, in imposing appearance, would put to shame the most elaborate performance of a London Professor. It occupies generally a large sheet of paper, is often diversified by red, added to the ordinary black characters, and is altogether a learned and laborious-looking composition. When carried to the Druggist, he spreads it on the counter, examines it attentively, and then proceeds to dispense *secundum artem*. Many ingredients, seldom less than nine or ten, make up the total of articles prescribed; they are almost always powders, sliced roots, or other dry substances, fluids being seldom sent from the apothecary's store. For each a separate piece of paper is laid out in regular array, some white, and others red; the former are the most numerous, and to them the most common simples are consigned, the crimson being reserved for those which are most powerful, or more highly esteemed, such as ginseng.

Surgeons dispense their own medicines, and local appliances, and do a little, what they can, in short, in way of medical prescription, to any who will apply for it. They hold nearly the place of the English general practitioner, but their shops are generally poorly furnished, and neither their employment nor profit is on a large scale.

The department of the Druggist is more lucrative than that of the Surgeon; for as the people are fond of physic, and they have no desire to balk the inclination, they not only give on every possible occasion, but give liberally. As an example of the latter disposition, it was observed that five balls, larger than marbles, to be taken at once, were prepared for some form of bowel complaint. It might be assumed that they did not possess very active ingredients; but how the patient, without the assistance of a probang, contrived to gorge them was the wonder. Men who should order or issue such perilous looking pellets in England, would be considered fit to deal with the diseases of horses only.

The Chinese Pharmacopœia, or rather Materia Medica, is a work of great magnitude; a brief epitome of it in the writer's possession extends to upwards of 1300 octavo pages.

Ginseng is the paramount promoter of health, and prolonger of life. It is said to possess astonishing power, not only of sustaining, but restoring the human frame, and is regarded with a degree of admiration bordering on religious adoration. No one's case need be considered desperate who can procure this, the *pabulum vitæ*, in abundance; but it is so costly, as to be beyond the reach of the great proportion of the afflicted. Generally it is, except in very small quantities, an article of sale by itself, the man who deals in it, dealing in nothing else; and it cannot be procured in every drug-shop. At Tinghae, the writer visited a ginseng repository, which was a most unpromising and barren-looking place. The commodity is too precious to be displayed at windows or deposited on shelves. Strong boxes behind a rampart of counters alone appear; there it is rigidly kept, disposed in small cases, each of which contains about a drachm weight. A stranger well introduced, or a person of known character, may look at, but not touch it, till he has paid the price. Proverbially it is represented as worth more than its weight in gold, which is confirmed by common practice; for the dealer alluded to asked, as a matter of course, for a bit shown, at the rate of twenty-five dollars an ounce.—*Ibid, from Dr. Wilson's Medical Notes on China.*

ART. XLIII.—ON THE CARDAMOMS OF ABYSSINIA.

By Jonathan Pereira, M. D., F. R S.

Two or three centuries ago, a large scitamineous fruit was employed in medicine, on account of the aromatic qualities of its seeds, under the name of *Cardamomum majus*. Cordus describes it as being a fruit like Melligetta, but smaller, turbinate like a pear, and having seeds which are agreeably aromatic. The fruit, he says, has been erroneously confounded with the Melligetta, but the flavour of the former, he adds, is much less hot than the latter, and is grateful and pleasant; whereas, the taste of Melligetta is very acrid, and like pepper. He furthermore tells us, that both the fruit and the seeds of Cardamomum majus are brought from Syria and Egypt.

This fruit has long since disappeared from commerce; but specimens of it are occasionally to be met with in some old collections of Materia Medica, and in that of Dr. Burgess, in the possession of the Royal College of Physicians of London, are several fine capsules of it, marked "*Cardamomum maximum Matthioli.*" One of these I have described and figured in the *Elements of Materia Medica*, p. 1026, fig. 195, 2d edit., and believing it to be identical with the *Amomum angustifolium* of Sonnerat and of Sir J. E. Smith, and the *Amomum Madagascariense* of Lamarck, I have adopted Sonnerat and Smith's name of *Amomum angustifolium*.

This cardamom is one of the fruits which, by some later writers in the Materia Medica, have been confounded with *Melligetta pepper* or *grains of paradise*.

About four years ago I received from my friend Dr. Royle some cardamoms which, he informed me, came from Abyssinia. In a letter which I have subsequently received from him, he says, that they were "brought strung on a string, and were sent to the India House by Major Harris's embassy. They were described as being carried to Abyssinia from Guraque, which is more to the southward, and where they might easily be produced. But I believe there is also some commerce up the rivers still further south, so that they might be produced even in Madagascar, and be sent as a spice to Abyssinia. But I should suppose they were more likely to be the produce of the interior, and probably of Guraque as they are called *Guraque spice.*"

These cardamoms I found to be identical with the fruit, which I had figured and described in my *Elements of Materia Medica,* under the name of *Amomum angustifolium.* The specimens, however, were scarcely so large as those I had previously seen, and were perforated for a string, apparently for the purpose of hanging them up to dry.

About a year and a half ago I received from Mr. Charles Johnston, the author of *Travels in Southern Abyssinia,* other specimens of the same fruit, and subsequently obtained from him the following information respecting them :—

"I hasten to answer your inquiries with regard to the cardamoms; and first of their place of growth. This I was given to understand was chiefly in the deep valley of the Abiah branch of the Bahr al Azzareeke, those you have received coming from that part of it which separates Guraque from Zingero. I have heard though, that, still further to the south, they are found in greater quantities, insomuch so, that the locality has received the name of the spice country, and as it was represented that extensive forests (? jungle) of the plant which produces them existed, we may presume, I think, that this land of spices is their indigenous country. As to the mode of preparing them for use, from the opportunities I had of observing the attention paid to cultivation in Abyssinia, I should suppose that it was the same in Guraque, and that the simple course of gathering the fruit, and drying them in the sun was all the inhabitants did to preserve the produce of their spice harvest. I must not forget though, that, for convenience of carriage and the usages of trade, each cardamom capsule is perforated and strung upon a strong thread in numbers varying from forty to fifty, for which, in the markets of Shoa, a distance of five day's journey, the priest merchants of Guraque can obtain one piece of salt-money, or about twopence-halfpenny in English money, but which, it must be observed, is sufficient to purchase at least two pecks of wheat in that country. The Abyssinians seldom use the cardamoms except for medicine. Its employment in domestic economy is certainly not so general as the nutmeg is with us."

Within the last few days I have received some specimens of the same fruit, under the name of *Korarima*, from Dr. Beke, to whom I am farther indebted for the following information respecting this cardamom :—

"The *Koraríma*, in Arabic called *Khéil* or *Khil*, is brought to the market of Báso, in Southern Abessinia, from the country of Túmhe, in Wallégga, an extensive level, and in great part desert region, which stretches from the river Dedhésa, the upper course of the Bahr el Azrek, or Blue River, as far as the Bahr el Abyad, or true Nile to the west, and the Gódjeb, a tributary to the latter now, to the south; northward it is bounded by the country of the Dínkas.

"The position of Túmhe is somewhere about 9° N. lat. and 35° E. long. Túmhe is usually known among the native merchants as "*the country of the Koraríma;*" and I have a map drawn by one of them in which it is so marked. But I was assured by others that it is not the growth of that country, but comes from other portions of Wallégga beyond it. As the land slopes westward from the high mountain country of Abessinia down to the valley of the Nile, I conclude that it is the produce of districts possessing an absolute elevation of probably not more than about 3000 or, may be, 4000 feet. This is in lat. 8° or 9° N.: nearer, that is higher up, than Túmhe it certainly is not found.

"The *Koraríma* is brought in considerable quantities by the way of Báso to Abessinia, in which country, as likewise among the Gallas further to the south, it is used as a condiment. I purchased at Báso one hundred heads for one *ámule*, a piece of rock-salt, of which about twenty are current there for one Austrian convention dollar, worth about 50$^{d.}$—consequently forty for one penny sterling. As a stranger I probably paid the *full* price. It is also taken to Massòwah, the port of northern Abessinia, on the Red Sea, from whence it is exported to India. Dr. Rüppell was informed at Massówah that the annual export is of the value of one thousand dollars—about £200 sterling.

"The specimens sent you are not so large as some that I had; but I believe they are of a fair average size.

"I should add, that *Koraríma*, is the Galla name, which is likewise used in Abessinia. The accent is on the penultimate, and the vowels being sounded as in Italian, the name is pronounced as if written in English *Korahreema*.

"With respect to the Arabic name *Khíl* it should be remarked, that according to the Kamús, it means "Rue," or rather *Peganum Harmalah*. The word does not occur in Ibn Baítar's *Materia Medica*, and would appear indeed be to but little used by the Arabs. Nothing, however, is more uncertain than the real value of Arab names of plants, and several plants of very different characters, are no doubt to be met with under the same appellation. Nevertheless, the fact is certain, that at Massówah, and in the Red Sea, the *Koraríma* is designated *Khêil* or *Khíl*, by the Arabs."

This fruit is best distinguished from other large scitamineous fruits, with which it has been confounded by the characters of its seeds; which are devoid of the fiery peppery taste of the grains of paradise; are not highly polished, dark brown, and oblong, or ovate, or cylindrical, like the seeds of the *Amomum Clusii;* nor are they greenish grey or lead-coloured, like those of *Amomum macrospermum*. But they are mildly aromatic, somewhat smooth, compressed or angular, and pale olive brown.—*Pharm. Journ.*

ART XLIV.—ON THE PRE-EXISTENCE OF AN ESSENTIAL OIL IN STARCH.

By M. Payen.

Many years ago the author asserted the pre-existence of an essential oil in starch, which was denied by most chemists and especially by Liebig. In proof of the correctness of his view, he now brings forward the following experiments:—500 grms. of starch were gradually added to three litres of boiling water, which had been acidified with 0.005 sulphuric acid, contained in a vessel capable of holding 6 litres; the condensation was effected in an apparatus similar to that which the author has described in the separation of the aroma from coffee. About half a litre of water condensed in the first two recipients; in the third, towards the end of the operation, some cubic centimetres of water; and in the fourth, which was surrounded by ice, only a few drops. The water in the first two recipients possessed the odour of the starch, and was covered with a whitish pellicle, which dissolved in ether and solidified on cooling. The water of the third recipient had a very strong odour of starch, and was covered with a layer of essential oil; by uniting the collected essential oil the author obtained 0.08 grm. of it. It was liquid, yellowish, had a very strong odour of starch, and at all events a lower boiling point than that of water. The water poured from the oil still yielded 0.018 of oil; so that the starch contains at least 0.0001 part by weight of essential oil.—*Chem. Gaz. from Comptes Rendus.*

ART. XLV.—HISTORY OF THE INTRODUCTION OF GUTTA PERCHA INTO ENGLAND.

By DR. WM. MONTGOMERIE.

HAVING in many late numbers of the *Mechanics' Magazine* seen frequent notices of the patents taken out for the application of the new substance, *gutta percha*, to various purposes, and its extensive usefulness becoming daily more apparent, it has occurred to me that as I was the person through whom the substance was first brought to the notice of the public, a few observations from me regarding it might be valued by many of the readers of your highly popular and useful journal.

I may not arrogate to myself the actual discovery of *gutta percha;* for, although previous to my introduction of it, it was quite unknown to Europeans, still it was known to a few of the inhabitants of certain localities of the Malayan forests; but even most of the native inhabitants of the towns and villages near those localities, to whom I showed it, did not know what it was, and it was likely to have remained unknown from the very trifling uses to which it was applied, being, as far as I could ascertain, only occasionally used to make handles for *parangs*, (wood choppers,) instead of wood or buffalo horn.

As far back as 1822, when I was on duty at Singapore as assistant-surgeon to the residency, I had obtained the *name* of it, while making inquiries relative to caoutchouc, of which there are several varieties; and some very fine specimens were brought me, particularly one called *gutta girek* (the *i* sounded as in Italian, and the *k* almost mute;) and I was told that there was another variety called *gutta percha*, and sometimes *gutta tuban*, which they said was harder than the *gutta girek;* but none of it was brought to me at that time, and I lost sight of it, having returned to the Bengal presidency. But being again sent on duty to the Straits settlements, and while at Singapore, in 1842, I on one occasion observed in the hands of a Malayan woodsman the handle of a *parang*, made of a substance which appeared quite new to me. My curiosity was excited, and on inquiry I found it was made of the *gutta percha*, and that it could be moulded into any form by simply dipping it in boiling water until it became heated throughout, when it became plastic as clay, and when cold, regained, unchanged, its original hardness and rigidity.

I immediately possessed myself of the article, and desired the man to fetch me as much more of it as he could get.

On making some experiments with it, I at once discovered that, if procurable in large quantities, it would become extensively useful; and even if only in small quantities, it would still be invaluable in the formation of many surgical instruments, particularly as a substitute for caoutchouc in many of the articles made of that substance, as I had found that those instruments which were made of caoutchouc, which had been dissolved in naptha, or other solvent, became speedily damaged, and totally useless in the damp and hot climate within the tropics. I therefore wrote to the Medical Board in Calcutta, strongly recommending its adoption, and sent specimens of the substance. After having examined it, the Board highly approved of my suggestion, and directed me to procure and send some of it to Calcutta, which was done.

I also addressed a communication to the Secretary of the Society of Arts, London, and sent some of the substance for investigation and analysis, for which, after my return to England, I had the honour to receive the Society's gold medal.

Being in bad health at the time the substance was brought under my observation, I was unable to prosecute the inquiry in the way I could have wished, not being able to go in person to the forest, and was therefore obliged to satisfy myself with such information as the natives could give me. I ascertained, however, that the tree producing it is one of the largest of the forest, growing to the size of three or four feet diameter; that the wood is of no value as timber, but that an edible concrete oil is procurable from the fruit, and often used by the natives with their food.

On extending my inquiries, I found the substance was quite unknown to the people at Malacca, although that place is only about a degree to the north of Singapore, and was told that the natives of the island of Sumatra did not know it, although at first I was inclined to suppose that the substance might have obtained its name from that island, the Malayan name for the island of Sumatra being "Pulo Percha."

I ascertained, however, that the tree was common in many places in the island of Singapore, and also in the forests of Johore, at the extremity of the Malayan peninsula; and was informed by the Buggese traders that it grew at Coti, on the south-eastern coast of the island of Borneo; and on requesting Mr. Brook to inquire about it at Sarawak, on the west coast, was informed by that gentlemen that it was found in the forests there also.

The following is a quotation from Mr. Brook's communication to me: "The tree is called *Niato* by the Sarawak people, but they are not acquainted with the properties of the sap; it attains a considerable size, even as large as six feet diameter; is plentiful in Sarawak, and most probably all over the island of Borneo."

I have reason to believe also that it is abundant on the thousand islands that cluster to the south of the straits of Singapore.

That it is very abundant is satisfactorily proved from the circumstance of its being now collected at Singapore to the extent of some hundreds of tons annually, although unknown to the public in 1842. But although the tree is at present sufficiently plentiful, yet the substance, I fear, will become soon more difficult to be procured, from the destructive mode pursued by the natives in obtaining it.

A magnificent tree of fifty, or more probably 100 years' growth, is cut down, the bark stripped off, and the milky juice collected and poured into a trough formed by the hollow stem of the plantain leaf; it quickly coagulates on exposure to the air; but from one tree, I was told that not more than 20 lbs. or 30 lbs. are procured.

I believe, however, that the juice may be obtained by tapping the tree, and that it might thus be made to produce in moderate quantities for many years; but this mode is too slow for the natives. Besides, although the first discoverer of a tree might be inclined to do so, the next who found it would, probably, cut it down, their being no property in the trees of the forest, excepting where grants of land have been given.

Allow me, now, to correct an erroneous mode of pronouncing the name, which I have observed used by many gentlemen with whom I have conversed on the subject. The word is a pure Malayan one, *gutta*, meaning the gum or concrete juice of a plant, and *percha*, the particular tree from which this is procured. The *ch* is not pronounced hard like a *k*, but like the *ch* in the English name of the fish perch. Had I thought there was a probability of the name being mispronounced, I might have used the uncouth orthography, per*t*sha, but it would have run the risk of being taken for a Russian or Polish name. Some of your readers may think I place too much value in a name; but in these days, when public attention is beginning to be attracted to the affairs of the "farther east," and the spirit of enterprise is leading many of our countrymen to explore those interesting regions, if one of them were to inquire of a Malay for gutta *perka*, he would be told the thing was unknown, when perhaps plenty of the *gutta percha* might be procurable by pronouncing the name properly.

Among the various uses to which it has been proposed to apply the *gutta percha*, I have observed some for which its properties render it peculiarly applicable, and one in particular, printing for the blind, for which the clear sharp impression it receives, and the toughness of the substance, admirably suit it, as well as in the formation of embossed maps for that unfortunate class.

As an application of it of minor importance certainly, but one of very general usefulness, it has been suggested to me that it would be found useful in stopping decayed teeth.—*Pharm. Journ. from Mechanics' Magazine.*

ART. XLVI.—CHEMICAL EXAMINATION OF GUTTA PERCHA.

By J. G. Scott.

Of the Honourable Company's Dispensary, Calcutta.

The *gutta percha* forwarded to the Medical board, by Dr. Montgomerie from Singapore, is one of those neutral vegetable substances, of which a proximate analysis cannot be made. On a careful examination, I have found it to possess the following properties:—

It is insoluble in water and in alcohol; soluble in volatile oils, and partially so in ether, from a solution of which it is precipitated by alcohol.

It melts when exposed to a temperature of 248°, and on cooling, remains in a semifluid adhesive state. When heated sufficiently in the open air it catches fire, burning with a strong yellow flame, and emitting much smoke.

On distillation it furnishes a volatile oil, similar in all its properties to *caoutchouc.*

It is insoluble in petroleum and in nitric ether.

The *gutta percha* is in thin films, varying in colour from a pale yellow to a pinkish tinge, and is destitute both of taste and smell. It is hard at a common temperature, but when immersed in boiling water, it softens so much, as to be capable of being beaten into a mass, and formed into any shape required; this, however, must be done immediately, for the mass on cooling becomes hard and unyielding.

When in a soft state, it can be stretched out into thin slips much beyond its usual length, but it does not recover its former bulk when the force is withdrawn. The slips are transparent and elastic.

I feel no hesitation in pronouncing the *gutta percha* a species of *caoutchouc*, possessing unquestionably some of its principal properties, but it is a species which I believe has not been examined before.—*Pharm. Journ. from Journal of the Agricultural and Horticultural Society of India.*

ART. XLVII.—ON A NEW TEST FOR PRUSSIC ACID, AND ON A SIMPLE METHOD OF PREPARING THE SULPHOCYANIDE OF AMMONIUM.

By Professor Liebig.

When some sulphuret of ammonium and caustic ammonia are added to a concentrated aqueous solution of prussic acid, and the mixture heated with the addition of pure flowers of sulphur, the prussic acid is converted in a few minutes into sulphocyanide of ammonium. This metamorphosis depends on the circumstance, that the higher sulphurets of ammonium are instantly deprived by the cyanide of ammonium of the excess of sulphur they contain above the monosulphuret; for instance, if a mixture of prussic acid and ammonia be added to the pentasulphuret of ammonium, the solution of which is of a deep yellow colour, and the whole gently heated, the sulphuret of ammonium is soon decolourized; and when the clear colourless liquid is evaporated, and the admixture of sulphuret of ammonium expelled, a white saline mass is obtained, which dissolves entirely in alcohol. The solution yields, on cooling or evaporation, colourless crystals of pure sulphocyanide of ammonium. Only a small quantity of sulphuret of ammonium is requisite to convert, in the presence of an excess of sulphur, unlimited quantities of cyanide of ammonium into sulphocyanide; because the sulphuret of ammonium, when reduced to the state of monosulphuret, constantly reacquires its power of dissolving sulphur and transferring it to the cyanide of ammonium. The following proportions will be found to be advantageous:—2 oz. of solution of caustic ammonia of 0.95 spec. grav. are saturated with sulphuretted hydrogen gas; the hydrosulphate of ammonia thus obtained is mixed with 6 oz. of the same solution of ammonia, and to this mixture 2 oz. of flowers of sulphur are added; and then the product resulting from the distillation of 6 oz. prussiate of potash, 3 oz. of the hydrate of sulphuric acid, and 18 oz. water. The mixture is digested in the water-bath until the sulphur is seen to be no longer altered and the liquid has assumed a yellow colour; it is then heated to boiling, and kept at this temperature until the sulphuret of ammonium has been expelled, and the liquid has again become colourless. The deposited, or excess of, sulphur is now removed by filtration, and the liquid evaporated to crystallization. In this way from 3⅓ to 3½ oz. of dazzling white dry sulphocyanide of ammonium are obtained, which may be employed as a reagent, and for the same purposes as the sulphocyanide of potassium. Of the 2 oz. of sulphur added, ½ an oz. is left undissolved.

The behaviour of the higher sulphurets of ammonium towards prussic acid furnishes an admirable test for this acid. A couple of drops of a prussic acid, which has been diluted with so much water that it no longer gives any certain reaction with salts of iron by the formation of prussian blue, when mixed with a drop of sulphuret of ammonium and heated upon a watch-glass until the mixture is become colourless, yields a liquid containing sulphocyanide of ammonium, which produces with persalts of iron a very deep blood-red colour, and with persalts of copper, in the presence of sulphurous acid, a perceptible white precipitate of the sulphocyanide of copper.—*Chem. Gaz. from Liebig's Annalen.*

ART. XLVIII.—ON THE CHANGES PRODUCED ON SOME DRUGS AND PHARMACEUTICAL PREPARATIONS BY THE SOLAR RAYS.

By Mr. Robert Hunt.

It has long been noticed that a peculiar change is frequently produced by the continued exposure of medicinal preparations to the influence of daylight, a change not merely in the colour of the article, but in its medicinal properties. To adduce a few instances, ginger (pulv. zingiberis Jam.) loses its fine yellow colour, and becomes white, with loss of its pungency. The powders of the leaves of hemlock (conium,) foxglove (digitalis purpur.) henbane (hyoscyamus,) &c., becomes a dirty yellow, and when this change has taken place, it is well known that no dependence can be placed upon these active drugs producing their peculiar influences on the system. The powders of the roots of jalap and ipecacuanha become pale, and, particularly the former, are rendered comparatively inert. The tinctures of cascarilla, catechu, kino, and frequently cinchona, deposit a considerable portion of the vegetable matter held in solution by the spirit on the side of the bottle exposed to the most light; the same result takes place with some others. In chemical preparations, many very remarkable changes take place, which need scarcely be particularized. The changes in oxide of silver, in oxide of mercury, and in nitric acid, have frequently been described. The effect of even diffused light on hydrocyanic acid is familiar to every Druggist, and there can be but few who have not observed alterations in the character of the peroxide of mercury (red precipitate) and the chloride of mercury (calomel) by the action of the sun's rays. The bleaching of the fixed oils and of wax need scarcely be mentioned, but the influence of light upon the resins, with the exception of guaiacum, was never pointed out until the publications of M. Niepce's photographic researches.

I am not aware that any investigations have been made into any of these changes: I am therefore induced to trouble you with a few remarks, the results of experiments which have extended over some years, and which, although far from complete as a scientific investigation, have the merit of some practical and really important applications. I shall not detail my experiments, which have been very numerous and frequently repeated, but, for the present at least, content myself with giving the general results of these researches.

It will be necessary, however, to describe the mode adopted by me in this examination, and the various conditions under which the experiments were made. Having selected the bright green powder of the leaves of the medicinal plants, carefully dried in the dark, and powdered by myself, it was placed in dry and warm glass tubes, and these were then hermetically sealed. Some of these tubes were placed aside in a dark cupboard to serve for comparison with those exposed to light; other tubes of powder were now exposed, day after day, to the action of the rays of a prismatic spectrum, which was maintained in a fixed position, by means of a good heliostat. The tubes were so placed across the spectrum, that each tube was kept under the influence of a particular ray. Although I frequently placed seven tubes in the seven rays of the spectrum I generally used only three, for the following reasons. Sir David Brewster considers that there are but three primitive colours in the solar beam—red, yellow, and blue; and that all the other colours are but compounds of those rays with each other. My researches have proved to me that the three great phenomena of the solar radiations—LIGHT, HEAT, and CHEMICAL ACTION—have their points of maximum power in three distinct parts of the spectrum; the red rays giving the largest amount of calorific power, the maximum intensity of light residing in the yellow rays, and the chemical power being greatest in the blue rays. It will, therefore, now be seen that by using three tubes only, the vegetable powder under examination was exposed to the influence of the heat of the suns ray's—to their light—and to their chemical, or, as I have proposed to term it, ACTINIC power. By this arrangement I soon ascertained that the decolorization of green vegetable powders was not due to the influence of LIGHT, as the powders exposed to the full intensity of yellow light, in which we have the maximum of luminous influence, underwent no change—the alteration of the colour was in nearly all cases, but not in all, first set up under the influence of the red rays. No great difference could, however, be detected between the action of the red and blue rays. Hence we learn, that the change in question is due to the action of the heating and chemical principles of the sun's rays. By using two spectra, and so arranging them that the blue ray of the one fell on the space occupied by the red ray of the other, we are enabled to examine the combined action of these rays—and I have always found the result to be a very rapid bleaching of all green vegetable powders. The bleaching of the brown and yellow powders —jalap, bark, and ginger, is due almost entirely to the blue or chemical rays. The chemical examinations which I have made of the bleached powders, appear to show that an absorption of oxygen takes place under the action of the chemical rays—but that the heat rays exert their power principally, if not entirely, in removing an atom of combined water.

It will not be difficult to understand how very important the changes effected in the constitution of the organic body must be, when we consider the very great differences in medicinal effects produced in chemical compounds, by the addition or subtraction of an atom of oxygen or of water.

These remarks and results apply with equal force to the resins and the fixed oils. The bleaching of the fixed oils appears to depend almost exclusively on the action of the blue and indigo rays of the spectrum, and although the thermic rays produce a little effect upon the resins, it is in no respect to be compared to the action of the actinic rays, which appear to liberate a portion of oxygen, by which, solarized is rendered much more soluble than unsolarized resin. The conversion of linseed oil into a substance resembling caoutchouc under the influence of the air, is very materially modified by the action of the sun's rays, the blue rays accelerating the absorption of oxygen, and the yellow and red rays retarding it.

All the changes which have yet been examined upon the salts of the metallic oxides, appear to be due entirely to the influence of the blue and violet rays, and the alterations in colour and character are dependent upon the liberation of one atom of the gaseous element from the compound. The phenomena connected with these changes are now under investigation by the author of this paper, and will shortly be published in another form.

The decomposition of the hydrocyanic acid under the influence of the solar radiation is also due to the chemically active rays, and I have found that the change has been effected more speedily in the blue and indigo rays than in any others. We have in this case the formation of ammonia, and the precipitation of a brown powder which appears to be a compound of nitrogen and carbon.

Such is a general outline of the results to which my researches have at present led me. It is a very common practice for Druggists and manufacturers to put those pharmaceutical preparations which are liable to change by light into dark purple coloured bottles, or to cover white glass bottles with blue paper, with the idea that the quantity of *light* admitted is then so small that no change can take place. We learn from these investigations, and the knowledge is of great practical importance, that no plan more efficient for producing rapid decomposition could be adopted than the use of blue glass bottles. Light positively acts as an interfering agent—this light is obstructed by the dark blue glass, and the pure or nearly pure chemical rays are permitted to act on the preparations with all their energy. If instead of using those kinds of bottles, others prepared of a neat form from the ordinary dark green bottle glass were adopted, there would be but little fear of any decomposition from the solar radiations. Not only does this kind of green glass obstruct the rays of light to a great extent, but nearly all the calorific rays are shut off, and the actinic or chemical rays are reduced in quantity and force in a very remarkable manner.

For bleaching oils there can be no question but purple bottles would be by far preferable to any other colour for the reasons above explained.—*Pharm. Journ.*

XLIX.—RESEARCHES IN ANIMAL CHEMISTRY.

By Prof. J. Liebig.

I have latterly made a series of researches on the nature of fluids, which belong neither to the sanguineous nor lymphatic vessels. The Academy will permit me to draw its attention to the results I have obtained. We know long since that the meat of animals recently killed presents a reaction decidedly acid. M. Berzelius has attributed this property to the existence of lactic acid, without, even to the present moment, analytical results having proved the fact in an irresistible manner. Many chemists have admitted the existence of lactic acid in the urine, in the gastric juice, and in the milk, but they supported the conclusion of its existence in those liquids, on reactions which do not possess great certitude. Even the opinion that lactic acid hinders the precipitation of oxide of copper by the milk of lime, rests on an error. M. Strecker has lately shown that the lactate of pure copper is perfectly decomposed by the milk of lime, and in the supernatant liquid, no reaction demonstrates the presence of oxide of copper. It is true that the lactate of pure lime dissolves a trace of oxide of copper; but a slight excess of lime water precipitates it entirely.

My researches have aimed at putting an end to this incertitude in respect to the non-volatile organic acid, which constitutes a part of the animal organism.

When the flesh of animals recently killed and beaten into a pulp is washed with cold water, a red liquor is obtained, which, heated to ebullition, gives a coagulum of albumen, and is almost entirely deprived of colour. The limpid liquid, scarcely yellowish, obtained in this manner, possesses a very decided acidity and a very aromatic and agreeable flavor of boiled beef. When neutralised by barytes water, there is precipitated phosphate of barytes and phosphate of magnesia; it becomes slightly alkaline, without any barytes remaining in solution.

After the separation of these precipitates, we can withdraw, by a suitable evaporation, crystals of créatine, discovered by M. Chevreul in boiled meat.

Pushing the concentration further, there is formed in the syrupy liquid acicular crystals, which separated by the filter, and purified by new crystallisations, presents white spangles of a very brilliant pearly lustre, and soluble with difficulty in alcohol. The liquid, separated from its crystals, changes into a thick mass formed of the syrupy mother-liquor and fine crystals, grouped concentrically, very soluble in alcohol, and even in a mixture of alcohol and ether. These two crystalline matters are salts with bases of potash and lime combined with new acids, containing nitrogen.

The latter mother-liquor contains lactate of potash. To extract the free lactic acid, I treat this mother-liquor with alcohol, and I add oxalic acid equally dissolved in alcohol. I thus obtain the separation of the potash in the state of oxalate of potash, I then add ether as long as the liquid is turbid. By these means, I separate divers other matters, and the alcoholic solution retains the lactic acid, susceptible now of giving, with hydrated lime, lactate of lime, which allows the lactic acid and the other lactates to be obtained.

In submitting to analysis the lactate of lime and that of zinc prepared by these various methods, I have obtained for the first the formulæ of $C^6\,H^5\,O^5 + Ca\,O \times 4$ Aq.; the lactate of zinc has given me $C^6\,H^5\,O^5$, $Zn\,O + 2$ Aq.

These results will no longer leave the least doubt on the nature of the non-volatile organic acid spread in the animal organism; they explain the rapid reaction of the muscles, and now that we know that in such an extent of the bodies of animals there exists a liquid acid which is only separated from an alkaline fluid (the blood and lymph) by very thin membranes, we may, I believe, explain many electric phenomena observed by M. Mattéucci, and other physiologists on the bodies of dead animals.

Having operated on hundreds of pounds of meat, I have obtained a sufficient quantity of créatine to be able to submit this substance to a thorough examination.

Its physical properties have been given with such precision by M. Chevreul, that I can add nothing to the description given by this illustrious chemist. I think I can conclude from my experiments that créatine makes part of the flesh of all animals. So far as I have gone I have shown it to exist in the flesh of beef, veal, mutton, pork, horse, hare and goat. The beautiful discovery of this able observer becomes still more important, since we cannot doubt that créatine plays a great part in the vital actions. It is at least certain that the *bouillée* of meat cannot be replaced either by gelatine, or by any other liquid extracted from another part of the organised animal, unless from the muscles. I have found créatine in the heart of the ox, but not in the brain, the liver, the lungs, or the kidneys.

Créatine belongs by its crystallisation to the clinorhomboïdal system ; it forms tolerably large crystals, clear, transparent, and of great beauty; they lose at 100 degrees, 12.18 for an 100 of water, which corresponds to two atoms.

The results of numerous analyses have given me as the composition of crystallised créatine, the formula $C^8 N^3 H^{11} O^6$.

Créatine is a neutral or indifferent body, which dissolves in alkaline liquids or weak acids, and may be again withdrawn without having undergone any change, but in presence of acids or concentrated caustic alkalies, its properties are changed.

In presence of energetic acids, créatine is transformed into an organic base, possessing very remarkable properties. The matter combined with the acid is no longer créatine, and can no more be transformed into this body ; it is a new body, which I shall designate *creatinine*, and which is formed in the presence of muriatic and sulphuric acids by the displacement only of four atoms of water. Analysis has given me for créatinine the formula $C^8 N_3 H_7 O^2$. Créatinine is much more soluble in water and in alcohol than creatine. Its solution in water *has a caustic taste like ammonia.* It changes to blue the red litmus paper; it combines with all the acids and forms salts of great beauty; its salt of platina is remarkable for the largeness of its crystals and their beautiful yellow golden colour. The formula just mentioned expresses the quantity which combines with one equiv. of acid. The crystals of créatinine belongs to the monoclinometric system—they are voluminous, colourless, and very shining.

Créatine contains the elements of glycocolle (sugar of anhydrous gelatine) with one atom more of ammonia; the créatinine, those of caffeine, with one atom more of amide.

I will add, that forty lean fowls have furnished me with about 24 grammes of créatine; 56 pounds of beef 16 grammes; and 100 pounds of horse-flesh 36 grammes.

The extracts of all the meats on which I have operated, evaporated to dryness and calcined to redness, leave a white ash containing only phosphates. The liquids furnished by the flesh of beef and of the horse leave a mixure of phosphate of alkalies (of potash and of soda,) precipitating the salts of silver yellow, and the pyrophosphate of soda and of potash precipitate them white. The flesh of fowl leaves pure pyrophosphates.

The relation of the salts of potash and of soda in the liquids of flesh and in the blood are very different. For 1 equiv. of potash the blood of the ox contains 10 or 12 equivs. of soda; this relation is inverted in the watery extract of the flesh of the same animal. The blood of the horse contains for 1 equiv. of potash 3.62 equivs. of soda; for the same quantity of soda, the flesh of the same horse contains 6.9 equivs. of potash. These relations will conduct to some important conclusions, if we remember that in milk they are the salts of potash which predominate. If a salt of soda (a phosphate of soda) is really and indispensably necessary for the constitution of the blood of many animals, it will follow that the addition of chloride of soda to the nutriment of these animals is as necessary and indispensable for all places where the forage food does not contain either the phosphate or the other salts of soda, as is the case in many of the localities of Germany.

We may easily conceive that the chloride of soda, by a reciprocal decomposition with the phosphate of potash (which predominates in our wheat grain, &c.) may furnish phosphate of soda and chloride of potash; and this latter salt is never deficient in the liquids of the flesh.

Not to encroach on the time of the Academy, I will end my observations here, in referring for a more lengthy detail to a pamphlet actually in the press. I shall only add that crêatine, by a prolonged ebullition with very concentrated barytes water, separates itself into urea (or into carbonate of barytes and into ammonia), into a new organic base, which forms a salt with sulphuric acid, which crystallises in pearly spangles resembling chlorate of potash, and into a new crystallisable acid, which I have not studied through want of a sufficient quantity.

In terminating this paper I will mention some facts observed in my laboratory, and which I deem worthy of attention.

M. Henneberg, one of my pupils, has found that the blood of fowl contains silicate of potash, or of soda, which explains the existence of the enormous quantity of silica remarked in the feathers of birds.

M. Dorter Bensch, my *preparer*, has shown that the milk of the three bitches fed with milk during twelve, fifteen, and twenty-seven days, contains sugar of milk perfectly crystallisable.

To conclude, M. Gugelberger, another of my pupils, has obtained by the distillation of casein or of gelatine with the peroxide of manganese and sulphuric acid, pure aldehyde and essence of bitter almonds, both in sufficiently large quantities to be able to demonstrate this remarkable fact by analytical results.—*Chemist.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At a stated meeting of the Philadelphia College of Pharmacy, held Ninth month 28th, 1846,

Daniel B. Smith, President in the Chair,

The following Report presented by Warder Morris, Chairman of the Committee on Finances, was accepted, and the committee discharged, with the thanks of the College for their services.

The committee appointed in 1844 on the finances of the College, have the satisfaction to report that they have at length brought the business intrusted to them to a conclusion. The debt of the College at the time of their appointment was $7,800, which was held chiefly by members of the College. Its inability to pay the interest on this debt would soon have rendered the College bankrupt, and the committee feel proud of the liberality and public spirit with which the members have responded to the appeal made to them. Twenty-six shares amounting to $2600, have been assigned to the College, and donations in money to the amount of $242 have been received in aid of the Institution. In addition to this sum there have been paid over to the committee by a resolution of the College, $100 of the monies in the hands of the committee of publication, $116 proceeds of the sales of directions for patent medicines, and $392 from the sale of Latin labels, and with these sums they have been enabled to purchase twenty shares of the loan. They have also received from the committee on the latter subject, seventy-five books of Latin labels, with which they have purchased two additional shares, making in all forty-eight shares which they have extinguished—thus relieving the College from the annual charge of $288. The committee flatter themselves that this timely aid will not only enable us to meet our engagements, but to form a sinking fund for the extinguishment of the debt. The unavoidable annual expenses of the College may be thus estimated.

Ground rent to A. Miller, - - -	$225
Interest on $3000 loan at 6 per cent. -	180
Taxes, - - - - - - -	65
Lighting and warming Hall, &c. - -	110
Advertising Lectures, - - - -	20
Serving notices, &c. - - - -	40
Total	$640

The income of the College will probably not vary greatly from the subjoined estimate :

Annual payments of 70 members, - -	$350
Rent of cellar, - - - - - -	75
Rent of 3d story, (vacant at present) - -	75
" 4th " - - - - -	75
Temporary rental of rooms, - - -	70
Diplomas, - - - - - -	30
Matriculating tickets, - - - -	15
Tax on Professors, - - - - - -	75
Total	$765

In making these estimates nothing has been allowed for repairs, and it is probable that an amount equal to the rent of the third story room for two years, must be applied within that time to this purpose. As there can be little doubt of our being able to rent the room, the committee think that there is every reason to believe that the income will more than defray the expenses of the College. In estimating the amount of annual payments at $350, the committee have supposed that those members who have relinquished stock to the amount of $100 and upwards, would be exempted from the annual payment. This exemption was stipulated for in several instances, and it seems but just to extend it to all alike. There is due on account of interest up to the first of this year, the sum of $500, and the Treasurer having $400 in his hands, the committee have authorized him to pay the arrearages. The committee further suggest that the profits on the printing of the Journal, the Labels and Directions, together with all that can be spared from the general income, be appropriated as a sinking fund for the payment of the debt. They further suggest an application to the Legislature to exempt the Hall of the College from taxation, all which is respectfully submitted. Signed,

Warden Morris,
Thomas P. James,
William Procter, Jr.
Charles Ellis,
Ambrose Smith.
Samuel F. Troth,
Joseph C. Turnpenny,
Daniel B. Smith,
Dillwyn Parrish,

In accordance with a suggestion in the said report, the following named members of the College, having generously relinquished to the College from one to five shares of its loan, each valued at $100 per share, it was resolved that,

Peter Lehman,
Charles Ellis,
Dr. George B. Wood,
Algernon S. Roberts,
John Price Wetherill,
Edward Roberts,
Dr. William Wetherill,
Edward Needles,
Warder Morris,
Alexander Fullerton,
Dillwyn Parrish,
Samuel P. Shoemaker,
Daniel B. Smith,
Frederick Brown,
Charles Shaeffer,
Thomas H. Powers,

be exempted from any further annual contribution to this Institution. Of this resolution the Secretary was directed to inform them. On motion of Warder Morris it was resolved, that a committee on the sinking fund be annually appointed at the time of the election for officers, whose duty it shall be to invest such sums, as may from time to time be placed at their disposal, in the purchase of the debt of the College. Also,

Resolved, That the sum of fifty dollars annually from the profits of the Publication committee, the profits of the committee on Latin Labels and Patent Medicine Directions, together with the amount received from the Professors, be annually paid over to the committee on the sinking fund. Warder Morris, Samuel F. Troth, and J. C. Turnpenny, were appointed the sinking fund committee until the next annual election.

The proposal submitted at the last stated meeting, to alter Law 5, Section 1st, by striking out "The number of Resident Members shall not exceed one hundred," was considered and adopted. The College then proceeded to the election of eight members of the Board of Trustees, to serve for one year in the place of those whose term expires this evening, and the following gentlemen were duly elected.

Thomas P. James.	H. W. Worthington,
Jacob L. Smith,	Robert Shoemaker,
A. J. L. Duhamel,	William J. Jenks,
James L. Elliott,	Caleb H. Needles.

Then adjourned.

At a stated meeting of the College, held Third month, 29th, 1847,

Daniel B. Smith, President in the Chair,

The minutes of the Board of Trustees were read and adopted. Henry Pemberton, Francis Truman, and Edward Needles, were recommended by the Trustees as suitable candidates for Resident Membership, and on motion the College proceeded to their election. The Tellers reported they had received the requisite number of votes, and they were accordingly declared members of the Philadelphia College of Pharmacy. The committee appointed to assist the secretary in preparing for publication the Constitution of the College, and a revised list of its members,

Report, That they have prepared from the minutes the amended Constitution, and a revised list of members, which is now ready for publication. By the minute of their appointment, they are authorised to publish the document and they would suggest the propriety of furnishing each member with a copy. All which is respectfully submitted.

Samuel F. Troth,
William Procter, Jr. } *On behalf of the Com.*

The following resolution, after some interesting discussion, was on motion adopted :

Whereas, a Convention will assemble in the city of Washington in May, 1850, for the purpose of effecting a revision of the United States Pharmacopœia, to which this College of Pharmacy is authorized to send delegates,

Resolved, that a committee of the College be appointed to take into consideration the proposed revision, and report upon such changes and amendments as may appear proper. The report to be submitted to the College at least six months before the sitting of the Convention.

The following members were apppointed to carry out the resolution :

Daniel B. Smith (Chairman,)
William Procter, Jr.
William J. Jenks,
John H. Ecky,
Robt. Bridges, M. D.
Thomas P. James,
Dillwyn Parrish,
William Hodgson, Jr.
Jacob L. Smith,
Ambrose Smith,
Charles Ellis,
Henry W. Worthington,
Edward Parrish,
Joseph C. Turnpenny,
Joseph Carson, M. D.

The committee on the Publication of the Journal made a report, of which the following is an abstract.

The receipts on behalf of the Journal since last report, including a balance on hand of $280.14, were		$833 03
Cash paid for printing 4 numbers, including materials, &c.	$325 06	
Do. Report of College, &c.	18 17	
Do. Editing Journal for one year,	150 00	
Other expenses including cash advanced to College,	171 69	664 92
Balance in hands of Publishing Committee,		$168 11

The committee expressed the desire that a more active interest should be taken by members of the College, both in the circulation of the Journal, and in original contributions to its pages.

Considerable interesting discussion ensued, in which the College was reminded that our Journal is the sole organ of Pharmacy in this country, and that it is conducted on a liberal basis, which should ensure the confidence of Pharmaceutists in different sections of the country.

The committee of Publication were encouraged to adopt such measures as in their judgment are best calculated to advance the interests of the periodical.

On motion the College proceeded to the annual election of officers. The following named gentlemen having received the requisite number of votes, were declared duly elected for the coming year.

President.

Daniel B. Smith.

1st *Vice President.*

Charles Ellis.

2d *Vice President.*

Samuel F. Troth.

Treasurer.

Joseph C. Turnpenny.

Secretary.

Dillwyn Parrish.

Corresponding Secretary.

William Hodgson, Jr.

Trustees.

Dr. Joseph Carson,
John H. Ecky,
William Procter, Jr.
Warden Morris,
Edward Parrish,

Dr. John Harris,
William P. Troth,
Daniel L. Miller, Jr.
Benj. R. Smith, for the unexpired time of A.J. Duhamel.

Publishing Committee.

Dr. Robert Bridges, Daniel B. Smith,
William Procter, Jr. Thomas P. James
Charles Ellis.

Committee on Sinking Fund.

Samuel F. Troth, Joseph C. Turnpenny,
Warden Morris.

Then on motion adjourned.

From the Minutes,
DILLWYN PARRISH, Secretary.

R.P. SMITH, 94 CHESNUT ST. PHILA

DRIMYS WINTERI.

DRIMYS WINTERI.

THE

AMERICAN JOURNAL OF PHARMACY.

AUGUST, 1847.

ART. L.—DRIMYS WINTERI, *Forster, De Candolle.* (Winter's Bark Tree.) With a Figure.

By Joseph Carson, M. D.

Sex. Syst.—Polyandria, Polygynia.

Gen. Char.—See D. *chilensis*, in last number.

Specific Char.—Leaves oblong, obtuse, glaucous beneath. Peduncles simple, approximated or very short, divided into elongated pedicels.—*(De Candolle, Prodromus.)*

Winter's Bark was brought before the medical profession in a paper read to the Medical Society of London, in 1779, by Dr. John Fothergill. It is contained in the fifth volume of "Medical Observations and Inquiries." In this paper is a history of the discovery of the tree, with a botanical account of it drawn up by the celebrated Dr. Solander. It appears that the tree and the bark were unknown, until the return of Captain John Winter from a voyage to the South Seas in 1579. Captain Winter was the commander of the ship Elizabeth, which sailed with Sir Francis Drake in 1577; but after having passed through the Straits of Magellan, on the 8th of October of the following year, was obliged by stress of weather to return to the Straits, and remaining there some time procured the bark which Clusius in honour of him named *Cortex Winteranus.*

Other navigators upon visiting the Straits noticed the tree, but nothing definite was known of its botany, until, in 1691, a Mr. George Handasyd, upon his return, presented some specimens to Sir Hans Sloane, who gave a description and figure in the Philosophical Transactions. But it appears that the flowers and fruit were wanting, and a systematic location was impossible, until, in 1768, Capt. Wallis, of the Dolphin, brought some perfect specimens, which came into the hands of Dr. Solander, who, from these and his observations when staying at Terra del Fuego, drew up his description.

"Winter's Bark Tree (*Winterana aromatica*) is one of the largest forest trees upon Terra del Fuego; it often rises to the height of fifty feet. Its outward bark is on the trunk gray, and very little wrinkled; on the branches quite smooth and green.

"The branches do not spread horizontally, but bend upwards, and form an elegant head of an oval shape.

"The leaves come out without order, of an oval, elliptic shape, quite entire, obtuse, flat, smooth, shining, of a thick leathery substance, evergreen; on the upper side of a lively deep green colour, and of a pale bluish colour underneath, without any nerves, and their veins scarcely visible; they are sometimes narrower near the footstalks, and there their margins are bent downwards.

"In general the leaves are from three to four inches long, and between one and two broad; they have very short footstalks, seldom half an inch long, which are smooth, concave on the upper side, and convex underneath. From the scars of the old footstalks the branches are often tuberculated.

"The peduncles or footstalks for the flowers, come out of the axillæ foliorum, near the extremity of the branches; they are flat, of a pale colour, twice or three times shorter than the leaves, now and then support only one flower, but are oftener near the top divided into three short branches, each with one flower. The bracteæ are oblong, pointed, concave, entire, thick, whitish, and situated at the basis of each peduncle.

"*Calyx or flower cup* it has none, but in its place the flower is surrounded with a spathaceous germ, of a thick leathery substance, green, but reddish on the side which has faced the sun; before this germ bursts, it is of a round form, and its size is of a small pea. It bursts commonly, so that one side is higher than the other, and the segments are pointed.

"The *corolla* consists always of seven petals, which are oval, obtuse, concave, erect, white, have small veins, and are of an unequal size, the largest scarcely four lines long; they very soon fade and drop off, almost as soon as the germ bursts.

"The *filaments* are from fifteen to thirty, and are placed on the flat end side of the receptacle; they are much shorter than the petals, and gradually decrease in length towards the sides.

"The *antheræ* are large, oval, longitudinally divided into two, or as if each was made up of two oblong antheræ.

"The *germina* are from three to six, placed above the receptacle, turbinated or of the shape of an inverted fig, flat on the inside and somewhat higher than the stamina; they have no styles, but terminate in a stigma which is divided into two or three small lobes."

The fruit was not seen by Dr. Solander in a ripe state, but in the immature condition is described as constituted of germs of a thick, fleshy substance, becoming unilocular seed vessels, and containing the rudiments of seeds, as in the generic account.

Captain Wallis stated that the trees are of various sizes according to the soil they grow upon and their situation. Those near the sea and in rocky ground were scrubby, the bark sticking close to the wood, and having a dirty look;

those on the plain ground and sheltered were straight and tall, rising to thirty or forty feet, and as thick as a middle-sized man. The bark is smooth and somewhat resembling the horse chesnut. In the neighborhood of Port Famine it is abundant. It flowers in March, which is the commencement of the fall. The bark attracted the attention of navigators from its warm, spicy, aromatic properties, and in the treatment of scorbutic diseases, which broke out in vessels going into the Straits of Magellan, was a valuable auxiliary. It is rarely brought into the market as a drug, but is sometimes confounded with the Canella alba from which it differs in colour, as it is pale-yellowish or dull-reddish gray, with elliptical dull-brown spots externally, and brown internally. It has an aromatic odour and a warm bitterish taste.

It contains resin, volatile oil and tannin, which last serves to distinguish between it and Canella, as the chemical evidences are present in one case and not in the other.

The medical properties of it are those of an aromatic and tonic. From its sensible qualities it was confounded with Canella alba. The medical uses are the same.

Some confusion is apparent among the authors who have treated of the tree with respect to its name; hence the different appellations by which it has been described. The generic term Winterana was bestowed by Linnæus in commemoration of its discoverer; in so doing, however, he mistook it for the Canella alba, and gave the account of the fructification of that plant. Browne, however, had stamped that genus with the name of Canella. Forster, having obtained the parts of fructification, gave to the plant the name of Drimys Winteri from its hot and pungent flavour. Murray, in his *Linn. Syst. Veg.*, gave the generic name Wintera, which he preferred to the original Linnæan one, and finally De Candolle has adopted the name of Forster in imitation of Lamarck.

By Lamarck a species has been made which he calls D. punctata, but which by De Candolle is regarded as a variety.

ART. LI.—OBSERVATIONS ON PODOPHYLLUM PELTATUM.

By John R. Lewis.

(*An Inaugural Essay.*)

The subject of this essay is among the most interesting of our indigenous Materia Medica, and has long attracted the attention of medical men for its active and efficient power as a cathartic; and were it not for the presence of a foreign drug in our market, possessed of similar and more active powers, there is little doubt but that the root of Podophyllum would attain a more prominent reputation as a purgative than it at present enjoys.

Its adoption in the United States Pharmacopœia, and the formula for the extract of it which there exists, are acknowledgements of its merits not to be disputed. Its chemical history has hitherto been but little examined into. Several years since Mr. Wm. Hodgson, Jr., of this city, in some experiments on this plant published in the American Journal of Pharmacy, describes a peculiar bitter principle existing in its root, which he obtained by boiling the drug with quick lime in water, and other subsequent treatment, but which he did not succeed in obtaining in a state of purity.

In the investigations detailed in the following pages, I have pursued the path pointed out by Mr. Hodgson as well as followed such indications as my own experience has suggested, which have thrown some light on the chemical relations of the Podophyllum, and shown a striking analogy between it and Jalap.

BOTANICAL HISTORY.

Podophyllum Peltatum.

Common names.—May Apple, Mandrake, Wild Lemon.

Sexual System.—Polyandria, Monogynia.

Natural Order.—Ranunculi, *Jussieu.*

PODOPHYLLEÆ, *Lindley.*

May Apple is an indigenous herbaceous plant, thriving in swampy, low, shady woods, being particularly adapted to rich and shaded soil, growing in patches close together, and sometimes covering a large extent of ground. The flowers, which are nodding and white, appear in May and June, are situated in the forks of the petioles at the top of the stems, having a corolla composed of about nine petals, and a calx of three oval concave leaves. The stamens number from twelve to twenty, surmounted by long yellow anthers. The stigma is sessile.

The stalk which is about twelve or sixteen inches high, supports two palmate leaves which are of a green colour, smooth on the top, veined and hairy on the under surface, and generally wither as soon as the fruit is matured. The fruit is a yellowish drupe about the size of a small hen's egg, resembling in shape and colour the fruit of Citrus limonis, from which it has derived the name of Wild Lemon.

The rhizoma, which is the only officinal part of the plant, is a long creeping jointed horizontal fleshy root; the joints which are much thicker than the other portions of the root are furnished with radicles of the same colour. In the dry state when broken it exhibits a whitish amylaceous fracture: externally it is of a reddish brown colour, corrugated and wrinkled lengthwise, has a bitter taste, and somewhat aromatic odour. It should be collected in the fall after the leaves and stalks are withered, or in spring as soon as the shoots are perceptible—the former is perhaps preferable, as the medical properties of the root, by its being in the ground all winter, are more or less subject to deterioration.

The decoction and tincture are very bitter; alcohol is the best solvent for the bitter principle, but diluted alcohol takes up a greater amount of extract, although it is much weaker in proportion to its bulk, therefore alcohol of 35° Baumé is preferable to any other menstruum for the extract, as it affords the same quantity of active principle, in a much smaller bulk. Sixteen ounces of the fresh root loses in drying 11½ ounces of its weight, consequently 100 lbs. of the fresh, would yield 28 lbs. of dry root. Great care should be taken to exclude moisture from the dried root, as in this state it is deliquescent. The fresh root should be dried in the sun.

CHEMICAL HISTORY.

Vegetable Albumen.—An ounce of the fresh root was beaten into a pulp, with a portion of water, and the fluid separated by filtering. This liquid was precipitated of a dirty white colour by bichloride of mercury and ferrocyanide of potassium, and when heated to the boiling point a coagulum was produced, which, taken in connection with the two preceding tests, indicates the presence of vegetable albumen. This albuminous matter appears to be rendered insoluble by drying the root, as the cold infusion yields no evidence of its presence to the tests mentioned.

Gum.—Another portion of the decoction was precipitated by the solution of subacetate of lead of a dirty yellow colour; the precipitate when dried assumed a reddish brown hue. A cold infusion of the dry root coarsely powdered, was made, filtered, and tested for albumen, from which it proved to be perfectly free. To this infusion a solution of subacetate of lead was added, which produced a dirty yellow curdy precipitate, which did not change its colour like that in the preceding experiment. Another portion of the infusion was mixed with its bulk of alcohol, which caused a precipitate of the same colour.

Starch.—The decoction made with one ounce of May apple root to a pint of water, was precipitated of a dark blue colour by tincture of iodine.

Gallic Acid.—The presence of tannin in the decoction was not indicated on the addition of gelatin; but by the solutions of the per salts of iron a dark colored precipitate was thrown down, indicative of gallic acid.

Fixed Oil.—Four ounces of the coarsely powered root was macerated during 48 hours in alcohol of 35° Baumé, heated to the boiling point, and then displaced with the same menstruum. The tincture thus obtained of a beautiful colour, resembling dark Madeira wine, was evaporated to a nearly dry extract, which weighed 250 grains Troy. This extract was treated with cold ether, which yielded on evaporation 98 grains of a mixture of fixed oil, and a resinous substance of a light yellowish olive colour. When pressed between bibulous paper most of the oil was absorbed, and the resinous substance was left in a dry brittle state, breaking with a shining fracture. The fixed oil has a greenish yellow colour, and becomes rancid by exposure for some time to the air. The resinous substance was dissolved in alcohol and evaporated to an extract, which possessed quite a different appearance, than when it contained the fixed oil,—having a brown colour, extremely bitter taste, soluble in alcohol and ether, and partially soluble in hot oil of turpentine. It burns readily, leaving a carbonaceous matter, and gives off much smoke.

Ethereal Treatment.—A portion of the root in powder was macerated with a sufficient quantity of ether requisite for its exhaustion, the liquid when evaporated yielded an oily extract of a yellowish colour with a slightly olive tint; this was treated with cold alcohol of 35° Baumé, which dissolved the solid portion, leaving the fixed oil in the form of globules in the bottom of the solution. This latter was separated by decantation, the oil which was collected in a watch glass was moderately heated to drive off the adhering alcohol. The oil now was of a dull olive colour, about the consistence of castor oil, with no taste, but had a slight odour which was due to impurities, it was unctuous to the touch, left a permanent stain on paper, was soluble in a solution of caustic potash, and when precipitated from this solution by the addition of muriatic acid, a substance rose to the top of the liquid which had all the appearance of an oil after being treated in that manner. When burnt it exhales the disagreeable odour of burning fat, and leaves a slight residue scarcely perceptible. This oil resembles that obtained by the alcoholic treatment in all its properties; it is soluble in hot alcohol and in cold ether.

Volatile Oil.—One pound of the fresh root was macerated in a sufficient quantity of water to cover it, for twenty-four hours, and distilled. The product was opaque, possessed the odour of the root, and had a mild nauseous taste. Twenty ounces of the dried root was macerated in the water obtained in the previous process for two days, and again distilled; the product had the same appearance and odour, but it was much stronger than that procured by the former distillation. It was kept in a closely stopped bottle for five months without the least apparent change in its character, except that it became more floculent, and separated in very light opaque scales. It was neutral to test paper.

A peculiar Resinous Principle.—A portion of the coarsely powdered root was macerated twenty-four hours in alcohol of 35° Baumé, then heated to the boiling point, and when cool was displaced. A transparent liquor of a beautiful wine colour was obtained, and evaporated in a water bath to the consistence of a thick extract, having a brown colour. This was treated with sulphuric ether of 55° Baumé, yielding all the fixed oil to it, and a large portion of the extract. The ethereal solution was of a light brown colour, and had a bitter taste, leaving when evaporated an oily and a resinous substance, like that already described. That portion of the extract not dissolved by the ether was boiled in distilled water, which dissolved a small part of it. The solution was of a dark brown colour, had a disagreeable and slightly bitter taste; the undissolved part having much the appearance of hæpatic aloes, was dissolved in alcohol of 42° Baumé, treated with pure animal charcoal, and the liquid allowed to evaporate spontaneously. In this state it had but little colour, and was in form analogous to tannin. To purify it still further it was washed in cold distilled water. It is soluble in a solution of caustic potassa and aqua ammonia, from which it may be precipitated by the addition of an acid, very soluble in alcohol, less soluble in carbonate of potassa and carbonate of soda, and insoluble in water. A solution of it in alcohol has the same bitter taste as the substance resembling hæpatic aloes. Under peculiar circumstances, the cause of which I have not yet been able to find out, it assumes a hydrated form. Eight grains of the dark brown resin left after treatment with ether and water is sufficient for a strong purge; it is a hydrogogue cathartic operating with griping, and producing a nauseating effect. Six grains of the resin still purer, operated as a *drastic* cathartic; it also occasioned vomiting and great debility. In the pure and colourless state it is amorphous. By one operation it was obtained in opaque feathery scales, by another in a light colorless powder, another in a translucent gelatinized mass, and often in globules like dried gelatin. Repeated efforts were made to crystallize it, but without success.

Four ounces of the root in coarse powder was boiled a few minutes in a mixture of alcohol and water in the proportion of one of the former and two and a half of the latter; when cold it was displaced. The liquor was of a reddish brown colour and yielded on evaporation by water bath twenty-four per cent of dry brown colored deliquescent extract, which was reduced to powder, treated with alcohol of 42° Baumé, boiled with purified animal charcoal, filtered, and allowed to evaporate spontaneously. The residue was of a very light brownish colour, had the appearance of a resin, and was redissolved in alcohol of 42° Baumé, and precipitated by water, which operation left a large portion of coloring matter in solution. The precipitate was separated, washed with distilled water, dissolved in alcohol of 42° Baumé, and left to evaporate. It was now in a very pure state, and analogous in its character to that obtained in the preceding experiment. Its alcoholic solution was bitter and caused a raw scratching sensation in the throat; it is dissolved and decomposed by nitric acid, producing a beautiful light burnt umber colour, approaching to a purple; and by sulphuric acid, to which it imparts a rich olive colour with a purple shade around undissolved portions. It is very soluble in hot diluted alcohol. Ten ounces of the dried root was treated according to the process of Mr. Wm. Hodgson, Jr., viz., by boiling it in water with lime, precipitating the clear liquid with sulphate of zinc, evaporating the filtered liquid to dryness, treating the residue with cold alcohol of 42° Baumé, and animal charcoal, and allowing it to evaporate spontaneously. The substance thus obtained was in the form of a gelatinous mass, resembling that described in the preceding operations, except that it was more soluble in hot water, apparently being converted into a hydrate by the lime treatment. Six grains of this mass was taken without any apparent effect, owing perhaps to its containing a large amount of water and impurities.

Ashes of the Root.—A portion of the root was incinerated, the product which weighed twenty-two grains was lixiviated with water, which dissolved out four and a half grains of solid matter. The liquid was reduced by evaporation, and a solution of tartaric acid was added, which caused a liberation of carbonic acid.

In a few minutes after the effervescence had ceased, a large quantity of shining crystals were precipitated, which had the characteristics of bitartrate of potassa.

Nitric acid in excess was added to a portion of the lixiviated liquid, which caused carbonic acid to be given off, and on the addition of nitrate of silver a white precipitate was thrown down of chloride of silver.

The ashes remaining after lixiviation were mixed with dilute muriatic acid and left to stand for a short time. The solution being separated by filtration, produced a precipitate with binoxalate of potassa consisting of oxalate of lime.

By the experiments detailed in this essay, it has been shown that the root contains the following principles:

Vegetable Albumen, *Gum*, *Starch*, *Gallic acid*, *Fixed Oil*, traces of *Volatile Oil*, *a Peculiar Resinous Principle*, soluble in alcohol and ether, and another soluble in alcohol only. Both possessed the active properties of the root, but the former is most active. The ashes were found to contain potassa, lime, and a chloride.

To these may be added as constituents of the root, lignin and extractive matter.

ART. LII.—ON EMPLASTRUM PLUMBI.

By N. Spencer Thomas.

(*An Inaugural Essay.*)

1st. One pint of olive oil was treated by boiling with two ounces of hydrated sesquioxide of iron, a portion of water being added as in the preparation of lead plaster; the mixture was kept at the temperature of 212° over a steady fire (fresh portions of water being added as the evaporation proceeded) for the space of three hours, at which time no change had taken place, except in colour, which was somewhat lighter than before the operation was commenced, probably from a change of oxidation, and not from any union of the oily acids with the oxide of iron.

After it had cooled sufficiently, the mixture was transferred to a bottle, and allowed to stand undisturbed for twenty-four hours, at which time the oxide of iron had entirely separated from the oil, which was as clear and transparent as before being submitted to the operation.

2d. The same quantity of olive oil as in experiment 1st, was treated in the same manner with half a pound of anhydrous sesquioxide of iron, the result being the same as in experiment 1st.

3d. One pint of olive oil was boiled with a half pound of protoxide of iron (prepared fresh, and added to the oil with the water, that it should not become peroxidized before being mixed with the oil) for the same length of time as in experiment 1st. After the water in which the protoxide of iron was added was driven off, the mixture was kept over a regular fire for a half hour, when it rose considerably above the boiling point of water; it was then removed from the fire, and water gradually added to reduce the temperature to 212°. Upon cooling, the oxide separated as in the former experiments; it being now black, it was probably in the state of a black oxide; the oil had a dark colour, caused probably by its being raised to too high a temperature, and slightly burnt. These experiments I think prove satisfactorily that the oxides of iron will not combine directly with the oily acids to form a plaster.

4th. Being in possession of an article of American litharge, which on former occasions had thrown down a precipitate of metallic lead, during the process of forming lead plaster, I determined to add a portion of red lead (oxid: plumb: rub:) with a view of supplying oxygen to the metallic lead. I therefore in this experiment took of litharge nine parts, of red oxide of lead one part; five pounds of which was added to one gallon of olive oil and two pints of water. The mixture was placed over a regular fire, and as it rose to the boiling point of water, and was continued at that degree of temperature, it gradually became darker—the yellow colour of the litharge giving way to a reddish hue. As the operation proceeded, the mass assumed a peculiar soapy appearance, the red hue gradually disappeared, until after about two hours boiling a plaster was formed, which upon being removed from the fire, and allowed to stand for a short time, became covered with a bright red froth, while the plaster below was of a dull brownish colour, and not white as when litharge alone is used. The red lead employed in this case failed to perform the desired effect, the residue or sediment of metallic lead falling to the bottom amounting to about one-fortieth of the weight of the litharge used in the process. I would add that the plaster formed with this kind of litharge is generally of a lighter colour, and more transparent when melted than that made with litharge, which produces no such precipitate; and probably this occurs, from the fact of the lead assuming a floculent form, and acting in the same way that gelatin does in clarifying liquors,—carrying down with it any particles of foreign matter that exists in the melted mass.

5th. Five pounds of English litharge in fine powder was mixed with one gallon of olive oil, two pints of water being added, as directed by the U. S. Pharmacopœia. The boiling was carried on as directed by that authority; the colour of the mass became lighter, as the operation was continued. Boiling water was added from time to time, and at the expiration of three and a quarter hours a plaster was formed of good consistence—white, with a slightly greenish tint, which is attributable to the chlorophylle, or green colouring matter in the oil. The change or variety in colour observable in experiment fourth did not occur in this experiment. Seven pints of water were necessary to the completion of the process.

6th. The same quantity of materials (the American litharge being substituted) as in experiment fifth, were mixed and treated in the manner directed for the formation of lead plaster. This parcel underwent the same change in colour, as noticed in the fourth experiment. Two and a quarter hours were required for its completion, and four and a half pints of water were consumed. The deposite of metallic lead in this instance was the same as that in the parcel where red lead was used. The plaster, however, after standing undisturbed for about five minutes, and thrown into cold water, had as fine a consistence as that made with English litharge.

7th. Eight pounds of lard being melted, five pounds of litharge (American) finely powdered was stirred into it, and a small quantity of water being added, the boiling was commenced and continued briskly, with constant stirring, until the water was driven off; then the mass attained a temperature above that of boiling water; it was removed from the fire and a fresh supply of water being added, an immediate union of the fatty acids and oxide of lead took place; a plaster being formed in a much shorter time than when the mode prescribed by the Pharmacopœia is closely adhered to. This plaster was of a good consistence, and as white, and apparently as perfectly formed as that prepared in the ordinary way. The danger of discolouring I conceive to be but little if any greater by this mode of proceeding, than by that directed by the Pharmacopœia; for the same reason that syrups may become empyreumatic by rapid boiling, the steam forming bubbles on the bottom of the vessel where the fire acts, as in this case the temperature would be about the same.

8th. A quantity of lard was boiled with an equal weight of water for fifteen minutes, then removed from the fire, and the lard allowed to harden. The lard was then subjected to the action of litharge and formed a plaster in much less time than lard that had not been treated in this way. A portion of the plaster resulting from experiment

7th was melted with resin in the proportion directed for adhesive plaster; it made a harder plaster than the result of experiment 5th, in which case olive oil was used. I account for this from the fact that the stearate is firmer than the oleate of lead. There was a slight difference in the fracture of the adhesive plaster, that made from the olive oil having a more shining fracture, than that from the lard. When applied to the skin the sticking qualities appeared the same.

The combining weight of stearine being much greater than that of olein, a less quantity of litharge would be required to convert it into a plaster, and there may be some advantage in using a plaster of this kind; as there is upon record a case of lead-cholic, as having occurred from the use of lead plaster, it might be desirable to use that which contains the smallest proportion of lead.

9th. A small quantity of officinal lead plaster was boiled with carbonate of soda, and was decomposed, forming a soap of soda, and carbonate of lead. When boiled with caustic potassa, a soap of potassa and oil was formed, and neutral margarate of lead was thrown down, which consists of one equivalent of margaric acid 140, and one equivalent oxide of lead 111.6 combined with one equivalent of water 9=260.6.

From these experiments it would appear first, that a plaster cannot be formed directly by the oxides of iron; and 2d, the specimen of American litharge used consisted of a prot and suboxide of lead, and when acted on by the oily acids it was reduced to a protoxide and metallic lead, the change of colour would indicate that oxygen is absorbed by a part, while that which parts with its oxygen is reduced; and 3dly, as the lead assumes a floculent form, and thereby improves the appearance of the plaster, it is an advantage; and 4th, it proves that lard is equal to olive-oil in all respects for making plaster, and perhaps advantageous on account of less litharge being required; and also another advantage in the preparation of it is, that less time is required for the accomplishment of the same object, than where the directions of the Pharmacopœia are strictly followed. A receipt, then, for lead-plaster that might be preferable to that of the Pharmacopœia, would be,—lard, eight pounds; litharge, four pounds; water, a pint. When the water is all evaporated, suffer the mixture to attain a temperature at which fuliginous vapours arise,—remove it from the fire and gradually add water—constantly stirring until ebullition ceases, and if the plaster be not perfectly formed, repeat the operation. When the lard was boiled with water, something was taken up, and the remaining lard acting on the litharge much quicker than ordinarily would prove Chevreuil's view to be correct. The specimen of neutral plaster obtained by boiling the officinal article with caustic potassa, appeared to be margarate of lead. On thirty grains being treated with warm diluted nitric acid, and precipitated with iodide of potassium, it yielded twenty-six grains; from which take the iodine, and twelve grains of lead would remain; to which add sufficient oxygen to make the equivalent of litharge thirteen. Take this from thirty and seventeen remains, which corresponds nearly with an equivalent of margaric acid and water.

ART. LIII.—ON A VARIETY OF CINCHONA BARK.

By William Procter, Jr.

A few weeks since a sample of bark was sent to me for examination as to its quinia strength, which presented so many of the characters of yellow bark, that at the time it was not suspected. The sample, amounting to about half a pound, consisted of several pieces from two to five lines in thickness, four to eight inches long, and more or less curved. The epidermis had in most instances been removed with here and there prominent portions of a dark, reddish-brown colour. The interior surface was of a uniform, dull, brownish yellow, the fibres straight, and the terminal spiculæ less abundant than in the calisaya. The exterior was darker coloured than the interior layers, the whole being quite bitter to the taste, and auguring well for its quality.

After a careful examination, I was not a little surprised to find nearly three per cent. of cinchonia, and no evidence of quinia, even to the most delicate tests of that alkaloid.

On mentioning this result to MM. Rosengarten and Denis, they informed me that an invoice of bark from Peru had been consigned to them, as a new article, and which in their hands had not yielded any quinine. At my request, they kindly gave me a sample of the bark, and copies of letters, etc., giving a history of its introduction here and its origin in Peru, with permission to use them.

The consignment was from a house at Valparaiso, who say: "We received from Lima, from Dr. J. Villamil, twelve seroons of bark, requesting us to consign the same to the United States, that a correct knowledge may be obtained of the quality. This gentleman has a perfect acquaintance with the article, has been the chief collector and dealer in it for many years in Bolivia; and during his present residence in Peru, discovered that, in the interior, there, a similar and equally good quality of the calisaya bark [tree] of Bolivia was growing. The only difficulty being a perfect knowledge for the selection, which he possessing has dedicated himself to it, and selected these bales as samples, although a much larger quantity has been sent by him to England.

"Should the result prove favourable, Dr. J. Villamil will extend his transactions in it, and will be willing to receive orders for purchases, which, however, we should be rather scrupulous to execute, fearful from its being a new article that it might come rather mixed in quality, as it appears that both genuine and spurious grow in the same soil and places.

"However, you will be better able to judge from the result of the seroons, regarding it; and whether you should feel inclined to send orders for it through us; without, however, our responsibility for quality.

"We further add the certificate of an essay made in Lima showing the quantity of quinine it contains."

[*Certificate.*]

"LIMA, 8th October, 1846.

DR. VILLAMIL:

Dear Sir,—The Calisaya tabla bark which you are extracting from the woods of Guanuco, in Peru, of which you have sent me a sample, in order to analyse it, I find produced two and a half per cent. of sulphate of quinine, which I assure you for the best of your interests.

I am, dear sir, yours, &c.

(Signed,) J. JEMY, Sr."

A perusal of the above letter and certificate will induce the belief that the parties believed they had sent calisaya bark, which is corroborated by the testimony of the analysis, as well as the aspect of the drug itself. The seroons are of the usual size, weighing about 160 pounds, covered with raw hide. The bark is in pieces varying from three or four to ten or fifteen inches in length, two to four lines in thickness and various breadths, generally in narrow flattened pieces occasionally in rolled or quill form, and portions broken up by attrition or packing. The exterior surface varies in different pieces to a considerable degree. A very fine specimen in my possession has the reddish-brown epidermis remaining on parts of the surface which is fissured both transversly and lengthwise, with several lichenoid spots of a whitish colour. Where the epidermis has been removed, the colour is a uniform yellowish brown, somewhat orange, marked with scar-like impressions, as if the exterior bark had been pealed off by a natural process. The interior surface has a brighter colour, is smooth and the fibres are straight, and not interlaced, as often observable in calisaya. In other pieces the external surface retains nearly the whole epidermis, which is thin and of a greyish brown hue, whilst the interior surface has a dull ochre colour, having evidently less of the red colouring matter. The fracture of all the specimens exhibits yellow translucent spiculæ analogous in appearance to those of calisaya, but less numerous, and not capable of penetrating the skin like those of the latter bark, which is one of the best criteria for distinguishing them. The edge of the bark presents the crystalline points like the calisaya, which are less numerous. All parts of the bark are decidedly bitter, accompanied at first with an acid impression, and the odour is analogous to calisaya.

Chemical Examination.—1000 grains of the bark in question taken from a number of the pieces was exhausted by water acidulated with muriatic acid, and the clear hot infusion was precipitated with a slight excess of milk of lime; the precipitate, thoroughly washed and dried, weighed

190 grs. This was exhausted with alcohol 35° Baumé by boiling, and the alcoholic liquid, which had a light yellowish colour, was evaporated until crystals commenced to form, and set aside. Twenty grains of nearly colourless crystals were thus obtained, and the mother liquor, evaporated to dryness, afforded eight grains more of the same crystals contaminated with a small amount of extractive, being 2.8 per cent. altogether. The crystals were brilliant four-sided prisons with dihedral summits; had very little taste, but after a time gave an impression of bitterness; they are insoluble in water, soluble in alcohol, especially hot, and but slightly soluble in ether. They are strongly alkaline, and cold nitric and sulphuric acids dissolve without decomposing them. The sulphate, which crystallizes with great readiness, is soluble in water, has a bitter taste, and is precipitated by tannic acid. When dissolved in chlorine water, the addition of ammonia does not cause a green colour, indicative of quinia.

The decoction of this bark is precipitated by sulphate of soda, though not so abundantly as calisaya ; it gives a dirty, greenish precipitate with persulphate of iron, a floculent white one with tincture of galls; tartar emetic instantly causes a white cloudiness, as also does oxalate of ammonia. When the filtered transparent infusion is dropped into a filtered solution of gelatin, the mixture becomes clouded, and, by standing, a very light floculent precipitate occurs.

The above results show that this bark is destitute of quinia, that it contains no aricina, and that it contains nearly three per cent. of cinchonia. The presence of this large percentage of alkali, and of kinate of lime renders all the ordinary chemical tests, as tincture of galls, sulphate of soda, etc., of little value, and in connection with the sensible characters of the bark is well calculated to deceive, as in fact nearly all of them agree with the calisaya. The character of the spiculæ noticed above, is the most striking difference, and nothing but the actual, isolation of the alkaloid will render its non-identity with calisaya certain.

It is said that a lot of the same kind of bark has been examined in New York with a similar result, and as the letter before quoted states it has been sent to England, we shall probably hear of it from abroad.

Although coming from Guanuco, this bark is not by any means to be classed with the Guanuco bark of the books, although it is analogous to the latter in containing only cinchonia. Pereira states under the head of Huanuco bark, that "Ruiz, when appointed to examine a cargo of Huanuco bark in 1799, found a bark amongst it which Tafalla has designated as "*similar to calisaya*,"—and under the name of "*light calisaya*," Guibourt describes a variety of bark which in some of its characters is analagous to the one now noticed, but the history of the latter is sufficiently clear to render it probable that this is its first appearance in our market. The bark described at the commencement of this paper, is evidently from the same source in Peru, but was not a part of Messrs. R. & D.'s invoice.

ART. LIV.—ON THE FLUID EXTRACTS OF RHUBARB AND VALERIAN.

By William Procter, Jr.

The high and justly merited esteem in which Rhubarb is held, renders it a fit subject for pharmaceutic research. The modified character of most of the liquid preparations of this drug, as well as their feebleness, unfits them for many cases where it is applicable, and the only resource is the powder; the well known nauseousness of which renders its avoidance often desirable.

In reflecting on the subject it occurred that a preparation might be made which should be liquid, nearly as concentrated as the drug itself, and sufficiently permanent to resist the temperature of our warm season.

In carrying out this idea, it has proved successful, and a preparation afforded containing the strength of sixty grains in a teaspoonful. Several advantages will result from this degree of concentration, besides that of permanency. It may be incorporated with liquid mixtures with the greatest facility, its syrupy consistence rendering it fit for suspending calomel or blue mass, and other insoluble substances, when these are prescribed with it; by dilution with simple syrup any required strength of simple syrup of Rhubarb can be prepared extemporaneously; and admixed with the fluid extract of senna, when the two cathartics are required together, it affords an excellent mode of administration.

In the following formula there has been no addition of aromatics to mask the taste,the sugar necessary for preservation being the only adjuvant. The active part of rhubarb is ceded equally to water and diluted alcohol, but the latter has been chosen as the menstruum because it enables the process to be conducted by displacement, and requires less heat and time in the evaporation.

Another reason is that whilst this menstruum extracts all the active part, it rejects a considerable amount of mucilage, which renders the preparation less viscid. If a watery menstruum is preferred, the best mode of extracting the root is to reduce it to small fragments or shavings, free from dust; then macerate it in twice its weight of water for twenty-four hours and strongly express. The residue is again macerated in the same quantity of water, and again expressed, until three times the weight of the root is obtained.

Take of	Rhubarb root,	eight ounces, (Troy.)
	White sugar,	five ounces, "
	Diluted alcohol,	two pints.

Reduce the drug to a uniform coarse powder, by grinding, if possible, and mix it with its bulk of coarse sand; moisten it with sufficient of the diluted alcohol to form a pasty mass, and allow it to stand for an hour, or until the particles are thoroughly impregnated and swollen with the liquid. The mass is then introduced into a displacer, and shaken until settled uniformly, covered with a piece of paper or cloth, and the rest of the menstruum carefully poured on until the passing liquid has but little odour or taste of the root, which is usually accomplished by the amount of menstruum indicated in the formula, if the percolation has been slowly effected. The concentrated tincture thus obtained is evaporated in a water bath until it measures five and a half fluid ounces, the sugar added, and when dissolved the whole should measure eight fluid ounces.

Fluid extract of rhubarb, made as above, has a dark colour in mass; is transparent in thin layers; has a strong odour and taste of the drug, somewhat modified by the sugar; and a thick syrupy consistence at the ordinary temperature, and has the specific gravity of 1.30. When mixed with water the solution is slightly turbid, owing to a little resinous matter.

In reference to its permanency it may be remarked, that the preparation has been kept for a month past, during the hottest weather, in the shop, without any evidence of change in appearance or odour, and its efficacy as a cathartic in the dose of half a teaspoonful has also been satisfactorily ascertained. The formula is offered, however, that it may be tried, and under the impression that, if no unforseen difficulty presents, it will prove a valuable agent in the hands of the practitioner.

Fluid extract of Valerian.—A formula for this preparation was published in the last number of this Journal, by Evan T. Ellis, which appears to have met with favour from those who have tried it, and it is certainly the best form of exhibiting this drug yet proposed. In some recent experiments on valerian root, I have been led to doubt the entire completeness of the formula alluded to, for the following reasons.

When valerian in powder is percolated with a mixture of one part of ether and two of alcohol, in such a manner that the menstruum shall pass slowly, and cease to extract matter from the root, it requires about three times the weight of the latter. If water is now added it is with great difficulty that it passes, if the valerian has been sufficiently fine for the first menstruum. When it has passed, the infusion has a very dark colour, and but little taste.

If now the ethereo-alcoholic liquid be suffered to evaporate spontaneously till it amounts to one half the weight of the valerian used, a quantity of green oily looking globules gradually separate, which attach themselves to the sides of the vessel, or float in the liquid, which is a yellowish, strongly odorous fluid, having a decided acid reaction, and the bitter, disagreeable taste of valerian. If the globules are now separated by a filter they amount to about one fiftieth of the root used, and are in fact an oleo-resin, consisting of oil of valerian, valerianic acid and the soft resin proper to the drug. When brought in contact with litmus paper it instantly reddens it more decidedly than the liquid from which it was separated, especially if touched with a drop of alcohol. The dark aqueous infusion is now reduced to three times the bulk of the alcoholic fluid, by a careful evaporation, and mixed with the latter, which causes a turbidness which arises partially from the separation of resinous matter by the water, and partially from the precipitation of gummy matter by the alcohol.

From these facts it is evident that the whole of the active principles of the valerian are not embraced in the preparation as published.

In one hundred parts, valerian contains about twelve parts of extractive matter, and eighteen parts of gum. It is questionable whether the extractive possesses any of the properties sought for in valerian, and the gum certainly does not. By using diluted alcohol instead of water, the extractive may be removed; the gum avoided; the imperfect extraction of the volatile and resinous principles by the first liquid compensated for, and a menstruum used capable of retaining all the active principles in solution.

The increase of alcoholic strength is not sufficiently great to injure the medical properties of the preparation as the dose is small.

In view of the above results, the following modification of Ellis' formula is suggested:

Take of Valerian Root,	eight ounces, (Troy,)
Ether,	four fluid ounces,
Alcohol,	twelve fluid ounces,
Diluted alcohol,	a sufficient quantity.

Reduce the valerian to coarse *powder*, and introduce it uniformly and without pressure into a displacing funnel. Mix the ether and alcohol, and allow the mixture to percolate slowly and regularly through the powder until all has been added. The diluted alcohol is then poured on until the ethereal menstruum has been displaced, which is known by the product amounting to nearly a pint. More diluted alcohol is now poured on until ten fluid ounces of liquid passes, when the operation is stopped. The ethereal tincture is placed in a shallow vessel, and suffered to evaporate spontaneously, till reduced to six fluid ounces. The clear liquid is then poured off and mixed with the ten ounces of tincture, and the oleo-resin adhering to the sides of the dish are dissolved in a little alcohol, and added to the rest. The mixing of the liquids, by changing the strength of the mentruum, causes the separation of a little resin and oil, and a little extractive; and it is requisite that the mixture should stand, with occasional agitation, for three or four hours before being filtered, after which it should measure a pint.

When thus prepared, fluid extract of valerian is a dark brown transparent liquid, with the taste and odour of valerian strongly developed, and a decided acid reaction. One fluid ounce represents half a troy ounce of the root, which is the same proportion as in the published formula.

ART. LV.—NOTE ON THE TESTS OF THE PURITY OF BALSAM OF COPAIBA. By Mr. Redwood, Professor of Pharmacy to the Pharmaceutical Society.

Some observations which have recently been made at a meeting of this Society, with reference to the adulteration of copaiba, especially that used for filling the cheap capsules, have induced many of our members to examine their copaiba capsules with the view of determining whether or not the contents were genuine. In these examinations the ordinary tests, mentioned in works on Materia Medica, have of course been resorted to, and in some instances results have been obtained indicating, according to the tests used, that the copaiba was not genuine. I have been applied to for my opinion in two or three cases of this kind, and after examining several samples of copaiba obtained from different sources, and trying the action of all the tests upon them, I have come to the conclusion that no satisfactory method, applicable in all cases, for determining the purity or impurity of this oleo-resinous substance by the application of a simple test, has hitherto been pointed out. Some of the tests, which appear to have been most relied upon, I believe to be quite valueless, and I have no doubt that many samples of copaiba have been condemned as impure on very insufficient data.

In obtaining the results which I am about to describe, I have used the following specimens of copaiba, but some of the experiments were repeated on several others:

1. Part of a specimen in our Museum, which was received about two years ago from one of our members, Mr. Goodbarn at Rio de Janeiro. It was taken by Mr. Goodbarn himself, from a tree in a primeval forest, in the district of Macahé, about four day's journey from the city of Rio de Janeiro, on the 5th of July, 1843. The tree was at the same time cut down, and some of the wood, bark, and leaves were sent with the specimen. On comparing these with Hayne's plates, they were found to correspond with those of Copaifera trapezifolia. Mr. Goodbarn described the tree as having been one hundred feet in height, and about three and a half feet in diameter. This is probably one of the best authenticated specimens of genuine copaiba in this country.

2. A specimen of copaiba taken from some capsules, said to have been imported from France. This specimen was brought me for examination by a merchant in the city. It had been previously examined and condemned as impure, but I believe it to be genuine and very good.

3. A specimen of good commercial copaiba obtained from a wholesale house.

The following are the tests which I have applied to these specimens, together with the results:

A. The addition of two parts of absolute alcohol to one of copaiba has been recommended as a means of ascertaining whether any substance insoluble in alcohol has been mixed with the copaiba. This is one of the tests given in the *Edinburgh Pharmacopœia;* it is stated that genuine copaiba is perfectly soluble in the above quantity of alcohol.

On applying this test to the specimens, a perfect solution was formed with No. 1, but not with either of the others. After adding the alcohol, which was of specific gravity .795, to No. 2 and No. 3, a white floculent substance remained undissolved, and ultimately settled to the bottom. This substance was collected, and appeared on examination, to be the viscid resin of the copaiba, which, as met with in many specimens, is scarcely, if at all soluble, either in rectified spirit or in alcohol. I applied this test to several other samples of copaiba, which I believe to have been perfectly genuine, and obtained results similar to those afforded with Nos. 2 and 3.

The use of this test in the manner described may therefore lead to error, as it indicates the presence of impurity in cases where none exist. But this is not the only objection to this test. The evidence it affords of the presence or absence of substances which are insoluble in alcohol, is very imperfect. It is an error to conclude that a substance insoluble in alcohol, when added to that liquid alone, will therefore be insoluble if it be added when mixed with other bodies. The balsam of copaiba itself affords an illustration of this statement. This oleo-resinous substance consists principally of volatile oil and resin, which may be easily separated. The volatile oil is but sparingly soluble in alcohol, yet when mixed with the resin it is freely soluble. The same may be said of oil of turpentine and some of the fixed oils, which by themselves are either slightly or not at all soluble in spirit, but which, nevertheless, become freely soluble when mixed with other substances, such as camphor, resin, oil of lavender, and other volatile oils. Some of the resins, also, which, alone, are but little soluble in alcohol, may be readily dissolved when mixed with camphor, volatile oils, &c. The fact of an oleo-resinous substance being freely soluble in alcohol, is therefore no proof that it contains nothing mixed with it which by itself would be insoluble, or but slightly soluble in that menstruum.

B. A solution of one part of hydrate of potassa in two parts of water has been recommended as a good test. It is stated that such a solution, mixed with nine parts of genuine copaiba, will form a transparent mixture, which will continue clear after moderate dilution with water or rectified spirit; but if there be from three to six *per cent.* of fixed oil present, the mixture will be opaque.

This test, when applied to sample No. 1, formed a mixture which continued opaque for several days; it then separated into two strata, the upper stratum being oily or saponaceous and clear, and the lower stratum aqueous, clear and colourless, and forming about one-tenth of the mixture. On shaking the tube, the mixture became again opaque; when diluted with water, it was rendered perfectly milky; the addition of spirit rendered it rather more clear, but left it still slightly opaque.

The same test, applied to specimen No. 2, formed an opaque mixture, which, after standing for some days, separated into three strata. The top stratum, constituting nearly one-half of the whole, consisted of the volatile oil of copaiba; the middle stratum appeared to consist of the resin and potash in the form of a soap; while the lowest stratum was aqueous, clear, and colourless. On shaking the tube, the mixture became again opaque, and this continued after dilution with water or spirit.

The same test, added to specimen No. 3, formed a mixture that was but very slightly opaque. No separation took place in it after standing for several days, but it still retained a slight degree of opacity. On adding a little more of the copaiba to the mixture, and shaking them together, it became perfectly clear, thus proving that the quantity of solution of potash first added was rather more than the copaiba was capable of forming a clear mixture with. After obtaining the clear mixture in this way, it became quite opaque and milky on diluting it with water, and slightly opaque on adding spirit to it.

Finding that specimen No. 3 formed a clear mixture when rather less than the quantity specified of the solution of potash was added, I treated the other specimens with the solution of potash in several different proportions. No. 2 formed a mixture very nearly transparent, when only one-third of the specified quantity of the solution of potash was used; but a separation took place on letting it stand for some hours. No. 1, when mixed in this and several other proportions, still continued opaque.

It is very evident, therefore, that no satisfactory inference can be drawn, with reference to the purity of copaiba, from the application of this test.

C. Solution of ammonia of sp. gr. .960, has been recommended as affording a good test of the purity of copaiba. It is stated, that if one part of such solution of ammonia be added to three or five parts of genuine copaiba, the mixture will be clear, presenting a similar appearance to that of the copaiba before the admixture. If the mixture be opaque, it is said to be a sign of adulteration in the copaiba.

I believe this test has been more used and relied on than any other; but Dr. Christison has objected to it, on the ground that copaiba may be mixed with a sixth of its weight of castor oil without affecting the action of the test. I have found it liable to an objection of a different character, as the following experiments will show:

Specimen No. 1, when treated with the ammonia as directed, formed an opaque mixture, which continued so after standing for several days. The ammonia was added in a great many different proportions to this specimen, but in all cases the mixture was opaque.

Specimen No. 2, treated with the ammonia, formed at first an opaque mixture; after standing for two or three days, it separated into three strata in the same manner as the mixture of the same specimen with the solution of potash.

Specimen No. 3, when treated in the same way, formed a perfectly clear and homogeneous mixture, which retained this character after standing for a considerable length of time.

This test, therefore, in addition to the objection stated by Dr. Christison, may indicate impurity where none exists.

D. Pure copaiba is said to dissolve a fourth of its weight of carbonate of magnesia, with the aid of a gentle heat, and to continue translucent, the presence of a small proportion of any fixed oil being indicated by the product being opaque. This, again, is one of the tests given in the *Edinburgh Pharmacopœia.*

This test was tried on specimen 1, 2, and 3, and the results were nearly the same in each case. After adding the magnesia, applying the heat of a water bath for about half an hour, and stirring the mixture from time to time, on allowing them to stand for a few minutes, a portion of the magnesia settled to the bottom of each of the tubes in which the mixtures were made. The fluid, or semi-fluid, portion might probably be said to be *translucent*, but I presume the test would leave as many degrees of impurity undetected as there may be degrees of translucency, for, surely, a more indefinite indication could hardly be conceived. After standing for several days, there was found at the bottom of each tube a saponaceous mass, constituting from one-third to one-half of the whole, and a clear oily fluid above. Specimen No. 3 gave the largest quantity of the saponaceous mass, and specimen No. 2 the smallest.

This test is as valueless as those previously noticed.

E. The last test to which I shall allude is probably the worst of all. It is stated, that if one part of oil of vitriol be triturated with three parts of pure copaiba, a plastic reddish mass will be formed; but if the copaiba contains castor oil it will be scarcely or not at all coloured, and will acquire the consistence of turpentine.

I need hardly say that this statement is erroneous, and the test of no manner of value.

Having thus proved the worthlessness of these methods of detecting impurity in balsam of copaiba, it becomes an important question to determine whether there is any other less exceptionable method.

The consideration of this question involves a reference to the natural history and chemical composition of the different varieties of copaiba met with in commerce. What is the substance to be tested? Is it always the same, or do different specimens of it differ in their physical and chemical characters? The answers to these questions will be found to explain the discrepancies already noticed in the action of the foregoing tests on different samples of copaiba.

The substance called balsam of copaiba, is an oleo-resinous exudation, obtained from several species of the genus Copaifera, by making incisions into the trunks of the trees. It possesses most of the chemical characters of common turpentine. By distillation, or saponification, it may be resolved into a volatile oil and a hard resin. These exist in very different proportions in different samples of copaiba, depending, probably, upon the species of Copaifera from which it has been obtained, the soil and climate in which the trees have grown, and the length of time during which the copaiba has been kept. I have found the quantity of volatile oil to be twice as great in some samples as in others, and to this difference is chiefly to be ascribed the dissimilar action of the tests upon it. There is probably no simple test that could with any satisfaction be applied for the detection of impurities in a substance which is itself subject to such great varieties in composition.

The only method that appears to me to be at all satisfactory, of examining a sample of copaiba, with the view of estimating its purity and value as a therapeutic agent, is, first, to resolve it into its proximate constituents, and then to examine these separately, with reference to their physical and chemical characters. The volatile oil is generally considered to be the principal, if not the only constituent of copaiba, which possesses any medicinal activity. This may be separated by distilling the copaiba with water, and its physical characters are so well marked, that it is difficult to conceive an adulteration that would not be readily detected. The resin would of course be at the same time separated by the above process of distillation, and the consistence and other characters of this part of the constituents of the copaiba will afford the best means of judging of the presence or absence of any non-volatile impurities.

The proportion of volatile oil, in different specimens of copaiba met with in commerce, is in some cases as low as 30, in others as high as 60 per cent. The specimens No. 1 and 2, alluded to in the foregoing experiments, contain nearly 60 per cent. of volatile oil; they are therefore unusually rich in the most active constituent of the copaiba. This volatile oil has the same ultimate composition as the oil of turpentine, with which it closely coincides in the action produced by most chemical agents; but its taste, smell, and other physical characters, afford means of distinguishing it from that or any other substance with which it is likely to be mixed.

The proportions of resin, in different specimens of copaiba, also vary to about the same extent as those of the volatile oil, the quantity being greatest where the quantity of oil is smallest, and *vice versa*. The resinous part of copaiba differs but little from common resin, obtained from turpentine. It is considered to possess but little medicinal activity, probably not more than common resin.—*Pharm. Jour.*

ART. VI.—ON EXTACT OF INDIAN HEMP. By ANDREW ROBERTSON, ESQ., Professor of Chemistry to the Medical College, Calcutta. Communicated by Messrs. T. and H. Smith, of Edinburgh.

A NUMBER of pounds of the extract of hemp were prepared by me—I think upwards of thirty in all—for the purpose of having its medical properties fully tested by European medical men. A quantity went to Paris, another to Berlin, another to London, sent by different parties, and for my share of the matter I sent four pounds of it to Scotland, part of which went to you. I do not care about making more of it, as its preparation is most tedious and troublesome, in which I was tormented by the Excise regulations of the country, for both the plant and the spirits used are the subject of heavy duties and stringent precautions, and the cost price of the extract to me, counting nothing for trouble, was fully fifteen shillings per lb. Dr. O'Shaughnessy made his extract with alcohol, in a Papin's digester, at a heat above the boiling point of alcohol—the extract so obtained is brown; mine is of a deep green, and gives a grass green tincture to alcohol, and has six times the activity of the brown, as ascertained by trial on hospital patients. If a speedy effect is desired it is given as a tincture; if a deferred and protracted, as a pill.

As the process by which it was prepared is an idea of my own, since copied by others, and which probably may be claimed by them afterwards, I may mention it to you. It is a variation of the process of percolation, alcohol in vapour being the agent. A still was charged with strong spirits, and its nose introduced into the side of a cask in which the plant was pushed.

The vapour of the alcohol, and alcohol at a boiling heat thus acted on the plant, instead of cold alcohol in the usual mode of percolation. First issued a thin tarry matter containing much resin, latterly, a brown liquor containing little resin but much extractive. At this point water was substituted for the spirit in the still, and as much as possible of the spirit retained by the plant thus expelled from it. From the bottom of the cask a pipe led to a common condensing worm. Part of the alcohol was recovered from the fluid by distillation, the rest dissipated by evaporation in Wedgewood ware on a sand-bath, not exceeding the temperature of 150° Fahr. One hundred weight of the plant was used at one operation, and about eight pounds of extract obtained. The operation was conducted so slowly as in all its stages to last a fortnight.*

The extract of hemp has been long known in the East in a most widely extended range of countries, under the names of Gunjah, Churrus, Hashish, Beng or Bang, the emerald cup of Haider, &c., and under every name renowned for its exciting and narcotic qualities. It is used by the natives here in the same way as opium is by the Chinese, and on that account is the object of fiscal regulations and duties. It is known throughout all India, Arabia, Syria, and Egypt. You will find it in the *Arabian Nights*, translated by Lane, under the name of Beng, as the narcotic used by Haroun Alraschid, and others. There cannot, therefore, be a doubt that it is a drug nearly as active as opium.

The inactivity of the drug, therefore prepared in Britain, I can attribute only to faulty preparation and overheating, or to its being made from old and decayed plants. The

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* This plan of percolation by means of condensed vapour is the same in principle with that of C. A. Smith of Cincinnati, (see vol. 18th page 98 of this Journal) except that the latter has a condensing apparatus around the vessel containing the matter to be extracted.—W. P. jr.

good plant is of a greenish brown, the heads loaded with a sticky resin; the bad is palish brown and does not adhere to the fingers. The good extract gives a grass-green tincture, the bad a brownish. My extract was made from dried plants of good quality, as it cannot be readily obtained fresh in Calcutta.

Mr. Fordred stated, that it had recently come to his knowledge that some of the extract, sold in London as extract of Indian hemp, was made from the plant grown in the neighbourhood of London, and he believed it possessed but little, if any, of the narcotic properties of the Indian plant.* The extract made from the hemp (*Cannabis sativa*) grown at Mitcham, was of a green colour, and being apparently an aqueous extract contained but little resin, while that prepared from the plant grown in India contained a large proportion of resin. He thought it important, as many medical practitioners in different parts of the country were trying the efficacy of this remedy, that they should be cautioned to be particular in obtaining the extract of the *Indian* hemp.

Mr. Redwood said, that much of the extract made from the hemp plant imported from India, as well as the extract which had been imported ready made, was found to possess but little narcotic power when tried in this country; certainly they had not realized the expectations which were formed from the accounts of its action given by medical

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* This statement accounts for the remarkable variableness of the commercial extract. A few months ago I had occasion to send two ounces of extract of Indian hemp to a practising physician in Mississippi, who wrote back that half an ounce of it produced no sensible effect analogous to thetrue drug, whilst two grains of another lot, since forwarded, was sufficient for a dose! May not the first article (which is known to have come from England) have been prepared from *English hemp plant?*—W. P. Jr.

men in India. Dr. O'Shaughnessy, when last in this country, had admitted that the extract, even some that he had brought from India himself, had failed to produce the effects he anticipated, when tried in our hospitals: and he had undertaken, on his return to India, to have some extract very carefully prepared, and sent over to this country. Mr. Squire had received a quantity of this extract, and he presumed it was that alluded to in the paper just read, as having been made by Mr. Robertson.

Mr. Bartlett had witnessed the effect of a very small dose of extract of Indian hemp, obtained from Mr. Squire, on one of his assistants, and the action was that of a powerful narcotic. The young man stated that he felt all the symptoms of intoxication.

Dr. Ure had been recommended the use of extract of hemp, by his son; but although he tried it for some time, he never experienced the slightest effect from it. The extract was the same as the above, having been obtained from Mr. Squire.

The Chairman thought that the present state of medical knowledge, in reference to the action of Indian hemp, was very unsatisfactory and imperfect.—*Pharm. Journ.*

ART. LVII.—QUERIES RESPECTING RHUBARB CULTIVATED IN THE NEIGHBORHOOD OF BANBURY, (ENGLAND.*)

1. How many persons cultivate rhubarb for medical use in the neighborhood of Banbury? State their names, and the number of acres occupied by each person.

2. For how many years has medical rhubarb been cultivated in that locality? What number of persons are employed in its cultivation and preparation for the market.

3. Is more than one species cultivated? If so, how many? By what names are they popularly distinguished? Specimens of all the species cultivated, either fresh or carefully dried, should be forwarded. The specimens should include *root*, *stem*, *leaves*, *flowers* and *seed.*

4. At what age and in what season is the root dug up for medicinal use? What are the uses respectively made of the root-stock and root-branches? Are both employed for yielding the medicinal rhubarb of the shops? Is the stick English rhubarb prepared from the root-branches?

5. Describe the mode of preparing the root for the market; including the cleaning, slicing, drying, and other operations. Is the root dried at ordinary temperatures in the air, or by the aid of artificial heat? If the latter, is it effected by the heat of a stove or a kiln; and at what temperature? What varieties are made of it in commerce, and what are the names by which these are known?

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* The following queries and answers respecting English rhubarb were given and received by one of the Standing Scientific Committees of the Pharmaceutical Society of Great Britain. It is probable that a similar action on the part of our College would elicit much interesting information relative to some of our indigenous drugs. The collection of Seneka, Spigelia, Serpentaria, the cultivation and manufacture of the Castor bean, and various other subjects, might be illustrated by apothecaries resident in the regions where they grow, and such information communicated for this Journal would be particularly acceptable.—W. P., Jr.

6. What uses are made of the *leaves* and *leaf-stalks?* Are the latter sold for the table? Is wine ever prepared with them? If so, a sample to be sent. Is there reason to suspect that the leaves are used for adulterating tobacco?

7. Which is the principle mart for English rhubarb root? Is it entirely consumed in England, or is any of it exported? What is the average price of it?

8. Is rhubarb cultivated in other parts of England for medicinal use? If so, where and to what extent?

ANSWERS TO QUERIES RESPECTING THE CULTIVATION OF ENGLISH RHUBARB, NEAR BANBURY.

By Mr. William Bigg.

1. Three parties cultivate rhubarb root for sale, in the neighborhood of Banbury, viz. Rufus Usher, of Overthorpe and Bodicott; Thomas Tustian, of Milcombe; and Edward Hughes, of Neithorp. The exact number of acres is not known, but probably does not exceed twelve altogether. On some portion of such land other crops are occasionally grown.

2. The cultivation of rhubarb for medicinal use was first undertaken in this neighbourhood by a surgeon and apothecary, named Hayward, about fifty years ago. That gentleman died in the year 1811. His widow (of a second marriage) is living, and states that Mr. Hayward, having communicated the results of his experiments to the Society of Arts, in London, received from them two medals—one of gold, the other of silver. The number of persons employed in the cultivation, &c., does not, probably, exceed six or eight—men, boys, and sometimes women.

3. Only one species is in cultivation for medicinal sale; *Rheum Rhaponticum.* It has no distinctive popular name. Specimens of the seed and of the prepared root are forwarded. (The stem and leaf procured are decayed.)

4. The root is suffered to grow from three to four years

in the ground, and does best in a light sandy soil.* If it were allowed (if they could afford to let it) to grow longer it would be all the finer and better. It is dug up in the month of October, or sometimes November. The root stock is what they call *"trimmed"* in large pieces (as specimens sent.) The root branches (*"fibres"*) go into the market as *"cuttings."* The third form in which it enters into commerce is that of *"raspings,"* these being the produce of the process of "trimming." The cuttings are most likely to acquire the name of the *"stick English rhubarb."*

5. The slicing, &c., I must defer till further information can be obtained, observing that I believe there is some precaution necessary in barking or stripping the root, so as not to pull off more than the true rind.

The root is dried in "drying-houses," heated by stove pipes or brick flues. The root when prepared for the drying house, is placed on a flat piece of basket work—some three feet long by two feet wide, and that is suspended by means of strings from above, over the pipe or flue—first at a considerable elevation (similar shelves containing root in a more advanced condition intervening), and gradually nearer as the process matures. There is great care requisite in conducting the process of drying—in *graduating* it; for if the root in a recent condition were subjected to the temperature to which it should be subjected in the final stage, it would become unsaleable, and they say "black in the *inside.*" The "cuttings," "fibres," or root-branches, are pierced and strung, and so hung up in the drying-house. The trimmed are pierced only to give them uniformity of appearance with the foreign.

6. Of the leaves, I believe no use is now made, except the use common to all vegetable offal—manuring. The leaf stalks are now very partially sold for the table. In former

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* Mr. Atkins, of Northampton, who is an authority on such things in general, says that a cool rich soil suits it best.

years, the sale of the leaf stalks formed a part of the trade, but it can scarcely be said to do so now. Wine has been occasionally made of them, but not to any important extent. Curious housekeepers here and there make a little to increase the variety of the table at the village " wake." The leaves were some years ago in demand (as I have reason to think) for the adulteration of tobacco, or the manufacture of cigars, but are not at present.

7. The principal, and with a small exception, the only mart for English rhubarb root is London. It is there purchased by the wholesale druggists, who would probably state that a great part of it is subsequently exported. Some of it is sold no doubt to the Jews and Turks *as English*, but I strongly suspect that a much larger portion is sold to the Christians as *foreign*.

The "cuttings" make, I dare say, a very decent powder, mixed according to conscience with East India Rhubarb. The price is variable, and though I have often in the course of the last ten years heard it quoted, I cannot trust my memory for a figure.* The "trimmed" is of course the highest —from two-thirds more to double the price of the "cuttings."

I have heard it stated on computation that not less than about twenty tons are, in the various forms described, annually sent into the market.

8. I know of no other place in which rhubarb is grown for medical purposes in a wholesale way. A field of rhubarb when in flower—the stalks from six to ten feet in height—has a very striking appearance, and cannot be passed without observation.

The leaf-stalk grown in private gardens is not unfrequently preserved with sugar, and is recommended in that form by Dr. Kerr, of Northampton as a laxative.—*Pharm. Journ.*

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* The large pieces fetch more, in proportion to their sizes. The prepared root is rubbed over with powder, and sometimes when damp with ochre.

ART. LVIII.—ON THE PREPARATION OF LACTIC AND BUTYRIC ACIDS.

By A. Bensch.

In the preparation of lactic acid according to the process of M. Gobley, there is nothing to show when the metamorphoses of the sugar into lactic acid has been effected, as he employs so much water that the lactate of lime formed remains almost wholly in solution. But since the formation of butyric acid begins as soon as the production of lactic acid is terminated, a great loss of lactic acid may readily occur, which may be easily prevented by using a smaller quantity of water. The addition of tartaric acid to the solution of sugar, in order to convert the cane into grape-sugar, and the addition of stinking cheese, facilitates the formation of lactic acid, and prevents the contemporaneous production of large quantities of butyric acid.

The circumstance that the lime-salts prevent the separation of the otherwise so sparingly soluble salts of zinc and protoxide of iron, does not allow of the employment of the lime-salt in the preparation of the above salts; and I therefore prefer decomposing it with sulphuric acid, and combining the lactic acid with oxide of zinc, as the purification of the lactate of zinc and the separation of the lactic acid from it present no difficulties. The mixture which I use for the preparation of lactic acid is essentially the same as that employed by Pelouze and Gelis for the preparation of butyric acid.

Lactic Acid.—6 lbs. of cane-sugar and ½ oz. of tartaric acid are dissolved in 26 lbs. of boiling water, and set aside for some days; upon this, 8 oz. of old stinking cheese, well diffused in 8 lbs. of curdled acid milk from which the cream has been removed, are added to the above mixture along with 3 lbs. of finely-powdered chalk, the whole located in a warm place, so that the temperature of the liquid is from 86° to 95°. It is well stirred every day several times; in the course of 8 to 10 days the entire mass solidifies to a stiff paste of lactate of lime; 20 lbs. of boiling water and ½ oz. of caustic lime are added to this paste, boiled for half an hour, and filtered through a linen bag. The liquid is evaporated to the consistency of a syrup, set aside for four days, in which time the lactate of lime has separated in a granular crystalline form; it is expressed, then agitated with one-tenth its weight of cold water, again submitted to pressure, and this operation repeated two or three times.

The lactate of lime, after being expressed as well as possible, is dissolved in twice its weight of boiling water; and for every pound of expressed lactate of lime, 3½ oz. of sulphuric acid previously diluted with its weight of water added to the solution. The hot liquid is immediately filtered through a conical bag from the gypsum, and boiled with 1⅜ lb. of carbonate of zinc for every 1 lb. of sulphuric acid used for a quarter of an hour; if boiled longer, a very insoluble basic salt is formed. The solution, filtered boiling hot, soon deposits perfectly colourless lactate of zinc in crystalline crusts, which may be obtained perfectly free from sulphuric acid by rinsing with cold water. The mother-ley is again boiled with any of the salt which may have remained on the strainer, or concentrated by evaporation. It yields, nearly to the last drop, perfectly white zinc salt.

To separate the lactic acid from this salt, I dissolve it in 7½ parts of boiling water, pass a current of sulphuretted hydrogen into the hot liquid until it has become cold, and no further separation of sulphuret of zinc is perceptible. The liquid filtered from the sulphuret of zinc is boiled to expel the excess of sulphuretted hydrogen, and then evaporated in a water-bath to the consistence of a syrup. 8 parts of lactate of zinc yield in this manner 5 parts of perfectly pure syrup lactic acid.

Butyric Acid.—When the above mixture of sugar, chalk, &c. is left longer than ten days at 95°, and the evaporated water renewed, the mass again becomes liquid, gas bubbles are given off, and in from five to six weeks the lactic acid is converted into butyric acid, and the evolution of gas ceases. The liquid is now mixed with an equal volume of cold water, and a solution of 8 lbs. crystallized soda added; the corbonate of lime collected on a filter, and well washed; the liquid evaporated to 10 lbs., and mixed cautiously with 5½ lbs. of sulphuric acid, which has previously been diluted with an equal weight of water. Butyric acid separates as a dark-coloured oily layer upon the solution of the bisulphate of soda, and can be readily separated by a separating funnel. The solution of bisulphate of soda is submitted to distillation, the product saturated with carbonate of soda, the butyric acid likewise separated after evaporation by sulphuric acid, and the crude butyric acid rectified, after the addition of 1 oz. of sulphuric acid for every pound, in order to prevent the separation of anhydrous sulphate of soda, which would cause a violent thumping. The dilute rectified butyric acid is saturated with fused chloride of calcium, which separates the acetic acid, and then again submitted to distillation. The first portion that passes is dilute butyric acid containing traces of muriatic acid; this is succeeded by concentrated butyric acid, and there is left in the retort a small quantity of chloride of calcium and brown-coloured butyric acid.

Pelouze and Gelis distilled the crude butyrate of lime with muriatic acid; this operation requires very large retorts, as a violent frothing is unavoidable; moreover, by this method the butyric acid is rendered very impure by muriatic acid, two evils which are avoided by the method I have proposed. I obtained from 6 lbs. of cane-sugar 28 oz. of pure concentrated butyric acid.—*Ch. Gaz., from Liebig's Ann.*

ART. LIX.—ON THE PREPARATION OF INDIA-RUBBER BY VULCANIZATION AND CONVERSION.

By Mr. Brockedon.

Mr. Brockedon's object in this communication was to describe, —1st, a mode of treating India-rubber by which new properties are imparted to this substance; 2d, the new uses in the arts to which these acquired properties now render India-rubber applicable. *Vulcanization* and *conversion* denote that combination of India-rubber with sulphur from which the new properties about to be described result. The process of conversion consists in submitting India-rubber to the action of bisulphuret of carbon mixed with chloride of sulphur. The caoutchouc cannot, however, be penetrated by this process to any depth; and therefore it is inapplicable when the mass to be acted on is thick. The process of *vulcanization*, which seems to be more applicable, is the result of many experiments made by Mr. Hancock; who found that caoutchouc, when immersed in a bath of fused sulphur, heated to various temperatures, by absorbing the sulphur, assumed a carbonized appearance, and lastly acquired the consistency of horn. It was in the course of these changes that it attained the state of vulcanization which Mr. Brockedon afterwards described. The same vulcanized condition can, however, be produced either by kneading the India-rubber with sulphur and then exposing it to a temperature of 190°, or by dissolving the India-rubber in any known solvent, as turpentine, previously charged with sulphur. Having thus explained the processes, Mr. Brockedon described the effect which they produced on the caoutchouc:—1st, the India-rubber, thus treated, remains elastic at all temperatures; in its ordinary state it is quite rigid at a temperature of 40°; 2d, vulcanized caoutchout is not affected by any known solvents, as bisulphuret of carbon, naptha, or turpentine; 3d, it is not affected by heat short of the vulcanizing point; 4th, it acquires extraordinary powers of resisting compression. Thus, a cannon-ball was broken to pieces by being driven through a a mass of vulcanized caoutchouc—the caoutchouc itself exhibiting no other trace of its passage than a scarcely perceptible rent. The applications of this substance appear to be almost infinite. Our readers are familiar with the usefulness of the "elastic bands;" but they may not be aware that the same fabric, adjusted in size and strength to the purpose required, furnishes springs for locks and for the racks of window-blinds. It is also capable of being moulded into the most intricate ornaments; its characertistic elasticity removing all embarrassments in relieving the undercut parts. It furnishes impervious bottles for volatile substances, like æther; as well as an excellent ink-stand. It is adapted to protect from corrosion, wires subjected to the action of the sea, as is the case of the wires required for the projected electric communication between England and France. For the same reason, air-tubes of vulcanized rubber are better suited for life-boats than those formerly made of canvass, which are liable to be destroyed by the action of the water. A similar tube has been used with success as a substitute for an iron band as the tire of a carriage-wheel; and it is stated that a vehicle so arranged runs much easier than on the present plan. But perhaps the most important application is in its use in railroads and railroad carriages. In the former, it is laid between the rail and the sleeper, and thus prevents the rails from indicating any traces of the pressure; and the springs connected with the buffers of the latter, when formed of vulcanized caoutchouc, can neither be broken, nor can their elasticity be surmounted by any degree of concussive violence. In conclusion, Mr. Brockedon exhibited objects illustrative of the great physical change induced on caoutchouc by vulcanization. He showed a screw, with its recipient, both made of this substance, as well as a form of letter-press (like a stereotyped page) for printing. He also noticed its usefulness in making epithems for surgical purposes, gloves and boots for gouty persons, &c.—*Chem. Gaz. from Proceedings of Royal Institution.*

ART. LX.—PHARMACY IN SPAIN.

By M. Orfila.

There are in Spain two pharmaceutical faculties, one in Madrid, the other in Barcelona; the title of Doctor in Pharmacy is, however, granted only in Madrid. For the faculty of Pharmacy, there is in Madrid a large and noble building, containing rooms for the different offices, lecture rooms, apartments for the meetings of the faculty, public *concours*, &c., as well as for the different mineralogical, zoological, chemical, and pharmacological collections. There are besides several laboratories, one of which, under the direction of Professor Camp, is especially intended for the use of the students of the pharmaceutical department during their course of studies. With regard to the botanical garden belonging to the faculty, Orfila observes, that it is not sufficiently ample, and the students of Pharmacy are consequently under the necessity of proceeding to the Royal Botanical Garden, which is however at once the pride and ornament of the metropolis.

The whole course of pharmaceutical studies occupies, like that of medicine, nine years; that is, in case the candidate aspires to the rank of Doctor in Pharmacy. The majority of students are however satisfied with the degree of Licentiate of Pharmacy, to obtain which, only seven years study are necessary. This degree ranks with that of Licentiate in Medicine, and entitles the possessor to practice Pharmacy throughout the whole kingdom; while the doctors of Pharmacy are, in addition to this, qualified for the public offices of instruction, such as *Agrégés* and Professors in Pharmacy.

At the expiration of the fifth year, every student in Pharmacy is expected to pass an examination as *Baccalaureus pharmaciæ*, which title is merely honorary, and does not allow of his practising Pharmacy independently. In order to be enrolled among the students of Pharmacy a good education is indispensable, and candidates are required to pass the *examen philosophicum*, besides devoting at least one year to the study of general chemistry, mineralogy, zoology, and botany. After these preliminary examinations, the student commences at the College during

The First Year.—Special mineralogy and zoology, with reference to Pharmacy and description of pharmaceutical preparations, three times a week, under Professor Lallana.

Second Year. — Pharmaceutical botany and Materia Medica, with special description of the plants used in Pharmacy, three times a week, under Professor Leon.

Third Year.—Chemistry of inorganic substances and pharmaceutical chemistry, three times a week, with Professor Ximenes.

Fourth Year.—Chemistry of organic substances and chemical Pharmacy, three times weekly, with Professor Rioz.

Fifth Year.—Practical instruction in all pharmaceutical operations, with Professor Camp.

Sixth and Seventh Years.—Pharmaceutical practice in a dispensing establishment.

Eighth Year.—Chemical analysis of alimentary substances, drinks, mineral waters, poisons, &c., with Professor Pow, who likewise directs the studies of the medical students in this particular branch.

Ninth Year.—Bibliography, history, and literature of medicine and pharmacy, by Professor Asuero of the faculty of medicine.

According to Orfila, the professors of pharmacy, like those of medicine, lecture without notes, and distinguish themselves by a profound knowledge of their profession. With regard to the course of pharmaceutical studies, he remarks that greater attention seems to be bestowed upon the theoretical than the practical education, and that the materia medica, practical pharmacy, and toxicology, appear somewhat neglected when compared with other branches. There is in this respect a striking contrast between the system of pharmaceutical education in Spain, and in this country. In Spain, too little attention is paid to practical pharmacy, while, in Great Britain, the theoretical education of pharmaceutists is (so far as the legislature is concerned) entirely neglected. The preliminary liberal edudation, strictly enforced in Spain before the students of pharmacy can be enrolled before the faculty, is, we think, highly creditable to the Spanish profession, and is, to a certain extent, worthy of imitation in this country. The entire course of study at the Spanish institution (nine years) is prolonged to an unnecessary extent. Supposing the preliminary examination to be passed at the age of sixteen or seventeen, a course of pharmaceutical studies extended over four or five years, including the time occupied in the shop, would be, in our opinion, quite sufficient to enable the student to qualify himself for a good practical examination in pharmacy. Orfila seems to think that a period of eight years ought to be allowed for the qualification, and that the student should begin with the theoretical portion, and occupy the sixth and seventh years in the dispensary, to obtain a knowledge of the practical part of his profession. In Buchner's *Repertorium für die Pharmacie* quite a contrary view is taken, and the German system of commencing with the practical part is defended. The writer in the *Repertorium* thinks that the student of pharmacy, after five years studies at the university, will scarcely be induced to accommodate himself to the dry and often disagreeable duties of the shop. We consider that the two departments of the pharmaceutical education ought to be continued together. The neglect of either the theoretical or practical portion, must of necessity detract from the efficiency of the pharmaceutical Chemist.

All students should attend a regular course of lectures, as well as of practical chemistry in proper laboratories, at the same time keeping in view the necessity of unremitted attention to the ordinary duties of the profession from which they are to derive a subsistence.

At the expiration of each year the student in Madrid is examined by two professors and one *agrégé,* as to his progress during the year. At the licentiate examination at the end of the seventh year the candidate is examined *orally*, in *writing*, and also practically in *chemical analysis.* The examination is quite as severe as that for the corresponding degree of licentiate in medicine. The examination for the degree of Doctor in Pharmacy is passed by comparatively few persons, the ordeal being very severe, and the vacancies at the faculty occurring at rare intervals. The pharmaceutical faculty in Madrid consists of the above-mentioned six professors and three *agrégés*, or assistant professors. Of the latter, one acts as secretary to the faculty, another as librarian, and the third as director to the laboratory. In 1842, the number of students of pharmacy registered by the faculty was 650, in 1843 it had increased to 780.

The fees are as follows :

Registration for first year	55	Francs.
Total for the five following years	275	"
Degree of Bachelor of Pharmacy	125	"
——— Licentiate	750	"
Total	1205	"
(Or rather more than £48 sterling.)		
The degree of Doctor of Pharmacy, *rarely taken*	750	"
	1955	"
(Or about £78 sterling.)		

The above abstract of the papers on medicine and pharmacy in Spain, by Orfila, has reference to the state of these sciences subsequently to the reform of 1835. Prior to that period the medical institutions of the kingdom were submitted to a board of medicine, appointed by the minister or by the crown, and subject to all the inconveniences attending a close connection between science and power. The distinction between physicians and surgeons was rigidly observed, and government situations given to the most subservient. The physicians in Spain seemed inclined to be more liberal than their opponents the surgeons, and with few exceptions joined the constitutional party of 1820. Upon the overthrow of this party in 1823, King Ferdinand revenged himself upon the liberal physicians by a decree converting surgeons into physicians, surgical colleges into medico-chirurgical, and granting the title of *medico-cirujanos* to a great number of young surgeons and students. No physician was permitted to enjoy any medical post at court, or in any of the public establishments, hospitals, &c. This state of affairs lasted quietly until the death of this medical reformer, when a contest arose between the physicians and medical colleges or surgeons appointed by Ferdinand. At length, by a royal decree of Christina, a medical commission of five members was appointed to consider the state of medicine in the kingdom and to draw up a plan for the necessary reform. The result of their deliberations has been briefly given in this paper and may propably be interesting to the medical reformers of our own country.

Preamble to the Royal Decree, appointing a Commission of Five Persons with a Secretary, to consider and report upon the modifications necessary for the Medical Reform in Spain.

"Animated by pure zeal for the preservation of the Public Health, and convinced of the necessity of rendering uniform the studies which are the basis of the healing art in all the Colleges and Universities now existing, or which hereafter may be founded in the kingdom; persuaded also of the advantage of duly honouring those who dedicate themselves to a profession as noble as it is necessary; I have thought well to institute a Commission, which may examine and propose to me such changes as the laws now in force may be susceptible of, and of whatever else, in the opinion of the Commission may contribute to the lustre of the Profession and the welfare of the Public."—*(Bulletin de Medecina, Cirugia, y Farmacia, Madrid,* 1835, *from Gaz. Med. de Paris and Jour. de Pharm.)* *Pharm. Jour.*

ART. LXI.– EXPERIMENTS ON THE DETECTION AND QUANTITATIVE DETERMINATION OF STEARINE AND STEARIC ACID IN WAX.

By E. Geith.

Carbonate of soda affords a ready method of detecting the adulteration of wax by stearic acid. When pure white or yellow wax is boiled in a porcelain dish with an equal weight of carbonate of soda and 6 parts of water, constantly stirring until a layer of carbonate of soda begins to form at the bottom of the dish, a tolerable quantity of the wax itself is saponified. If the mass, while still hot, is treated with 6 times the weight of the wax of alcohol of 0.80 spec. grav. and the whole then rubbed to a powder, with a gradual addition of from 16 to 18 parts of alcohol of 0.50 spec. grav., until the insoluble portion remains suspended in the liquid, a considerable precipitate is produced in the filtered solution by an acid. When, therefore, wax is tested with carbonate of soda for stearic acid, this substance saponifiable by soda must be previously extracted, which may be done with alcohol. In examining wax, it should first be tested for stearic acid; about 2 drms. of the sample to be examined are digested for some time in a flask with 1 oz. of lime-water and 1 oz. of distilled water, when the liquid, if stearic acid be present, loses its alkaline reaction. Regnault has, it is true, asserted that a precipitate of stearate of lime is deposited from the liquid, but the author was never able to obtain any such precipitate; on the contrary, even turbid lime-water became clear on digestion with the wax. When the absence of stearic acid has been thus ascertained, 1 drm. of the sample of wax is boiled for a few minutes in a flask with 2 oz. of alcohol of 0.80 spec. grav., and the whole poured into 1 oz. of alcohol of the same strength; after a few hours the finely-divided wax is collected on a filter and washed with 2 ounces of the same alcohol. The wax on the filter is pressed between two porous tiles till nearly dry; it is then carefully transferred into a porcelain dish, and boiled with 1 drm. carbonate of soda and 6 drms. of distilled water, stirring the whole time, until some carbonate of soda begins to form on the bottom of the dish ; 1 oz. of alcohol of 0.80 is added to the warm mass, and the mixture stirred gradually, adding some ounces of alcohol of 0.50, until the insoluble portion is converted into fine powder. When it has become perfectly cold, it is poured upon a filter, and edulcorated with alcohol of 0.50, until acetate of lead no longer produces any opacity; the whole is then evaporated to 1 oz. The residue is filtered when cold, and washed with weak spirit. The liquid which passes is well shaken in a phial with 2 to 4 per cent. of stearic acid or stearine, a considerable froth is formed, which persists from half an hour to an hour; with pure wax the frothing is very slight, and it soon disappears. To further test the liquid, an excess of acetic acid is added to it; if the wax was pure, there is at the utmost only a faint opalescence; but if it contain stearine or stearic acid, a precipitate is formed, especially on shaking. If it is desired to determine the amount of these impurities, the liquid is not treated with acetic acid, but with acetate of lead, as long as a precipitate is formed, and the liquid then acidified with acetic acid. When the precipitate has subsided, it is collected on a weighed filter, and washed with distilled water until the liquid which passes through is no longer coloured by sulphuretted hydrogen. If the wax was pure, the quantity of the precipitate from 1 drm. only amounts from one-half to two-thirds of a grain; if it contained 10 per cent. stearine, it amounts to 2 to 2½ grs. The quantity of the precipitate is not constant, and it is far more easy to determine the stearic acid than the stearine, for with 5 per cent. of the former the precipitate amounts from 2 to 2⅔ grs. M. Buchner states, in a note to the above paper, that he has convinced himself of the practicability of the above method.—*Chem. Gaz., from Buch. Rep.*

ART. LXII.—ON ARTIFICIAL BLUE COPPER, (COPPER-INDIGO.)

By A. and C. Walter.

The monosulphuret of copper, hitherto artificially obtained either by precipitating persalts of copper with sulphuretted hydrogen or by treating the sesquisulphuret of copper with cold concentrated nitric acid, is generally not blue like copper-indigo, but dark-green or brownish-black; if, however, the precipitate obtained with sulphuretted hydrogen is dried at a moderate temperature, it frequently yields a greyish-black powder, which under a steel polisher, gives a faint steel-blue streak, especially when it is fixed by means of size upon paper, and after drying burnished with the polishing steel. According to the observations of Covelli respecting the formation of blue copper at Vesuvius, it appears as if it were produced by the long-continued action of sulphur upon persalts of copper; and the authors therefore attempted to prepare it in a similar manner. After numerous experiments, they found the following process to be the most advantageous:—Pure sulphate of copper is dissolved in hot water, dilute solution of caustic potash or soda added to it until nothing further is precipitated; the precipitate is then washed in hot water, and dried at a high temperature, until the entire mass has become converted into black oxide. 1 part of this oxide is now heated in an open dish with 1 part sulphur and ½ part chloride of ammonium until the sulphur takes fire; while the sulphur burns, the mixture is well stirred, covered from time to time with a loose lid, removed from the fire for a time, and a fresh quantity of 1 part sulphur and ½ part chloride of ammonium added, the dish covered and again exposed to a gentle heat. When the dish has been left covered for some time, it is removed from the fire and allowed to cool and the lid taken off, when, if the right time has been hit, a portion of the sulphur will be found sublimed, and this should then be furthered by gentle heat. If the mass does not possess a dark blue, but still a black colour, it must be mixed with more sulphur and chloride of ammonium, and heated as above, constantly taking care, however, that the temperature is not too high; it is on that account advisable to add from time to time fresh portions of powdered chloride of ammonium. The indigo-blue or dark-black powder thus obtained is now finely ground, and washed with a sufficient quantity of water to remove all chloride of ammonium; to get rid entirely of the sulphur, the well-washed powder is boiled with a strong solution of potash or soda until no more sulphur is removed. It is frequently requisite to wash the compound, which has been well exhausted with boiling ley, and to treat it with fresh ley. The mixture might also contain undecomposed oxide of copper, which could be removed by digestion with caustic ammonia, but not without occasioning some loss of sulphuret of copper. However, when the operation is well conducted, especially with repeated additions of sulphur and chloride of ammonium, no such impurity will easily occur. The residuous mass is now well-washed with water, to remove all adherent potash and soda. The sulphuret of copper so obtained forms an indigo-blue or blackish blue dull powder, which when burnished with a polishing steel assumes a beautiful steel-blue tint. Ground up with oil or varnish, it affords a beautiful violet-blue. It can be prepared equally well from metallic copper, or by mixing the dry monosulphuret of copper with sulphur and chloride of ammonium, and treating it as above directed. Carbonate of copper would answer equally well, as also the nitrate, but not the chloride.

The compound described exhibits the same behaviour as the monosulphuret obtained by precipitating persalts of copper with sulphuretted hydrogen; but it is not dissolved so easily by cyanide of potassium or sulphuret of ammonium; but it dissolves readily in ammonia when air is allowed access, forming ammoniacal oxide of copper and depositing sulphur. The authors have not yet made any analysis of this compound, but it is very probable that its composition is identical with that of blue copper. It is more difficult to answer the question whether it has the same composition as the bluish sulphur compound prepared by Winkelblech. The samples made by the authors, according to the method described by Winkelblech, did not possess the beautiful blue colour of the compound described.—*Ib.*

ART. LXIII.—ON CITRATE OF MAGNESIA, AND A PURGATIVE WATER MADE WITH THIS SALT.

By M. Roge Delabarre.

On making some experiments with the salts of magnesia, I had occasion to observe that the citrate of magnesia is devoid of the bitter and disagreeable taste which characterize the other soluble salts of this base.

This result, which at first surprised me, appeared less extraordinary on considering that of all the soluble salts of iron, the citrate is almost the only one which is free from the particular taste that distinguishes the ferruginous salts.

Experiments founded on these observations, led to the conclusion that these facts, so far from being exceptions, may be taken as illustrations of a law which may be thus generalized:—That, *of all the salts of any base, the citrate* *is that in which the taste peculiar to the base is to the greatest extent lost.*

Citric acid, which appears to have the property of thus modifying the taste produced by the base with which it may be combined, is obtained in several states. It contains sometimes three, sometimes four, and sometimes five atoms of water.

According to Liebig, the formula for citric acid, such as it is met with in combination with oxide of silver, is $C_{12}\,H_5\,O_{11}=\overline{Ci}$.

Crystallized citric acid, dried at 212°, contains $C_{12}\,H_5\,O_{11}+3\,H\,O=\overline{Ci}+3\,H\,O$.

If it be crystallized from a boiling solution, it will contain $C_{12}\,H_5\,O_{11}+4\,H\,O$; and if crystallized by spontaneous evaporation at 68° Fahr., its composition will $C_{12}\,H_5\,O_{11}+3\,H\,O+2\,H\,O=Ci+5\,H\,O$.

Citric acid is a tribasic acid, it forms with bases neutral salts, acid salts, and basic salts.

In the neutral salts, each atom of acid is combined with three atoms of base. These salts are represented by the following formula : $\overline{Ci},\ 3\,M\,O+Aq$. Their composition, is, therefore, analogous to that of the acid, with four atoms of water. The water of hydration in these salts may be replaced by an atom of metallic oxide, when basic salts are formed. These have an atom of water of crystallization, which they lose at common temperatures, as the salt of silver, or at a higher temperature. They are therefore analogous to the acid with five atoms of water. The composition of the basic salts when dried, is $\overline{Ci},\ 3\,M\,O+M\,O$.

The citrate of magnesia, which forms the subject of this notice, is a salt but little known, being scarcely mentioned by chemists. Liebig, in his *Traité de Chimie Organique*, merely says, "Magnesia, alumina, and protoxide of manganese, form, with citric acid, neutral insoluble salts, and soluble salts which are acid."

Berzelius, in the eighth and ninth volumes of his *Traité de Chimie*, which treat of the salts of magnesia, mention the oxalate, the acetate, and the tartrate, but not the citrate. In his theory of chemical proportions he gives the following composition for the citrate:—Magnesia, 26.12; citric acids 73.88; but no account is here taken of the water of crystallization, which the salt contains.

Citrate of magnesia may be obtained in two different ways. It may be made by double decomposition from sulphate of magnesia and citrate of soda, or by saturating a solution of citric acid with magnesia or the basic carbonate. If it be prepared by saturating a solution, somewhat concentrated, of the acid, the liquor which is at first liquid and transparent, becomes in an instant a hard mass, adhering strongly to the sides of the vessel in which the combination is effected. This arises, probably, from the water which at first holds the salt in solution, passing to the state of water of hydration.

The neutral citrate of magnesia, prepared by either of the processes above described, is a white pulverulent insipid salt, soft to the touch, heavier than magnesia, and soluble in water aided by the addition of a slight excess of the acid. This solution has a slightly acid taste, but is in no way disagreeable.

A small quantity of the citrate of magnesia having been put into a glass tube and heated over the flame of a lamp, aqueous vapour was disengaged and condensed at the other end of the tube. On further heating the tube, white inflammable vapours were given off, in which carbonic oxide and acetic acid were distinguished.

One gramme of citrate of magnesia, dried *in vacuo*, and then strongly calcined in a porcelain capsule, left a white residue, consisting of pure magnesia, and the weight of which was 0.170.

Citrate of magnesia may, therefore, be considered as having the following composition:

1 eq. Citric acid, . .	2511.25	55.3
3 eq. Magnesia, . .	774 00	17.2
1 eq. Water of Constitution,	112.50	2.5
10 eq. Water of Crystallization,	1125.00	25.0
	4522.75	100.0

There is the same quantity of oxygen in the water present as in the acid.

I propose the following preparation for the administration of citrate of magnesia:

SEIDLITZ WATER FREE FROM BITTERNESS.*

Or, Purgative Mineral Water of Citrate of Magnesia.

No. 1 (mild.)

	grammes.		grains.
Citrate of Magnesia, . .	40	=	617.360
Citric Acid, ...	2	=	30.868
Simple Syrup, . . .	125	=	1929.252
Essence of Orange, . .	q.s.		
Water charged with Carbonic Acid,	q.s.		

to fill a common mineral water bottle, containing 750 grammes (about the size of a wine bottle.)

No. 2 (strong.)

	grammes.		grains.
Citrate of Magnesia, . .	50	=	771.701
Citric Acid, ...	2½	=	38.585
Simple Syrup, . . .	150	=	2315.103
Essence of Orange, . .	q.s.		
Carbonic Acid Water, . .	q.s.		

for a wine bottle.

The following is the formula for making 100 bottles of

---

* The common *seidlitz water*, as made on the continent, contains sulphate of magnesia.

the above, each containing 50 grammes, or 771 grains of the citrate:

Dissolve 6 pounds 9 ounces and 364 grains (avoirdupois weight) of crystallized citric acid in 22 pounds of water, and add to the solution 1 pound 5 ounces and 83 grains (avoird.) of calcined magnesia. When the combination has been effected, filter the solution, and add to it 33 pounds (avoird.) of simple syrup flavoured with essence of orange. Distribute this solution in one hundred wine quart bottles.

Then—

Precipitate 2 pounds 10 ounces and 145 grains (avoird.) of sulphate of magnesia, with a sufficient quantity of carbonate of soda, in the usual way; wash the precipitate, put it into a proper apparatus, with about 90 pints of water, and pass carbonic acid through it until the magnesia is dissolved. This being effected, use the solution thus formed to fill up bottles into which the previous solution has been put.

Report by Messrs. Renauldin and Soubeiran on the above Mineral Water.

The proportion of magnesia in the citrate is sensibly the same as that in an equal weight of the crystallized sulphate, but the former salt is not so powerful in its medicinal effects as the latter, the fifty grammes or 771 grains of citrate contained in the bottle of mineral water, being about equal in effect to thirty or thirty-five grammes (463 or 540 grains) of crystallized sulphate.

Notwithstanding the large quantity of citrate in the mixture, the taste does not at all indicate the presence of any salt; it resembles lemonade in flavour, and acts as a purgative, quite as well as the ordinary seidlitz water. It certainly affords, from its agreeable taste, a good method of overcoming the repugnance of some patients to purgative medicines. It occasions neither thirst nor tenesmus, and but little pain during its operation, it may therefore be said that it operates safely and agreeably. Our observations would indicate that the proper dose of the salt is forty-five grammes (694 grains) for a man, and forty grammes (617 grains) for a woman.

In the preparation of the magnesia lemonade according to the above formula, the first part of the operation consists in making a citrate of magnesia with excess of acid. In the second part of the process, part of the free citric acid is saturated with the carbonate of magnesia, carbonic acid being at the same time set free so as to make it an effervescent water, while there is sufficient uncombined citric acid to give it an acidulous taste.—*Pharm. Journ., from Journ. de Pharm.*

ART. LXIV.—ANTIDOTE TO PRUSSIC ACID.

By Messrs. T. and H. Smith.

Some time since, an antidote to the poison of prussic acid was made known to the public by us, through the medium of the *Lancet*, of 5th October last. Subsequently, Professor Christison, Mr. Taylor, and other eminent toxicologists, have sanctioned with their approval the principle of the proposed antidote, which, when tried on animals, proved so strikingly successful. It need only be repeated here, that the utility of the remedy rests on the presentation to the deadly acid of iron in such a state of oxidation, as to form with it the well-known compound called Prussian blue; and as the latter is innocuous to the stomach, animal life may be preserved wherever such a combination of the acid with the iron can be timely formed. In suggesting this process, we claim only the merit of having noticed the necessity for presenting the iron in a double state of oxidation—of protoxide and peroxide—along with an alkaline carbonate, and of having made known a method for using the same as a remedy, safely, practically, and effectually.

As cases of poisoning by prussic acid are becoming, unfortunately, more and more numerous, it has occurred to to us that a simpler, though certainly inferior mode of using the remedy proposed by us, might have a chance of being more frequently available. By the first method the antidote would require to be prepared and kept in readiness, by practical chemists and medical men. The plan which we are about to propose renders this less urgently necessary. The materials for the antidote are among the most common articles of every laboratory or drug shop.

The English medical practitioner, who lately fell a victim to prussic acid, and who lived *twenty minutes* after being seen by his brother and partner in business, would in all human probability have recovered, had the following remedy been known and used—since the parties were in their own house, and had a laboratory close at hand. The materials required to form the antidote, are sulphate of protoxide of iron or green vitriol, tincture of the muriate of iron, and carbonate of potash, or the ordinary salt of tartar of the shops. The principle is the same as that first stated—the presentation, namely, of the protoxide and peroxide of iron to the prussic acid, in the presence of an alkaline carbonate, so as to cause its neutralization, but in a different way. We will now endeavour to explain how and in what proportions the different substances, composing the antidote are to be used, so as to secure the end aimed at.

As according to Phillips' observations as well as our own, one fluid ounce of the tincure of the muriate of iron contains about thirty grains of peroxide of iron, one drachm must contain very little less than four grains; and as the prussian blue resulting from the action of the antidote is composed of two equivalents of sesquicyanuret of iron, and three equivalents of protocyanuret,

$$3\ Fe\ Cy+2\ Fe_2\ Cy_3,$$

two equivalents of the sesqui or peroxide $80\times 2=160$ with the proper quantity of a protosalt of iron, will separate nine equivalents, or 226.51 of prussic acid:

$$\text{thus } H\ Cy \text{ 1 equivalent}=27.39\times 9=246.51.$$

Taking as the basis of our calculation the quantity of peroxide of iron contained in tincture of muriate of iron, it will be found by the rule of proportion, that one drachm of the tincture, containing four grains will neutralize 5.6 grains of real or anhydrous prussic acid, or 280 grains of the strength prescribed by the London College, thus

$$160 : 246.51 :: 4 : x=5.6.$$

The relative quantity of sulphate of the protoxide of iron, or green vitriol, can also be learned by proportion, for as two equivalents of peroxide of iron are united to three equivalents of protocyanuret of iron, to constitute Prussian blue, every two equivalents of a peroxide of iron in solution must be mixed with three equivalents of a protoxide of iron also in solution; and as the equivalent of protosulphate of iron is 130, three equivalents will be 390, calculating from these figures, it will be found that four grains of peroxide of iron will require 9.75 grains of green vitriol, for

$$160 : 390 :: 4 : x=9.75.$$

In the same way the correct quantity of salt of tartar, or carbonate of potash, may be found. The equivalent of this is, in round numbers, 70, of which nine equivalents must be present, along with the prussic acid to seize the nine equivalents of the strong acids, sulphuric and muriatic, contained in the mixed iron salts, to allow the prussic acid to take their place. The affinity of prussic acid for iron, is not of itself sufficient to effect this result, but the two affinities—that of prussic acid for iron, and sulphuric and muriatic acids for the alkali—acting in concert, do so at once. Nine equivalents being $70 \times 9 = 630$, four grains of peroxide of iron will require 15.7 grains carbonate of potash, thus

$$160 : 630 :: 4 : x = 15.7.$$

According to the above calculation, one drachm of tincture of muriate of iron and 9.75 grains of green vitriol in solution, on being added to a liquid, containing 15.7 grains of carbonate of potash, can separate prussic acid from that liquid if present, whether in an open vessel or in the living stomach, to the extent of 5.6 grains; but in fact, it will be found that an amount equal to that is not separated. This is readily understood, when it is recollected that the common carbonate of potash is a very deliquescent salt, and further, that it is by no means pure; and besides this, the tincture of muriate of iron contains an excess of acid, which, with the alkaline carbonate will form chloride of potassium, which has no affinity for the prussic acid, but must have the effect to the extent of the quantity formed, of diminishing the amount of carbonate really effective in precipitating prussic acid. The practical result of these various disturbing causes, is, that on precipitating the prussic acid by the method above explained, from a liquid containing the acid in considerable excess, the Prussian blue, separated by filtration and converted into peroxide of iron, weighed, after ignition, instead of seven grains, only one-third of that number. So that instead of 5.6 grains of anhydrous prussic acid being removed, the real quantity was only a third of this; but it must be kept in mind, that if a quantity of acid exceeding that should be taken, it is but too probable that the unhappy individual would perish too quickly to allow of any means whatever being used. To make up to a certain extent for the moisture and impurities of the salt of tartar, instead of using 15.7 grains, which is the correct quantity when in a pure state, twenty grains should be used. We would not recommend more than this, as an excess of alkali would so far prevent or redissolve the precipitate, causing the production of prussiate of potash; which, although it has been found to have no poisonous action on the human body, yet it seems better that the poison should be separated in an insoluble form.

To render our meaning more precise and clear, and less likely to be misunderstood, we will briefly state the course which we think ought to be adopted. On the one hand, dissolve ten grains of sulphate of protoxide of iron, or green vitriol, in an ounce of water, using a mortar to hasten solution, and adding one drachm of the tincture of muriate of iron. Put this liquid into a phial, and in another phial dissolve twenty grains of carbonate of potash, or, according to its common name, salt of tartar, in another ounce or two of water, and to prevent delay—the serious consequences of which cannot be two strongly impressed on the mind, as every moment bears a swift message of life or death to a human being—dispense with labelling, and let the person who prepares the antidote, if possible, go at once and give it himself.

The action of the antidote forms of itself a very pretty and interesting experiment, which may be shown in the following way:—Dissolve in one glass, containing a little water, eight grains of carbonate of potash, adding twenty or thirty drops of medicinal prussic acid, and in another glass, five grains of green vitriol in half an ounce of water, adding half a drachm of tincture of muriate of iron. Mix the two liquids together. As there is too small a quantity of prussic acid present to convert the whole of the iron into Prussian blue, the colour of this is masked by oxide of iron thrown down at the same time; but on adding a sufficient quantity of a strong acid, such as nitric acid, to dissolve the oxide of iron, as Prussian blue is not soluble in the acid, it remains displaying its strikingly beautiful and characteristic blue colour.*—*Pharm. Journ.*

ART. LXV.—ON THE VARIETIES AND CLARIFICATION OF HONEY.

By Otto Köhnke.

1. *Varieties.*—It is well known that raw honey varies in its properties according to the nature of the vegetation from which the bees have gathered their food; according as the honey is obtained from cultivated or wild bees; according to the method and attention used in separating it from the wax, as well as according to the age of the honey and the manner of preserving it.

The honey of young bees is in general lighter coloured and more agreeable than that of old bees, even when both kinds of bees gather their honey in the same district, except when the honey is gathered from the flowers of the buckwheat, the common heath, and coniferous plants, in which case the honey of old bees may also be white. But young

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[* The above should have found a place in our pages long since. Messrs. Larocque and Lepage have each examined the power of the proposed antidote, and agree that whilst it is no protection against the anhydrous poison, nor even certain when it is diluted with eight times its weight of water,—yet for the more dilute preparations, as that of our Pharmacopœia cherry laurel water, etc., it is very serviceable, and to be relied on if given in time.—Ed. Am. Jour. Pharm.]

bees always yield, under like circumstances, whitish honey, whether the same be separated from the wax without heat, or at a temperature of from 88°.25 F. to 99° F., and by pressure. It is also well known that honey becomes brown or impure if too great heat and too strong pressure be applied. Brown honey has a less specific weight, and does not become so quickly granular as white honey.

Bright yellow honey of young bees, whose food consisted chiefly of buckwheat blossoms, solidified, after three or four weeks, into a crumbly unctuous mass, and had a specific weight of from 1.425 to 1.429. *Honey of old bees* from the same place concreted only after four and six weeks and formed a crumbly unctuous mass, having a specific gravity of from 1.415 to 1.422.

Honey of a heath country (heath-honey) was of a pale yellow colour, harder than the before-mentioned, and had a specific weight of 1.425 to 1.434. From old bees of the same heath-country the honey was light brown, and had a specific weight of 1.422 to 1.430.

Honey of a marshy country (marsh-honey), where the bees had gathered their food chiefly from the flowers of the Brassica, Vicia Faba, and Trifolium, was almost white, hardened after six or eight days into a mass which could be compared to melted ox-tallow, and had a specific weight of from 1.435 to 1.440, and was consequently the heaviest of the whole and possessed the best qualities. Marsh honey, therefore, is in much request.

2. *Preservation.*—The preservation of honey is best effected in small wooden tubs with well closed lids, so that such a vessel when once opened may be emptied in three or four months. The honey after having run, and been pressed out of the comb at a temperature of from 88°.25 F. to 90° F. should be immediately poured in these vessels which should be put in a dry cool spot. When the honey has concreted, it should be covered with waxed paper, and and the vessels closed with well fitted lids. Earthen pots

are sometimes burst by the solidification of the honey, and they are, therefore, less suitable for the preservation of honey than small wooden casks. In damp air the honey gradually undergoes a partial decomposition : liquefying and becoming sour. If the acid of such old honey be saturated with milk of lime, some ammonia is evolved and lactate of lime formed. That the honey ferments, if it be watery, is well known. If the same after being diluted with water be saturated with lime a flocculent sediment is formed, which possesses the qualities of a ferment containing caseine.

It has been hitherto believed that all honey contains some free acid; but Köhnke tested recently separated and almost colourless marsh-honey, from more than fifty hives, with litmus paper, and could not discover any acid reaction. But upon testing honey from bees which had been killed by brimstone, an acid reaction took place.

3. *Clarification.*—As regards the purification of honey for medicinal use, there has been already so much written and proposed on it, that one would scarcely believe that anything new could be added; nevertheless we think that the following deserves notice. Köhnke prefers the method of purification by means of charcoal (*kohle*) to all other methods. In order, therefore, to prepare *Mel depuratum,* he takes ten parts by weight of solid honey, five parts by weight of water, and one part of animal charcoal (bone black), in pieces of the size of peas, and carefully separated from the fine powder. The whole is heated in a covered tinned copper kettle over a slow charcoal fire, at a temperature of 144°.5 F. to 167° F.

This heat is to be kept up for from twenty-four to thirty-six hours; frequently stirring the mixture. At last the heat is to be increased until the honey begins to boil, which must be only allowed to continue for one or two minutes. He then pours the whole into an earthen vessel, and lets it stand for six or eight days.

Should too much water have evaporated, and the specific weight be found heavier than 1.300, sufficient water must be immediately added after the ebullition. If the specific weight be lower than this, the raw honey must have been watery and light. In that case proportionately less water should be employed from the beginning.

In six or eight days the charcoal has settled to the bottom of the vessel, so that the now almost clear honey only requires to be poured upon a thick single or double woollen cloth, taking care not to disturb the sediment. From forty to fifty pounds of pure clear strained honey of 1.300 specific weight are obtained in a few hours. If brown honey was used, it appears after purification of a wine-yellow colour. White honey requires only half of the above-mentioned quantity of charcoal, consequently for twenty pounds of honey only one pound of charcoal is required, and the *Mel depuratum* thereby obtained is nearly colourless.

By this process the honey undergoes no decomposition. It is well-known, however, that honey boiled, according to the old method, diluted with water, for a longer period in an open vessel, loses its balsamic fragrance, and in general undergoes a remarkable change. But the honey purified by Köhnke's method is deprived of all opaque and waxy particles, has a specific weight of 1.300, and retains its natural fragrance, although in a weaker degree, together with the agreeable taste of the raw honey. If one or two drachms of it be diluted with from four to six ounces of water, no flocculi are deposited. An especial proof of its strength and purity consists in its becoming again granular after it has been for some time exposed to a temperature of from 54° to 58°.5 Fah. The residual charcoal and the filter or strainer should be washed with hot water in order to extract the residual honey, which may be employed for technical or economical purposes. The loss of honey, however, is scarcely worth consideration.—*Pharm. Journ. from Buchner's Repertorium.*

ART. LXVI.—ON A SIMPLE METHOD OF PREPARING CORROSIVE SUBLIMATE.

By. Drs. A. and C. Walter.

The authors propose turning to account the property which chlorine-water possesses of converting calomel into corrosive sublimate, for the preparation of the latter. According to the method which they describe, calomel is prepared from the protonitrate of mercury and chloride of sodium, and is then placed in several separate vessels, as in the preparation of chlorate of potash, each of which must be capable of containing, without being quite filled, 8 parts of water for every 1 part of calomel placed in it. The gas is first passed through a washing trough, and then successively through all the vessels, until the whole is converted into a clear solution. The filtered solution is then evaporated and set aside to crystallize. Even with calomel, which had not been recently precipitated, the process proved perfectly successful. It would be highly advantageous if hot water could be employed instead of cold, and the vessels, with the exception of the last, heated upon a sand-bath; only 4 times the quantity of water would then be required, and a great part of the evaporation would be spared. Calomel may also be rubbed to a paste with water, and chlorine passed into it, when it also furnishes corrosive sublimate in the form of a crystalline powder.—*Chem. Gaz. from Buch. Rep.*

ART. LXVII.—ON THE PREPARATION OF PURE BARYTIC WATER AND PURE SALTS OF BARYTES.

By H. Wackenroder.

When 240 grms. of finely-ground heavy spar are intimately mixed with 60 grms. of colophony and 20 grms. of powdered charcoal, and the mixture heated to redness in a covered crucible nearly filled with it, the sulphate of baryta is readily and advantageously decomposed. The ignition may be affected in an ordinary furnace of sheet iron provided with a dome, and is continued from half to three-quarters of an hour. When meal or sugar is employed for the reduction, and a very strong heat, apapproaching nearly to white heat, employed, soluble monosulphuret of barium is scarcely formed. The ignited mass is loose, yellowish-grey or reddish, and yields, on boiling with water in a porcelain dish, a saturated solution of baryta and bisulphuret of barium, together with some hyposulphite of baryta. The alkaline liquid is consequently yellowish, and deposits on suitable concentration a tolerable quantity of hydrate of baryta and some sulphuret of barium; the residue, insoluble in hot water, consists of undecomposed heavy spar with some coal, metallic sulphurets and the earthy substances mixed with the mineral and the coal. To prepare any salt of baryta, the sulphuret of barium is repeatedly exhausted with boiling rain-water, and the baryta precipitated by carbonate of soda. With very dilute nitric acid the solution readily yields perfectly pure nitrate of baryta, as this salt may be easily separated by crystallization from the less-easily crystallizing salts. Chemically-pure chloride of barium is most readily obtained. For this purpose, the solution is mixed with dilute crude muriatic acid until the liquid indicates the presence of a slight excess of acid; the precipitate of sulphur, sulphate of baryta, and at times also sulphuret of arsenic, is separated by filtration, and the liquid evaporated until but little mother-ley is left, which contains chloride of calcium, chloride of strontium and perchloride of iron. The dried chloride of barium is readily freed from adhering muriatic acid and perchloride of iron by exposing to a faint red heat, dissolving in water and filtering. About one-third the amount of the heavy spar employed is obtained; if the whole of the heavy spar had been reduced, a much larger quantity of chloride of barium would naturally be obtained, but the loss of heavy spar, which however may be employed in subsequent operations, is fully compensated for by the lesser amount of labour required.

To obtain perfectly pure barytic water, the sulphuret of barium is exhausted with as little boiling water as possible, and the yellow liquid allowed to cool in a tall covered glass. Upon this the liquid is separated as perfectly as possible from the crystallized hydrate of baryta; the latter then dissolved in water, and boiled in a porcelain dish with pure hydrated oxide of copper until a sample of the liquid yields with solution of acetate of lead a white precipitate. If, after boiling the liquid for some time, it is found to contain some copper, it is filtered, and a small quantity of hydrated oxide of silver, or carbonate recently precipitated from the nitrate of silver by pure caustic or carbonate of soda, added to it. On digestion, every trace of hyposulphurous acid and oxide of copper is removed, and sulphuret of silver formed.—*Chem. Gaz. from Archiv. der Pharm.*

MISCELLANY.

Phosphorus Paste for the destruction of Rats and Mice. By M. Simon, of Berlin.—The Prussian government issued an ordonnance on the 27th of April, 1843, directing the following composition to be substituted for arsenic, for destroying rats and mice; enjoining the authorities of the different provinces to communicate, at the expiration of a year, the results of the trials made with it, with the view of framing a law on this subject.

The following is the formula for this paste, as published in the *Berliner Medicinische Zeitung:*

Take of phosphorus 8 parts, liquify it in 180 parts of lukewarm water, pour the whole into a mortar, and add immediately 180 parts of rye meal; when cold, mix in 180 parts of butter melted, and 125 parts of sugar.

If the phosphorus is in a finely divided state, the ingredients may be all mixed at once, without melting them.

This mixture will retain its efficacy for many years, for the phosphorus is preserved by the butter, and only becomes oxydized on the surface.

Rats and mice eat this mixture with avidity; after which they swell out, and soon die.

M. Simon, has employed this mixture for many years, with constant success, by placing it in places frequented by those animals. According to him, the phosphorus is less dangerous than arsenic, for supposing the mixture to be badly made, and the phosphorus imperfectly divided, the oxydation which would take place in a few days would render it nearly inactive; and it would be almost impossible to employ it for the intentional poisoning of human beings.—*Pharm. Jour. from Jour. de Chim. Med.*

Fizeau's process of etching Daguerreotype Plates and its application to objects of Natural History. By Mr. Goadby.—In a Daguerreotype portrait, the black parts of the plate consist of silver, the white of mercury, and the intermediate tint of a mixture of the two, the degree of darkness or light depending upon the excess either of the silver or of the mercury. In converting a Daguerreotype into an engraved plate, it is necessary to etch away the dark parts and to leave the white untouched. This is done by immersing the plate in a fluid, consisting of dilute nitric acid, nitrous acid, chloride of sodium, and nitrate of potash. The nitric acid is so far diluted, that no decomposition can take place until the mixture is heated, when the chloride of sodium and nitrate of potash are decomposed, and chlorine and nitrous acid are evolved. These attack and remove the silver, or the *dark* portions of the plate, but have no effect upon the mercury, so that the *lights* of the picture, being the mercurialized portions of the plate, constitute the *etching* ground, and effectually defend such portions of the Daguerreotype from the influence of the corroding fluid. After a time, those portions of the plate that have been acted upon by the chlorine, &c., become covered with a protecting coat of the chloride of silver: this must be removed by dilute liquid ammonia, when the biting may be continued by a fresh supply of the mixed acid. Grease and foreign matter must be removed by repeated washings in dilute acid and alkali, and by boiling in caustic potash. These cleansing operations must be repeated after every biting, after washing out the chloride of silver by the ammonia. The plate being thus bitten, but in a slight degree, is to be inked after the ordinary manner of engravers, and allowed to dry; the surface of the plate is then to be thoroughly polished, the ink still remaining in the corroded portions of the plate. It is now to be gilded by the electrotype, those parts alone receiving the gold that have been previously polished. The ink is then to be dissolved out of the hollows by potash: the parts that are gilded now constitute the etching ground, instead of the mercury, and the biting may be henceforth continued by nitric acid, in the customary usage of engravers. The plate thus etched, generally requires to be finished by the hand of the engraver, who has the advantage of a *perfect*, although *faint* picture to work upon. The amount of labour which he must bestow will depend upon the goodness of the Daguerreotype, and the success of the etching. M. Claudet has fully established the successful application of this process to the purposes of illustrating Natural History, by copying from Nature and engraving several delicate and difficult dissections of the lower animals, particularly the nervous system of Aplysia and Tritonia (the latter much magnified,) and the nutrimental organs *in situ* of a caterpillar. These preparations, together with the engravings of them, were handed round.

Dr. Carpenter stated, that a similar process had been employed for engraving microscopic objects, the discovery of which was due to Capt. Ibbetson. He exhibited some plates of blood-globules, and other microscopic objects, published by Dr. Donne, of Paris, which had been procured in this way.—*Ibid.*, *Meeting of the British Assoc.*

Saponine and Ganteine for cleaning Kid Gloves.—M. Duvignau has taken out a patent for a preparation intended for cleaning gloves, and called saponine, which, according to the patent is made as follows:—

Take of	Soap in Powder	250 parts.
	Chloruret of Potash (Eau de javelle)	165 "
	Solution of Ammonia	10 "
	Water	155 "

Make the whole into a paste, a small portion of which is to be rubbed over the glove with a small piece of flannel, until it is sufficiently cleaned.

M. Buhan has prepared and sold a compound which he calls ganteine, which consists of soap and essence of citron, made into a paste with water.—*Pharm. Jour.*

On the Action of Nitric Acid upon Brucine. By A. LAURENT.—It had been stated by Gerhardt, that nitrous æther was formed in the action of nitric acid upon brucine, when this, as is well known, is coloured red, an assertion which Liebig declared to be unfounded. Laurent, who repeated Gerhardt's experiment, arrived at the same result, but obtained moreover a new substance, which he calls *cacotheline*, the composition of which is represented by the formula $C^{10}H^{22}N^{4}O^{10}$. This substance yields, on treatment with ammonia, various products, one of which is a powerful base.—*Chem. Gaz. from Comp. Ren.*

Preparation of Aurocyanide of Potassium for Electro-Gilding. By ALEX. KEMP.—Dissolve 1 part of gold in nitrohydrochloric acid, and render the solution as neutral as possible by evaporation to dryness; redissolve the chloride of gold in 8 parts of water, and heat the solution until it boils; add as much calcined magnesia as is equal to half the weight of the gold, and boil the whole till the liquid loses its yellow colour; the precipitate which forms is oxide of gold, with the excess of magnesia. Throw it on a filter, and wash it with boiling water until the liquid passes through tasteless. Having dissolved 8 parts of Liebig's cyanide of potassium in 80 of boiling water, pour it on the filter while still hot, it will dissolve the oxide of gold, leaving the magnesia unchanged. The same method may be followed in forming the silver solution, substituting nitric acid for the mixture of nitric and hydrochloric acids used in forming the gold solution.—*Ibid.*

On Thialdine and Selenaldine, two new artificial organic bases. By MM. WOHLER AND LIEBIG.—On passing hydrosulphuric acid into an aqueous solution of aldehyde of ammonia containing a few drops of free ammonia, the authors produced a beautiful new base, free from oxygen, and containing a large proportion of sulphur. This body, to which they give the name of thialdine, is obtained in large crystals, insoluble in water, but soluble in alcohol, and much more so in ether. It forms crystallized and well-defined salts with the acids.

The analysis of these bodies gave the following results:—

Thialdine	$C^{12}H^{13}NS^4$
The hydrochlorate	$C^{12}H^{13}NS^4, HCl,$
The nitrate	$C^{12}H^{13}NS^4\ NO^5, HO.$

The following equation expresses the mode of formation of thialdine:—

$$\underbrace{3(NH^4O,\ C^4H^3O)}_{\text{Aldehydite of ammonia.}}+6\,HS=\underbrace{C^{12}H^{13}NS^4}_{\text{Thialdine.}}+6\,HO+\underbrace{2\,NH^4S.}_{\text{Sulphide of ammonia.}}$$

On substituting hydroselenic for hydro-sulphuric acid, the corresponding selenium compound, selenaldine, is obtained, which, though it greatly resembles the former base, is far more liable to decomposition.—*Chemist.*

Chloride of Soda as a test for the presence of Guaiacum in resin of Jalap. By M. Smedt.—It has long been known that chlorine possesses the property of rendering resin of guaiacum blue. According to the author, the chlorides of soda and of lime also possess this property, and may be used for detecting the smallest traces of guaiacum resin when mixed with resin of jalap. In fact, two grains of a mixture of fifteen parts of resin of jalap, and one part of guaiacum resin, dissolved in fʒj. of spirit, specific gravity .825, gives on the addition of a single drop of solution of hypochlorite of soda (chloride of soda,) a green streak, which is deposited as a precipitate to the bottom of the glass, leaving the supernatant liquor of its original colour.

The sensibility of this reaction is such, that the presence of one part of guaiacum resin in 320 parts of resin of jalap may be indicated.

M. F. Boudet has found that this test may be applied with equal advantage for detecting the presence of guaiacum resin in scammony.—*Pharm. Jour. from Jour. de Pharm.*

New Green Ink. By M. Winckler.—Dissolve 180 grains of bichromate of potash in f℥j of water; add to the solution, while warm, f℥ss of spirit of wine, then decompose the mixture with strong sulphuric acid until it assumes a brown colour. Evaporate the liquor to one half, let it cool, dilute it with f℥ij of distilled water and filter it, then add f℥ss of spirit of wine, add a few drops of strong sulphuric acid, and let it stand. After some time the ink assumes a beautiful green colour, and is rendered fit for use by the addition of a small quantity of gum arabic.—*Ibid, from Jour. de Chim.*

Simple and easy process for quickly preparing the Iodide of Potassium. By M. J. H. Pypers.—The process of M. Pypers consists in slightly heating a mixture of 100 grains of iodine, 2 drachms of water, 75 grains of carbonate of potassa, with 30 grains of iron filings.

The mass is dried to redness. The resulting red powder is treated with water; then filter and evaporate to dryness.

100 parts of iodine will furnish 135 parts of very white iodine of potassium, but slightly alkaline.—*Chemist from Jour. de Chim.*

Note on the preparation of Scammony and its employment. By M. Wimmer.—The author recommends the following formula, as offering the greatest advantages:

℞ Pure scammony resin	3 grammes.
Venice soap	25 centigrammes.
White sugar	275 “

Mix, and reduce to fine powder. Then add by degrees—

Powdered biscuit	24 grammes.
Water	a few drops.

Triturate well, and carefully, to remove the powder that may be attached to the pestle, and then mix with the remainder of the powder.

These powders are afterwards dried in the air, and divided into packets of 30 grammes each.

3 grammes of the powder contains 30 centigrammes of scammony. The dose is from 50 centigrammes, which is sufficient to produce several stools in the case of an adult. For children of 15 years of age, the dose is reduced to 30 centigrammes, for those of seven or eight years to 20 centigrammes, and finally for children of two years of age to 10 centigrammes.

These powders, in addition to their purgative properties, have the advantage of being an easily administered vermifuge.—*Ibid.*

On the Preparation of Hyposulphite of Soda. By E. F. Anthon.—If dry sulphurous acid be conducted over powdered sulphuret of sodium (in a dry state) no action is observed; but if the sulphuret has previously been moistened with about 20 per cent. of water, the sulphurous acid is then very quickly absorbed, provided the sulphuret contain an excess of carbon (*kohle.*) and was exposed only to such a temperature that it could not melt, and but only slightly concrete. During the absorption of the sulphurous acid a strong developement of heat takes place; and the pulverulent sulphuret of sodium becomes moist. These phenomena can be easily noticed if the sulphuret be placed in a glass tube, and the sulphurous acid be allowed to enter from beneath. At this stage no odour can be perceived at the upper opening of the tube, but as soon as the heating and moistening of the sulphuret have arrived at the upper end of the tube, sulphuretted hydrogen gas begins to be developed, and sulphur to sublime on the sides of the tube. If the experiment be now interrupted, hyposulphite of soda, containing carbon and some sulphuret of sodium, is found in the tube. This forms with water a pale yellow-coloured solution; but if the sulphurous acid be allowed to pass as long as the sulphuretted hydrogen is detected, and until nothing but the excess of sulphurous acid is perceived, the product gives, when mixed with water, a colourless solution, which is free from sulphuret of sodium, and, therefore, quickly changes, on the admission of air, into sulphite and sulphate of soda.

The sulphuret of sodium gains about 70 per cent. in weight (the water included.) The whole experiment lasts, when small quantities of sulphuret are used, scarcely a quarter of an hour, and from the carbonaceous crude mass, crystallized hyposulphite of soda can be easily obtained.

The facility with which solid hydrous sulphuret of sodium (hydrosulphuret of soda) is converted, by means of sulphurous acid, into hyposulphite of soda, affords, therefore, a simple and cheap means of procuring this salt, which has latterly acquired some importance for Daguerreotyping and in the manufacture of paper.

With regard to this process, it is particularly to be observed, that the transmission of the sulphurous acid into the powdered sulphuret of sodium must be stopped before the developement of sulphuretted hydrogen gas has ceased, in order to obtain hyposulphite of soda, containing some sulphuret of sodium, and consequently permanent in the air.—*Pharm. Jour. from Buch. Reper.*

THE

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ART. LXVIII.—LECTURE, INTRODUCTORY TO THE COURSE ON PRACTICAL PHARMACY, DELIVERED AT THE HALL OF THE PHILADELPHIA COLLEGE OF PHARMACY, OCTOBER 25th, 1847.* By William Procter, Jr.

Gentlemen :—We have assembled this evening to commence the course of Lectures on Practical Pharmacy, and I take advantage of the occasion to proffer you a friendly greeting.

You have already listened to the introductory addresses of my colleagues, the Professors of *Materia Medica* and of *Chemistry*, who have exposed the importance of two great branches of pharmaceutical education, and in complying with this time-sanctioned custom, I know not in what way to better employ the opportunity afforded, than by asking your attention to some general, though, perhaps, not unimportant remarks, on the profession of Pharmacy.

The business you have adopted is an honorable one; it is a pursuit in which any mind may engage without contravening the best principles of his nature, because it is necessary and useful. Its skilful conduction calls for an extensive range of knowledge, and few vocations tend more to excite scientific investigation and mental activity. A great

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* Published at the request of the Officers of the College.

variety of objects are brought before the mind, the history of which connects them with almost every country and people, whilst their qualities are often so striking and curious, as to invite examination. It was such circumstances and objects, aided by the mysterious workings of the chemical laws, that prepared the foundation of that love and search for scientific truth in the apothecary's boys of Penzeance and Gottenberg, which resulted in a Davy and a Scheele.

The natural history of the Materia Medica is intimately interwoven with that of the kingdoms of nature and the Naturalist has largely contributed to extend its borders. The arid deserts, the luxuriant deltas, and sombre forests of the tropics, the moss covered and icy rocks of the extreme North, the highest mountains and the deepest oceans, all yield their tribute to the healing art; and the pharmaceutist finds collected around him, through the agency of commerce, these diversified productions of every clime.

To understand their characters and derivation he has to familiarize himself with Botany, Zoology and Mineralogy, which alone are able to determine them with correctness; whilst in the laws of chemistry and physics, he obtains an exhaustless power to combine and fashion them into the numerous compounds and conditions which constitute and characterize the catalogue of medicines.

The pursuit of those sciences, for themselves, presents a broad field for the intellectual powers, and the apothecary, occupying a point toward which they converge in lending their aid in the cause of humanity, enjoys a position which enables him, when disposed, to choose from them whichever most accords with his tastes; and often without neglecting his daily duties, he may not only contribute to his own gratification, but by the accuracy of his observations may materially advance the cause of scientific truth. In his occupation, he is constantly interrogating nature, and eliciting facts favorable to its object; and where the performance of these labours is accompanied with research and reflection, the most trivial incidents may originate discoveries far outreaching in their influence the boundaries of his special department.

It is a fact, however, that the majority of those who practise Pharmacy, do it solely for a livelihood ; they have no views beyond the profits, and, as a natural consequence, every thing is made subservient to that object. They view the business as a lucrative one, bring the habits of the merchant to bear in the promotion of their interests, and science (whose true position is in the foreground) is tolerated only in so far as she lends her aid and advice in the process of accumulation.

Some individuals enter the lists of Pharmacy under delusive impressions, or are placed there by guardians who are equally misguided, illy prepared by education or endowments for so responsible a vocation. It is a sad spectacle to behold such giving their earlier years and youthful energies to a profession not suited to their talents or inclinations, pursuing it, perhaps, until, on the threshold of manhood, they find themselves about to be cast on the ocean of society in a vessel with whose qualities and powers they are too slightly familiar to enable them to cope with the difficulties that assail them. Many who are unsuccessful as apothecaries, might have arisen to respectability and competence in other pursuits, more harmonious with their inclinations or natural gifts. It too often happens with these, that, repelled by ill success from their legitimate calling, they are induced to bow before the image of empyricism, in the hope of a golden reward, and prostitute that knowledge that they never should have acquired, to the invention of nostrums, and forcing them into notice.

But ill success is not always the result of a false position, nor is success the invariable sequence of endowments and advantages. There are individuals on whom nature and fortune have not smiled in their distribution of talent and favours, but whose indomitable perseverance and industry have triumphed over their scanty allotments, and gained them a position, despite difficulties that would have damped the ardour of many a more fortunate student.

In thus speaking, it is with no view of raising clouds of discouragement and distrust; on the contrary, it is intended to draw such inferences as will prove a source of hope and satisfaction to all who enter this hall with the true motives.

The pharmaceutical beginner should be thoroughly impressed with the fact, that there is nothing really valuable in this world to be gained without industry, and that perseverance will conquer the difficulties of any pursuit possible to his powers. He should constantly keep in mind that the main object of his apprenticeship is the acquisition of a thorough and solid pharmaceutical education; in a word, to become master of his profession. With this view to the future, he will perform more cheerfully the tedious and often disagreeable details of his daily course; knowing that they are inseparable from the business; and that time will make it his province to *direct*, as it is then to *obey*. The interests of his preceptor should be as his own; and the disinterested performance of duty will yield him a richer reward in consciousness of rectitude, than all the temporary gratifications arising from too much attention to selfish ends.

The love of pleasure is innate in most of us,—too often it is the grand object of life presented to the youthful mind; rendering irksome and distasteful its humbler avocations,—wise is he who can cheerfully submit his pleasures to his duties, and, by a proper appreciation of the true ends of existence, extract enjoyment from every occurrence that presents; whilst his mental powers, unshackled by passion, and unclouded by discontent, are left free to wrestle with the genius of knowledge, and wrench from her those precious treasures, that she is ever ready to yield to the victorious.

It is an often repeated truism that "knowledge is power," but it is only so to him, who knows how to use and apply it to the exigencies of life. Without an active use of acquired information the mind of a learned man is a mere library, and his learning might as well be in the form of ink and paper for all the advantages derived from it by himself or others. This applies to the profession of Pharmacy, which is a union of the theoretical and practical, and the learning of the apothecary is of little avail if it point not to the illustration and amelioration of his practical duties.

The design of this school of Pharmacy, like other educational institutions, is to *aid* the student in the acquirement of necessary information ; it is the duty of its teachers to explain pharmaceutical knowledge systematically ; and they hope to present such a view of the *materials, principles and processes,* of their departments, as will enable you, with the assistance of that energy which should characterize the student, and that field of practice which is found in the laboratory and behind the counter, in your intercourse with the public, to render you able pharmaceutists and useful members of society.

Pharmacy, in its most circumscribed definition, is *the art of preparing Medicines.* It embraces the knowledge and ability that enables an individual to modify those materials of nature, that accident or research have discovered to possess remedial powers, in such a manner as to conduce most effectually to their actions as medicines.

Theoretical and practical pharmacy may be divided into four departments or divisions. The first consists of the knowledge of simple drugs, or the Materia Medica, including their natural history, derived from the researches of Botanists, Zoologists and Mineralogists ; their commercial history, which points out the sources from whence derived, and other facts that aid in forming a correct judgment of their genuineness ; their physical structure, taste, and odour, gained by a strict scrutiny of their sensible properties ; their chemical composition as exposed by the analyses of chemists ; and such leading medical properties and uses as will instruct the apothecary in the precautions requisite in dispensing them.

This department is especially useful in the choice of drugs, and is the ground-work of a good stock, without which, it is hardly necessary to observe, all subsequent nicety in pharmaceutical treatment will be labour lost. The natural causes of imperfection, arising from growing plants in ungenial climates, and their unseasonable collection; together with the deteriorating influences of age, light, moisture, etc., are duly explained and remedies suggested for defending and preserving them, so necessary to the druggist. And finally, it points out the adulterations and falsifications that drugs are liable to from the cupidity of collectors and dealers, (a species of rascality that is abundantly practised at this time,) and indicates the means of their recognition and detection.

The second division comprehends the study of the chemical and physical laws bearing on pharmacy. It is here that the most difficulties occur to the student. He has to master the general principles of Chemistry, and such of the physical laws as are embraced in the subjects of heat, light, electricity, and the structure and divisibility of matter. The principles of mechanics, hydraulics and hydrostatics, are exceedingly useful in the construction of apparatus or its adaptation to processes, and should be studied with a view to these objects. General Chemistry includes the history of mineral or inorganic drugs, their mineralogical derivation, properties, etc.

The third department consists in the application of the aforesaid laws to the modification of drugs—in a word, it is *practical pharmacy*, and constitutes the mass of the every-day business of the shop and laboratory.

The ground work of practical pharmacy is expert manipulation; hence the first object in this department is an acquaintance with the elementary operations required by the apothecary. These comprehend the processes and instruments used in effecting the mechanical division of drugs; the separation of solids from fluids; the solution of solids in liquids; the extraction of the soluble from the insoluble ingredients of a compound; the evaporation of fluids and the recovery of solids from their solutions by evaporation; the distillation of liquids and the precipitation, fusion, sublimation, etc., etc., of substances. Weights and measures, specific gravity, and a nice appreciation of quantities in general, are important features, and are constantly recurred to.

The relations that vegetable drugs bear to different menstrua, and the nature of the matter they cede to these liquids, together with the influences that light, heat, and air exercise on the solutions, by age or evaporation, constitutes one of the chief branches of the subject, including the preparation and characteristics of *infusions, decoctions, tinctures, wines, syrups, extracts, etc.;* in fact the greater part of those vegetable and animal preparations which have a complex, inexact composition, from the nature of their ingredients.

To prepare these medicines with judgment, an acquaintance with the proximate constituents of drugs is essential, those that are active ascertained, and the modes of treatment most adapted to their removal applied. For instance, *Krameria* contains a peculiar tannin, apothegm, starch, and coloring matter amongst its ingredients; the tannin being active and the rest inert,—and it is desirable to prepare an extract which shall possess the greatest possible activity. Now it has been ascertained that apothegm and starch are insoluble in cold water, but are dissolved by it when boiling, after which the starch and a part of the tannin combine to form a compound insoluble in cold water. Alcohol dissolves the tannin and apothegm and not the starch. Hence it must be apparent at a glance that the extract prepared with cold water must be superior to any other, inasmuch as it contains neither apothegm nor starch.

Again:—In the preparation of the oil of bitter almonds or bitter almond water, experience has proved that when the ground kernels are allowed to macerate in cold water for twenty-four hours before the distillation is commenced, the product is larger, if the oil, and stronger if the water is in question; a result very natural, when the properties of the constituents are understood. These kernels contain amygdalin and emulsin, two substances that react with each other in the presence of water with the production of the oil of bitter almonds and hydrocyanic acid. Boiling water coagulates emulsin and renders it inert, and hence if the distillation is proceeded with at once the latter principle is made incapable of acting on the amygdalin before all of it has been decomposed, and the product is proportionably affected.

From these examples the value of a knowledge of the composition of drugs must be at once apparent, and its extension affords a field of research in organic proximate analysis, that has been occupied to some extent by the graduates of this school.

It is in Pharmaceutical Chemistry, however, that the most interesting labours of the apothecary are to be found. Here he is governed by exact rules, and arrives at precise results which accord with the beautiful laws of definite proportion; and as it were to harmonize, his products assume mathematical forms of definite character.

The chemist deals in certainties—demonstration is his watch-word; and the chemistry of the apothecary must partake of this accuracy. Instead of the uncertain and variable mixtures that have been noticed as resulting from the action of solvents on vegetables, he here has to deal with those curious organic principles upon which the activity of plants depend. In the discovery and isolation of these, pharmaceutists have contributed more than any others. The discovery of morphia by Sertüerner, opened to view that interesting field of research which has since been so industriously cultivated, that nearly the whole Materia Medica has been compelled to pass through the laboratory to be examined and cross-examined by its untiring votaries, until they have yielded up the secrets of their composition for the benefit of medicine.

The Pharmaceutical Chemists of Europe are a body of which Pharmacy may well be proud; they have done more for the advancement of organic chemistry than any other profession, and by the multiplicity of their labours they are now illuminating the yet misty records of animated nature, as traced in the proximate and ultimate constitution of vegetables and animals.

Analysis! What a significant meaning has this word when applied to the labours of the chemist! What mighty results are daily occurring from this magic wand, this open-sesame of science! Many apparently inexplicable phenomena of animal life and organism have been unfolded; the hidden secrets of nature brought to light; agents of tremendous energy discovered, and impending catastrophes fraught with ruin and desolation turned aside. These are the results to which the apothecary may aspire,—the path that leads to them is open—and as their is no royal road to knowledge—he may accomplish by his industry and talents what others have done before him.

But to return: the basis of analytical knowledge consists in a nice discrimination of quantity—habits of great accuracy—a keen perception of qualities, and an unflinching conscienciousness of the record of observations. The daily engagements of the pharmaceutist are in harmony with these conditions, and it only needs energy and determination to acquire them. That such knowledge is useful, none will dispute; it gives its possessor a character superior to those around him; and the public, who often require its assistance, readily concede to the analytical chemist a high place in their regard. In one's own affairs it is a source of pleasure and profit; it enables us to detect those adulterations which are introduced into chemical substances, and thus protect ourselves and patrons from the effects of these infamous practices.

The fourth division may be called the dispensing department—it is that portion of the business of the apothecary which is transacted at the counter, in which the drugs and medicines that have undergone the processes of preparation are to be dealt out to the public, either at their own demand or by the prescription of physicians.

I need hardly observe that this is the most responsible portion of his duties. On its correct accomplishment depends the health and lives of his fellow-citizens. Intended to be the coadjutor of the physician, an error may convert him into his worst enemy: an oversight, the sale of one thing for another, a wrong label, and many other equally insignificant causes, may be productive of serious consequences.

A good dispenser requires a variety of qualifications, including a knowledge of the three branches already spoken of. Constant presence of mind is an essential requisite; he must be conscious *all the time*, of his acts, to prevent the substitution of similarly appearing substances. A foolish reverie, whilst compounding a prescription, has caused, and may again produce the most melancholy results. In a prescription of nitrate of potassa, tartar emetic, and calomel, how readily may such a fatal substitution occur; and how many of us, in recurring to our early experience, can recollect some occasion when we were on the point of committing an error of equally grave character. His acquaintance with nomenclature and synonyms must be extensive to meet the variable phraseology of prescriptions; added to which, the contemptible characters in which many medical men couch their requests, requires a judgment and decision for their interpretation, often in cases of urgency, which greatly increases his responsibility.

Physicians in prescribing are sometimes more governed by the effects of their remedies viewed separately, than by the effect of the compound, which leads them in the pursuit of their ends, to overlook the modifications due to chemical reaction: for instance, solutions of morphia, opium, or other liquids containing salts of the alkaloids, are prescribed with magnesia, the great basic power of which causes their precipitation in an insoluble form, (in most instances,) and the solution is nearly free from them. If the patient takes the clear liquid only, or is careless in mixing the soluble and insoluble contents of the vial, the desired narcotism is not produced, or is reserved to be exerted with redoubled force by the last portion of the mixture. It is the dispenser's duty to suggest the necessary precaution.

In the hurry of professional duties, it is by no means uncommon for medical men to commit serious errors in the phraseology of prescriptions, indicating wrong quantities or wrong substances. Only a few weeks since, in New York, morphia was written where quinia was intended—it was dispensed, and death followed in its train. This is not an uncommon error, and has several times came under my own notice, as it doubtless has to some of you; and in the instance mentioned had the apothecary exercised the judgment that was proper to the occasion, the prescription would not have been dispensed.

It should be a constant rule in compounding every prescription, to recur to the questions: *is this as the Doctor designed? are the doses within propriety?* or if extraordinary, *does the case demand it?* If the directions for use are appended, a judgment can at once be arrived at; if not, a little tact will gain the necessary data by enquiries of the messenger skilfully propounded;—and it is better even to delay the dispensation of the prescription until the physician has been consulted, rather than peril the life of the patient, or the reputation of his medical servitors.

The apothecaries of the United States have much less legal, but far more moral responsibility resting on them, than those of most other civilized countries, where government enacts rules for their guidance, by compelling the observance of a uniform code of formulæ. Our physicians represent every country of Europe; their prescriptions are more or less modified by the formularies and habits of their native medical authorities, and they often without due consideration prescribe remedies but illy understood. To avoid the difficulties thus engendered, requires, truly, great discrimination and clearness of judgment. A case in point occurred recently in London. A German physician directed six ounces of bitter-almond water as a vehicle in a prescription. The apothecary to whom it was taken, not having the preparation, sent to another establishment and obtained it. He then dispensed the medicine literally—without a thought, apparently, of its nature—and the patient, a lady, died soon after taking the first dose! The physician was tried for manslaughter, and acquitted on the grounds of intending a weaker preparation made with the volatile oil, which he had before obtained on prescription; whilst the apothecary, who had been instrumental in bringing about the catastrophe, was held blameless in sight of the law, because, forsooth, the bitter-almond water was not recognized by the London Pharmacopœia, and he was not held responsible beyond its requirements. Can we acquit him? Should his own conscience hold him guiltless? Was it not his duty *to know* the nature of the medicine he vended, and that each dose contained *thirty minims of officinal prussic acid?*

Besides these cases, between the physician and himself, the dispenser has to assume a responsibility in the sale of *poisons* to the public for various objects; and the looseness with which this trade is effected, is often the cause of serious results. The law has not yet reached forth its arm to control their sale, as it is now doing in France, where stringent legal enactments regulate the trade; hence our responsibility, morally speaking, is great, and he is a fortunate apothecary that in the course of a long career can find no cause of self-reproach for agency in the distressing casualities that occur from time to time by the misuse of those noxious agents.

In addition to these graver duties, the dispenser has a multitude of minor calls on his attention. Advice is asked as to the qualities of materials for dyeing, bleaching, and various other matters connected with household affairs, in which chemicals are concerned. By attention to these useful, though humble and not always relevant requests, he does much for his character with the public, who, though they cannot always appreciate the value of his chemical knowledge and learning, know well how to repay that pharmaceutist, who, in addition to his legitimate engagements in their behalf, has the kindness to listen to, and the ability to gratify, numerous little wants that arise in the course of domestic life.

There is another kind of service often requested of the apothecary, which may not be so readily conceded as that just mentioned. I allude to the habit of the people to ask medical advice—often in very obscure cases—where the disease, though not very apparent, is making strong inroad on the vitality of the patient—and where nothing short of a skilful diagnosis can point out the course of medical treatment applicable to the case. Much mischief has been done by the empyrical practice of apothecaries in these cases, and such a course cannot be too highly deprecated. Prescribing, in any form, is foreign to our profession, and should be avoided when possible—*yet there are cases, in the present organization of society, which demand a certain degree of action on our part*, and it should also be our study to be able to lend a helping and efficient hand in those emergencies which sometimes occur when the physician is not near, where continued life, or death, turns on the action of the moment, and where the sympathising friends or relatives of the sufferer urge our aid till the physician shall arrive. Indifference, at such junctures, would incur the charge of inhumanity, and deprive us of that sweet satisfaction that ever arises from obedience to the dictates of benevolence.

In no business is attention to appearances more required. All that tends to deprive medicine of its repulsiveness, and silence the whims and notions of the sick and suffering, should be resorted to, whether it have reference to the medicine itself, or the manner and neatness with which it is dispensed; in fact, it is *on the exterior minutiæ* of extemporaneous pharmacy that the public are most liable to base their conclusions in comparing one store with another; hence that apothecary exhibits good policy, who pays due regard to order and neatness, and who sees that skill and kindness mark every feature of his intercourse with his patrons.

Gentlemen, this fourth department of your business cannot be learned in this hall—it is altogether practical, and your proficiency in it must be due to your private instructor and your own industry and good sense in employing the opportunities afforded you at home. There is much that can only be learned in a long experience, and it is for this, among other reasons, that the diploma of this college requires a probation of four years from its possessor. Notwithstanding, therefore, your merit as pharmaceutists will depend in great measure on your proficiency in the three first noticed departments, your professional standing in the community, and your pecuniary interest, will be very much promoted by not neglecting the last.

In the remarks that have been made, I have endeavored to present a fair view of the profession of Pharmacy, of its aims, its responsibilities, its usefulness. In this country, however, but small progress has been made in its cultivation, in a scientific point of view, compared with its condition on the continent of Europe. The reform amongst the apothecaries of Germany dates but two years earlier than our first movements, and now *they* are unrivalled even on their own continent. The cause of this is their superior educational advantages, but more especially it is to be attributed to the all-powerful influence of government, which, in the matter of medicine, assumes the whole control. The student is compelled to a long course of study and practice before he is eligible for examination, and after success in passing the ordeal and in possession of his diploma, he has no power to commence business until he has authority from government, or buys out, with *its* consent, an already existing establishment. The German apothecary is, therefore, an officer of the government; his duties are clearly defined; he has no competition, because the prices of his medicines are fixed by authority, and a certain district of population is assigned to his *pharmacy*, which is always sufficient to yield a handsome income. With these advantages guaranteed to them, it is not surprising that the German pharmaceutists have time and disposition for those scientific investigations for which they have became so celebrated. In Russia the apothecary is yet more directly a government official, and is required to possess qualifications of the first order. In France, Pharmacy has also become a child of the state, but not in the sense of the German and Russian. By an act of 1840 the schools of Pharmacy were made branches of the University, and the instruction is entirely at the national expense. All students have free access to these fountains of knowledge without measure, but when application is made for the honours of graduation the ordeal is conducted with a severity and closeness far outrivalling any similar tribunals on this side of the Atlantic.

Indeed, the difficulty of obtaining a diploma, (without which it is impossible to conduct an establishment) seems yet to be increased, as the late Medical Congress of France recommend that no student of Pharmacy shall be eligible as a CANDIDATE for the diploma until he has acquired the *degree of Doctor of Arts!* a stringency well calculated to drive from the ranks all but learned men, but of doubtful utility, even in that scientific country.

English Pharmacy, on the contrary, has just awoke to a sense of her dignity, and the complex elements of our profession there, are but now assuming that order and consistency so long characteristic of her continental sisters. The whole medical body in England is marked with features not elsewhere discernible, being divided into four distinct divisions: the physicians, surgeons, apothecaries, and chemists and druggists. Pharmacy is conducted by two of these—the apothecary, who also practices medicine, and the druggist and chemist who has the same characteristics and duties as the apothecary of this country. The latter are the more numerous, and until recently were entirely without unanimity of action for mutual advantage. As might be expected, this body is composed of men of every degree of qualification, many of them second to none of their calling in the chief requisites, whilst the majority are individuals in many respects illy fitted for the responsible duties they have assumed.

In 1840, on the application to parliament by the other medical bodies for a law to regulate the practice of Pharmacy, which bore hardly on the chemists and druggists, the latter, by one of those universal movements that sometimes occur in professions, as well as in nations, arose and assumed the initiative, organized a society, whose centre was in London, with ramifications in the chief cities and towns of England and Wales; founded a central, and, prospectively, several provincial schools of Pharmacy, and now present the noble spectacle of a flourishing, self-constituted institution, numbering 2500 members, with an annual income of over $20,000. Since their commencement, the society has issued a monthly Journal of transactions and scientific papers, which has a powerful influence on the members and others, by its open, unflinching advocation of correct principles and practice. In the past six years the difficulties that assailed its youthful endeavors have been boldly met, and many objections overcome; the school has been placed on a firmer basis, and a practical laboratory established. With the inherent energy of the English people, it is by no means hazardous to predict that in ten or twenty years a body of pharmaceutists will be raised up that will do honour to English Pharmacy.

It is a characteristic of our national and state governments to interfere as little as possible with the working of private interests, and competition is left unimpeded to control the business affairs of society. This liberty of action, so advantageous in the common intercourse of men, is unfortunate in reference to medicine, which, as no guarantee of qualification is required by law of its practitioners, is thrown open to any individual who chooses to adopt the title of doctor or apothecary, be he ever so ignorant.

When we look abroad in the land and witness the working of the complex systems of quackery, which, like the miasma of an infected region, hover over every city and penetrate every village, leading thousands astray by hollow promises and lying certificates of cure, whilst legitimate means are neglected or overlooked, we cannot but desire that the strong arm of the law might reach forth and banish them from amongst us.

The only clear course that remains for us, is to enlighten public opinion through the agency of properly educated and skilful pharmaceutists, disseminated through the country, who will take a firm stand in upholding their profession from the polluting influence of empyricism, whilst they ennoble it by the cultivation of science.

You, gentlemen, are the future apostles of this great work of reform; on you will devolve in a season, the support of that cause, which, as students of Pharmacy, you have embraced; and I need hardly urge, therefore, the profound influence your present endeavors will exert on your future usefulness. Aim at the highest honour this College has to bestow—*its diploma;*—do not proceed within grasp of it and retire without making it your possession, as too many have done; but by an energetic course of study, make it your *right*, and enjoy the honorable satisfaction of *feeling that you have deserved it.*

ART. LXIX.—ELEMENTARY CHEMISTRY, THEORETICAL AND PRACTICAL. By GEORGE FOWNES, Ph. D., Chemical Lecturer, &c. Edited with notes by R. BRIDGES, M. D., Prof. of Chemistry in the Philadelphia College of Pharmacy, &c. Second American edition. Philada., Lea & Blanchard, 1847. pp. 460.

THE announcement of a new American edition of Fownes' Chemistry, so soon after the first, is a gratifying indication not only of the merit of the work, but of the increased demand for chemical literature in this country. An English reprint has not yet appeared, and the editor, in bringing out a new edition, has not had the advantage of those suggestions from the author of the work which are generally forthcoming with a reprint. In lieu of these, he has given evidence of a careful revision in the numerous notes that are appended to the text, elucidating some portions, extending others, and in several instances introducing substances overlooked by the author. The ammoniacal phosphates may be instanced as an example of the latter. One of these, the neutral phosphate, has come into use as a remedy and it is of some importance to know the characters which distinguish it from the acid phosphate, which is not possessed of the same medical qualities. The tartrate of iron and potassa is another instance; and indeed the work has been brought up to the present time by the introduction of the new facts announced since the former edition appeared.

Of the merits of the work as a text book, it is unnecessary to speak, having on a former occasion fully expressed our views. It is sufficient to state that the typography and paper are clear and good, whilst the already numerous diagrams have been increased. W. P, Jr.

ART. LXX.—PHARMACEUTICAL NOTICES.

By William Procter, Jr.

Note on the preparation of Hydrocyanic Acid.

The formula for hydrocyanic acid in the United States Pharmacopœia, was adopted by the revisers of that work from the last London Pharmacopœia. It is founded on that of Géa Pessina for the strong acid, and is the best and most economical of all that have been proposed.

The Pharmacopœia directs :

Ferrocyanuret of Potassium (yellow Prussiate of Potash) - - - - - -	℥ij.
Sulphuric acid, - - - - -	℥iss.
Distilled water, a sufficient quantity.	

The acid is mixed with four fluid ounces of the distilled water and poured into a glass retort. The prussiate of potash is then dissolved in ten fluid ounces of distilled water and added to the diluted acid. Half a pint of distilled water is poured into a well refrigerated receiver, adapted to the retort, and heat applied to the latter by means of a sand bath until six fluid ounces of liquid have distilled. The fourteen ounces of solution of hydrocyanic acid thus obtained in the receiver, is stronger than 2 per cent., and is directed to be diluted until 100 grains of it is of such strength as to accurately saturate 12·7 of nitrate of silver.

In remarking on this well established formula, it is with no view of changing it, but merely to suggest a few practical directions not found in the books, and the result of much experience. It may be observed that the directions of the Pharmacopœia in reference to the use of distilled water should be adhered to, at least so far as the water in the receiver and the water of dilution are concerned. Our Schuylkill water sometimes contains sufficient oxide of iron to cause, by standing, a minute deposite of Prussian blue in the acid. In a globular receiver it is difficult to tell just when six fluid ounces of liquid have distilled, especially when the receiver is enveloped in the refrigerating liquid as it should be. It is more easy to judge by the decrease of liquid in the retort than by its increase in the receiver, as follows: After pouring into the retort the diluted sulphuric acid, introduce the solution of prussiate with the exception of six fluid ounces, and when the retort is in position for the distillation, mark with slips of pasted paper the level on either side. The reserved solution is then introduced, and the process proceeded with until the level of the liquid in the retort is marked by the pieces of paper.

The heat should be applied with a sand bath, as direct heat almost invariably causes violent concussions due to the insoluble Everitts' salt formed, and which cause the projection of the colored liquid into the neck of the retort and thus contaminate the product. A sheet iron bowl of rather greater diameter than the retort filled in with sand between, is the best arrangement when lamp or gas heat is used.

The object of placing water in the receiver is to absorb the vaporous hydrocyanic acid at first liberated, which would otherwise, unless the refrigeration was very complete, rupture the luting or the vessel. In addition to the receiver, the neck of the retort should be kept cool by a constant stream of cold water, unless, indeed, a Liebig's condenser is used, which is greatly preferable.

The most difficult step in the process, and that involving the most care, is in ascertaining how much water of dilution the distilled product requires to reduce it to exactly the strength of two per cent. The Pharmacopœia merely gives the direction to add as much distilled water as is sufficient to make 100 grains accurately saturate 12·7 grains of silver, a direction very difficult to follow literally, and then requiring repeated trials. It is much better to base the calculation on the quantity of cyanide of silver produced by an acid of the strength sought, which is *ten grains.* All that is necessary is to weigh 100 grains of the stronger acid from the receiver, add to it a slight excess of solution of nitrate of silver, and wash the precipitated cyanuret until pure. It is then dried by pressure between paper and exposure to a heat of 212° Fah. and weighed. Every ten grains of this precipitate is equivalent to two per cent. of anhydrous prussic acid, and the amount of water of dilution is readily obtained by a simple sum of proportion, viz.: Suppose the precipitate weighs 13½ grains, proceed thus: if 13·5 grains of cyanuret are produced by 100 grains of the stronger acid, 10 grains of cyanuret will be produced by 74 grains of it, hence every 74 parts of the solution of prussic acid in the receiver requires 26 parts of water of dilution, which is readily converted into fluid ounces by the following statement: 74 : 26 : : f. ℥14 .. f.℥4 f. ʒ7 ♏ 21, which is nearly that stated in the formula.

As there is great liability to variation in the strength of the product of the distillation, this experimental essay is always necessary, and hence the language of the Pharmacopœia—"five fluid ounces, or as much as may be sufficient."

The above directions are chiefly intended for those who manipulate with the small quantities of the officinal recipe; but, in making large quantities of the acid, it is better to use less water with the materials in the retort, which demands a smaller amount of distilled liquid, and yields a a stronger acid. I am in the practice of obtaining an acid of 5 or 6 per cent., and diluting in accordance with the above mentioned plan.

If any of the acid contents of the retort are thrown over into the receiver by concussion, the subsequent testing cannot be depended on, as a portion of the precipitate will be sulphate of silver. To prevent this, a deep retort should be used.

A word in relation to stopping the vials: These should be of the capacity of one fluid ounce, glass stopped, and after introducing the acid, the cavity of the neck should be wiped dry, and the stopper pressed firmly into its place, after covering it near the middle with a thin layer of stiff cerate. Before tying over the vials, a small piece of putty should be put around the stopper joint, which greatly adds to the security of the acid. The presence of ammonia causes rapid decomposition in this [preparation, and hence in the materials and subsequent manipulation this agent should be avoided. It should be excluded from the light.

Fluid Extract of Rhubarb.

In the last number of this Journal, a formula for fluid Extract of Rhubarb was suggested, by which a concentrated solution of the soluble portion of rhubarb may be obtained, with sufficient sugar to act as a preservative. As the *Extract* has since been employed by several physicians with advantage, it has been thought best to recommend the addition of aromatics to prevent the griping tendency of this, in common with other simple preparations of the drug. Half a fluid ounce of tincture of ginger, holding in solution ten drops or more of volatile oils, as anise, fennel, etc., to half a pint of the fluid Extract, will be sufficient.

Tinctures of Aconite and Wines of Colchicum.

Some very judicious remarks were made in the October number of the *Pharmaceutical Journal*, under the caption of "Random Prescribing," showing the extreme looseness with which some English physicians prescribe active remedies for which no standard formulæ exist—or in cases where several preparations of the same plant, or of different parts of the same plant, are in use. The Editor observes: "If it be asked how such remedies should be prescribed, the answer is plain : Give the formula for the tincture, solution, etc., at the top of the prescription—a practice usually adopted by some medical men; or publish the formula, and refer to the Journal or other work in which it is published, stating on the prescription the volume and page where it may be found. The former is the most unexceptionable plan, and surely the trouble of writing two extra lines on a prescription should not be considered a hardship when the life of a patient is at stake."

These remarks have an *American* application, and, it may be said, a Philadelphia one, as almost every apothecary will vouch for, and give evidence of, on his prescription file, and they have been considered a fit preface to the following observations:

We have but one tincture of aconite officinal in the United States Pharmacopœia, whilst two, if not three, are in use. The officinal tincture is made by treating four ounces of the leaves of aconite with two pints of diluted alcohol. Another tincture, (that of Dr. Turnbull) is made by digesting ℔j. of aconite root in ℔iss. of alcohol; whilst a third tincture contains the root in the proportion of one part to four parts of alcohol. The high price of aconitia is well known. The concentrated tincture above noticed is used as a substitute for it, and when carefully prepared is a very good one. It is chiefly applied externally, although occasionally prescribed as an internal medicine. Now the object of this notice is to call attention to the fact that tincture of aconite is prescribed under the names of "Tinctura Aconiti fortis," "Tinctura Aconiti Radicis," and sometimes as simply "Tinctura Aconiti," when the strong preparation is intended. Dr. Keating of this city states, that in doses of three drops repeated three or four times, it has produced temporary paralysis of the lower extremities, whilst thirty or forty drops of the officinal tincture are given at a dose. The consequence of substituting the strong for the weak tincture internally, would be fearful, and calls for the serious attention of physicians and apothecaries.

In reference to the concentrated tincture made ℔j. to Ojss. the results obtained by M. Personne with other substances, leads to the belief that the root is far from being exhausted, and that a tincture made of half the quantity of root is equally strong. It is a point worthy of examination.

Another case is the very common habit with some practitioners to direct "Vinum Colchici," without specifying whether the wine of the root or seeds is desired. There cannot be a doubt but that half a pound of the root or cormus of colchicum, possesses more activity, and yields more power to a pint of wine, than two ounces of the seeds, and that their indiscriminate use is improper. Hence the importance of physicians using exact terms when prescribing them.

Citrate of Magnesia.

Our last number contained an article on the Citrate of Magnesia, and a purgative water made with that salt. The advantages proposed by the use of this salt, are chiefly in its being in great measure devoid of the bitter taste of the sulphate. Its sparing solubility is an objection to its use, were its expensiveness less. The purgative water is the form in which it has been most used, which is a solution of the salt in carbonic acid water, with syrup. The process of Delabarre is a tedious one, and has been improved upon both here and in France.

Our friend, Edward Parrish, of this city, prepares the "water" by forming a slightly acid citrate of magnesia, (about 1½ oz. of the salt to a pint of water,) which is introduced into ordinary Saratoga water bottles, containing the requisite quantity of lemon syrup, until nearly full, and the remaining space filled with moist, recently precipitated, carbonate of magnesia, after which the bottles are immediately and well corked. Upon mixing the contents of the bottle, the carbonate of magnesia is decomposed by the free citric acid in the solution, and the evolved carbonic acid is retained by the close cork and absorbed by the liquid.

M. Duclou suggests that a solution of any suitable strength of the magnesian citrate in hot water, be introduced into pint bottles containing the syrup, and after cooling, a dram of bi-carbonate of soda, and afterwards a dram of powdered citric acid, be added and the bottle well corked.

M. Bardet of Valençay suggests the following:

Sub carbonate of magnesia,	5¼ drams.
Citric acid,	5½ "
Lemon Syrup,	2½ "

Water sufficient to fill a seidlitz bottle.

Dissolve the acid in one-sixth of the water, triturate the carbonate of magnesia with the remainder, and add to it half the acid solution, and when the effervescence has ceased, pour it in the bottle with the syrup, and then add the rest of the acid solution and cork instantly.

M. Massignon of Paris, recommends after introducing the solution of citrate into the bottle, to add first 75 grains of recently precipitated carbonate of magnesia, and then 105 grains of citric acid in crystals, and cork quickly.

MM. Garot, Marchand, and others have suggested formulæ differing but little from the above; in fact a perfect mania appears to exist in Paris for this substitute for Epsom salt.

Whilst the citrate of magnesia has found so many advocates in France, several writers have appeared in favour of the *tartrate*, which is stated to possess the same purgative power, and to be equally devoid of bitterness. M. Aviat directs 5 parts of tartaric acid to be dissolved in 80 parts of water, and one part of recently calcined magnesia, suspended in 5 parts of water, added.

A paper on a method of depriving Epsom Salt of its bitter taste, will be found in another part of this number.

REVIEW.

ART. LXXI.—ADULTERATIONS OF VARIOUS SUBSTANCES USED IN MEDICINE AND THE ARTS, AND THE MEANS OF DETECTING THEM, INTENDED AS A MANUAL FOR THE PHYSICIAN, THE APOTHECARY, AND THE ARTISAN. By Lewis C. Beck, M. D., Professor of Chemistry in Rutger's College College. New Jersey, and in the Albany Medical College, &c. New York, 1846. Samuel S. & William Wood. pp. 333.

Adulteration of medicines has become a crying evil in this country, for a long time it has been permitted to increase in silence, darkness, and obscurity, until it has assumed the dimensions of a hydra-headed monster, formidable because gigantic, and difficult of eradication because its vitality is so multiform. The community seem at length to have aroused from a state of apathy for its own protection, as foreigners, no doubt perceiving the facility with which home-made fraudulency is tolerated, have desired to participate in the profits, and have commenced to glut the market with vile and worthless preparations. The whole secret of such imposition, as that involved in the sophistication and adulteration of drugs and medicines, does not lie solely in the desire to obtain large gains, it has also its foundation in a morbid, pernicious practice, ultimately destructive to all trade, of cheapening every article to the utmost limit of reduction, and a general ignorance on the part of the public, and even of those through whose hands the public are made to suffer. There is a fixed standard of value for every thing genuine, which in some articles is known to every one, and is not to be deviated from, as for instance for the precious metals, and to expect to obtain a pure preparation of such at half the cost of the metal itself, is as absurd as to expect to appropriate the standard coins for half their value. Where nitrate or cyanide of silver are sold for less than the metal required to prepare them, such transaction is a collusion between the seller and the buyer for after imposition. With respect to foreign articles of import, although some variation may occur according to demand, supply, impediments in trade, &c., yet for the time being there is a fixed value for them, and it may be laid down as an axiom, that *where there is the least price there is the least value.* Good drugs cannot be bought for less than they are worth, and first hands may benefit, but second or third hands must suffer. To buy worthless trash is presuming on the ignorance or confidence of the consumer. We are rejoiced at length to find, that our Colleges of Pharmacy have seriously taken up the subject. We sincerely hope that their deliberations and movements will be of benefit to a much-injured public.

The design of Dr. Beck's Manual is to diffuse information to all who are interested in this department of science, and as it is the first professed treatise on adulteration in the United States, thereby separating this branch from the vast accumulation of details contained in the books on drugs generally, it may be regarded as a pointer in a constellation. As stated in his preface, he has borrowed his information from all sources from which it could be procured, and hence the treatise is an authentic, authoritative compilation of the knowledge of the day. The first part of it is devoted to simple substances and manufactured articles, arranged in alphabetical order, the nomenclature being that of the Pharmacopœias, with the common appellations appended. Each article is succinctly described in the pure state, to which are added the modes of sophistication and the means of detecting it. The second part is devoted to "Operations and Instruments employed in Quantitative Analysis," to which are added "Tables containing the behaviour of some reagents with the more important metals." The "Index" is a full one. The convenient form of this book, a duodecimo, renders it easy to carry and to use, and we highly recommend it to pharmaceutists and physicians, who are in the habit of purchasing drugs in the gross. If we have any fault to find with the Manual, it is a want of specification of the relative quantities of the elements in each compound, as directed by the authorities that are followed. The account of the articles is too cursory and not sufficiently specific, and again it does not enter into officinal preparations; this perhaps belongs more strictly to the materia medica than contemplated by Dr. Beck, but is of great importance in guiding the dealer and medical man. For instance, blue pill is but cursorily treated of, and yet it is as varied in strength and preparation as possible, containing from ten to thirty per cent. of the metal, and so of others. If the present edition should shortly be exhausted, we hope the author will extend the sphere of its subjects and thereby its usefulness. J. C.

ART. LXXII.—ON THE ANTI-SEPTIC AND DISINFECTING POWERS OF CHLORIDE OF ZINC AND NITRATE OF LEAD.

THE English journals have been busy of late in discussing the relative and absolute merits of chloride of zinc and nitrate of lead, as anti-septic and disinfecting agents. It appears that in the year 1840, Sir William Burnett, Director General of the Medical Department of the British Navy, took out a patent for preserving animal and vegetable substances by means of chloride of zinc, and its application was directed entirely to the prevention and suspension of decay. Since then the patentee has brought his liquid before the public as a disinfectant applicable to destroy deleterious and offensive effluvia, such as those of a contagious character in fever hospitals, etc.

More recently, a preparation called "Ledoyen's disinfecting fluid," has been brought into notice, which is represented to "possess the property of destroying the offensive effluvia of cesspools, drains, sick rooms, &c., and preventing the spread of contagious diseases." It was the design of M. Ledoyen to submit the merits of his "fluid" to a committee of Parliament that if substantiated he might receive a reward from government, for divulging the composition of his preparation. He refused, meanwhile, to place the disinfectant in the hands of any party who did not obligate himself not to examine it; but the editor of the Pharmaceutical Journal having obtained posesssion of a specimen, without this condition, he states it to be a solution of nitrate of lead, which has since been acknowledged by the parties.

The anti-septic power of chloride of zinc, has been too fully established in the dissecting rooms of this city to need comment—but in reference to the more important power of a disinfectant that has been attributed to it, there is much doubt. The disinfecting action of both the substances is founded on the premises, that hydrosulphuric acid is the cause of contagion and fœtor, in the miasm and exhalations from decomposing animal matter, the truth of which is by no means perfectly established, else, as Mr. Bell observes, why do not the occupants of our laboratories become diseased through its influence. Admitting that sulphuretted hydrogen is the noxious agent to a certain extent, the question arises, are these salts efficient in decomposing and neutralising its effects?

Chloride of Zinc.	*Nitrate of Lead.*
If neutral chloride of zinc be treated with sulphuretted hydrogen, but a small part of the salt, will undergo decomposition forming sulphuret of zinc and hydro-chloric acid.	If nitrate of lead be treated with hydrosulphuric acid, sulphuret of lead will be formed and nitric acid and water be set free.
The presence of free acid in solutions of zinc salts, prevents their decomposition by the gas, and hence the disinfecting action of the solution is destroyed.	As the salts of lead are decomposed by the gas in question, in the presence of free acid, the disinfecting action will not cease till all the salt has been decomposed

The conclusion arrived at is that chloride of zinc has very decided powers as an anti-septic—whilst nitrate of lead is far more efficient as a destroyer of noxious effluvia containing sulphur.

In reference to Ledoyen's solution, the discoverers speak of its powers in the following terms:

1st. "It disinfects night soil, not destroying but increasing vegetation, more particularly as regards agriculture; *completely preventing the disease in potatoes*, when the land is manured with disinfected night soil."

2d. "It disinfects hospital wards of miasma, also cellars, water closets, and buildings infected by impure gases."

3d. "It disinfects sailors suffering from fever on board vessels; it will also disinfect ships at sea, and under quarantine."

4th. "It disinfects patients suffering with infectious disorders and wounds; also dead bodies, so that they may be kept nearly a month; also different parts of the body can be kept for the purpose of dissection, for coroner's inquests, &c."

Finally. "This process is most effectual as a sanatory remedy for towns, &c."

It may readily be conceived that a preparation promising such immense advantages to mankind, would attract the attention of government and the public. Accordingly, Lord Morpeth, as Commissioner of her Majesty's Woods and Forests, submitted the "fluid" to the deliberate examination of Dr. Southwood Smith, Mr. Toynbee, and Mr. Grainger, in connection with the discoverers, whose report was extended over many pages; but of which the following are the conclusions:

"1st, That this fluid does not possess any peculiar power in preserving the dead body from decomposition, and that, therefore, it is not applicable to any considerable extent to purposes of dissection.

"2. That it removes the fœtor of putrifying substances, vegetable and animal, by decomposing the sulphuretted hydrogen upon which that fœtor chiefly depends.

"3. That it is capable of preventing the disengagement of sulphuretted hydrogen in sick chambers, and in the wards of hospitals, and of removing it in a few minutes when it is present, not merely by dissipating the smell, but by destroying the poison.

"4. That the use of it is simple and easy, and as the occasions on which it is required are of constant occurrence, and as it has the peculiar advantage of being itself inodorous, its possession would be a comfort and blessing to private families.

"5. That by decomposing the sulphuretted hydrogen, it removes from night-soil the poison which renders such matters injurious to health and dangerous to life, and by changing the ammonia from a volatile into a fixed substance, and thereby preventing its escape and loss, it preserves in the night-soil the principle which renders it chiefly valuable as a manure, while it presents that principle to the plant in a form which is known to be highly beneficial to vegetation.

"6. That, as it renders the removal of night-soil practicable without creating a nuisance, it ought, in our opinion, to be made a matter of police regulation, that no privy or cesspool should be emptied without the previous use of a sufficient quantity of it to destroy all offensive smell."

The reporters have evidently avoided the chief question at issue, and directed their answers merely to the action of the fluid on sulphuretted hydrogen, without noticing other deleterious gaseous exhalations or referring to the powers of the liquid in disinfecting miasmatic and contagious atmospheres. The following exposition of the case was submitted to the referees by Dr. Leeson of St. Thomas's Hospital, and is so clear in reference to the objects proposed to be accomplished by the discoverers, that it is introduced here without abridgement:

"The decomposition of animal and vegetable substances gives rise, as it is well known, to septic or infectious miasmata. Those arising from vegetable putrescence, generating disease and fevers of a remittent type, whilst those arising from animal matter are distinguished by a typhoid character.

"Such miasmata, although so dangerous, are not, it is believed, to be distinguished by the smell, and are most probably composed of vegetable and animal organizations so minute and subtle, as to elude the cognizance of those methods and instruments of investigation which have hitherto been employed.

"The fœtid and offensive gases or vapours consist of combinations of hydrogen with sulphur, phosphorus, nitrogen and carbon.

"The most offensive compounds are those of hydrogen with sulphur and phosphorus, forming sulphuretted hydrogen (or, as it is otherwise termed, hydro-sulphuric acid) and phosphuretted hydrogen gases.

"The ammonia resulting from the combination of hydrogen and nitrogen, although odorous, can scarcely be termed an offensive compound, but being commonly combined with sulphuretted hydrogen, it then furnishes a highly offensive substance.

"The compounds of carbon and nitrogen forming cyanogen; of cyanogen and sulphur forming sulpho-cyanogen, and of carbon and hydrogen forming light carburetted hydrogen, may be reckoned amongst the less offensive, although volatile ingredients of the putrefactive vapours, but which combine to complete the farrago of unpleasant odours.

"The compounds of carbon with oxygen forming carbonic oxide and carbonic acid, although fatal to animal existence when too largely respired, can scarcely be considered as offensive compounds.

"To recapitulate: we may divide and distinguish the elements of animal and vegetable putrescent vapours thus :

Dangerous, but inodorous.	*Odorous, but slightly offensive.*	*Most offensive.*
Remittent miasmata	Ammonia	Sulphuretted hydrogen
Typhoid miasmata	Carburetted hydrogen	Phosphuretted hydrogen
Carbonic oxide	Cyanogen	Hydro-sulphate of ammonia.
Carbonic acid	Sulpho-cyanogen	

"Two methods naturally suggest themselves to the chemist by which such dangerous and offensive compounds may be destroyed or prevented.

"First. To alter or otherwise form their component elements into new elements, which are neither dangerous, fœtid, nor offensive.

"Secondly. To fix certain of the elements so as to render the substances themselves no longer volatile, and consequently neither odorous nor offensive.

"First Method. The principal re-agent heretofore made use of in the destruction of animal and vegetable miasmata and for the decomposition of the offensive compounds of hydrogen with phosphorus, sulphur, &c., is chlorine, the efficiency of which, is dependent on its great affinity for hydrogen, with which it forms hydro-chloric, or, as it is commonly termed, muriatic acid. Unfortunately chlorine is itself an offensive, irritating and corrosive substance, which will account for its not having been more extensively employed, although the cheap combination of chlorine and lime is applicable as a disinfecting agent, and might, it is believed, be advantageously employed.

"Second Method, by Fixation. This method is chiefly applicable to the sulphuretted hydrogen, which may, as is well known, be decomposed by a great number of metallic salts. These salts consist of an acid in combination with the oxide of a metal. When sulphuretted hydrogen is passed through or added to a solution of one of the salts alluded to, its sulphur combines with the metal, forming an insoluble inodorous metallic sulphuret.

"The hydrogen combines with the oxygen of the metallic oxide, forming water, and the acid of the metallic salt is set free.

"With regard to the particular process of M. Ledoyen, the experiments conducted by that gentleman at St. Thomas's Hospital led to the conclusion that his process was founded on the second method before alluded to; namely, that of the fixation of the sulphuretted hydrogen by a metallic salt, and that the actual metallic salt employed was ——.*

"This opinion has been frequently verified by M. Ledoyen himself, who, in the most candid manner, not only admitted the composition of his fluid to be such as is here stated, but also delivered a bottle of it to Dr. Leeson for analysis and further experiment.

"In regard to its efficacy as a disinfecting agent, the general result of these experiments establish the conclusion that the efficacy of this process is confined to the removal of the unpleasant odours due to sulphuretted hydrogen and hydro-sulphate of ammonia. As the sulphuretted hydrogen is the most abundant and most offensive of the various products of animal and vegetable decomposition, it is evident that although this process cannot remove the whole of the offensive odours, it is still well suited to effect a very important and extensive amelioration of the nuisance arising therefrom.

"In regard to the application of this liquid as a dressing to putrescent sores, there can be no doubt that it will be found useful, and that it possesses several advantages over those in common use; among others, that it is itself inodorous, that it corrects

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* This omission occurs in the Report, as here printed.

the fœtid exhalations arising from sores, and that it eliminates one of the most excellent applications to gangrenous sores yet known.

"In regard to the last and most important application of the disinfecting fluid to the removal of the fœtid and offensive odours arising from privies, cesspools, night-soil, &c., it will appear from what has been already stated, that so far as the offensive effluvia result from sulphuretted hydrogen and hydro-sulphate of ammonia, this liquid will totally remove them.

"The odour resulting from phosphuretted hydrogen and from the other less offensive compounds, will still remain; but as these odours are neither so offensive nor so readily diffused to a distance as the sulphuretted hydrogen, a most important and beneficial improvement will be effected, particularly in the process of removal.

"It remains to consider what benefits or injuries may result from the employment of this liquid in respect to the subsequent use of the night-soil as manure.

"Two important advantages will no doubt be attained; the one, the conversion of a prejudicial and poisonous ammoniacal salt; viz. the hydro-sulphate of ammonia into an inodorous and highly fertilizing compound; viz., the nitrate of ammonia. The other advantage is, that by removing that poisonous and injurious compound, thereby saving the long and offensive exposure of the night-soil to the air, which would be otherwise necessary, and which is not only disagreeable, but, by the consequent loss resulting from the volatility of the ammoniacal salts, is also injurious.

"On the other hand, there is one problematical objection to the extensive applications of this fluid as a manure to land; namely that the small quantity of the metal employed may possibly, by its accumulation, be productive of ultimate mischief; but this requires further investigation and experiment.

"The above suggestions are made without any desire to detract from the merit due to Messrs. Ledoyen and Calvert, in having thus directed public attention to the use of chemical reagents as a means of removing a very serious and dangerous impediment to the sanatory condition of towns.

The above facts and statements are chiefly derived from the editorial discussion of the subject, in the August and September numbers of the Pharmaceutical Journal.

It has recently been stated in our daily papers that the frigate Raritan, which had been abandoned at anchorage in the Chesapeake Bay, owing to the contagious miasm that infected her hulk since returning from the tropics, was entirely disinfected by the application of some disinfecting agent, the name of which was not mentioned. May it not be one of the salts in question, most probably the nitrate of lead? W. P. Jr.

ART. LXXIII.—ON A CHLOROMETRIC PROCESS FOR THE VALUATION OF BLEACHING POWDER.

By F. Grace Calvert, Esq.

(*Read before the Philosophical Society of Manchester*.)

The process to which I beg to call your attention is not entirely new, being Gay Lussac's method by arsenious acid, which I have transformed from the French system into the English, and, I hope, made it sufficiently simple to be employed by bleachers, or other persons not accustomed to much chemical manipulation.

It was the knowledge, proficiency, and precision required under Gay Lussac's method, which prevented the great majority of bleachers, even in France, from adopting it.

Let us throw a glance at the different methods which have been employed to test bleaching liquors. The first one was called *Bertholimetre,* from the celebrated Chemist, who was the discoverer of it, although it was first published in 1794 by a person of the name of Decroizilles. It was based on the power possessed by chlorine to destroy the colour of indigo. His standard liquors were made with one part of indigo dissolved in nine parts of sulphuric acid, and the whole diluted with 990 parts of water.

In 1824, Gay Lussac greatly improved upon the system of Decroizilles, and called the process for testing bleaching powders *Chlorometry*.

His attention was chiefly directed to improvements in the method of producing the standard liquor, and in introducing apparatus of a simple construction, which, by their easy graduation and *handling*, rendered the process sufficiently easy for the practice of bleachers.

Though this method is still employed by nearly all the bleachers on the Continent, it is subject to serious errors; for instance, from the deterioration which the standard indigo liquor undergoes in time, and which consists in its gradual loss of strength.

A second disadvantage, not less to be noticed, is a want of the knowledge of the exact time when the process is ended.

It was owing to these principal difficulties, combined with some minor ones, that Gay Lussac was induced to search for some more accurate process, and after many years' trial he published, in 1835, three new standard liquors, which shall be noticed after our attention has been directed for a short time to the system generally followed in this country.

" It is one in which the chlorine is determined, by finding what quantity of the chloride of lime to be analysed is required to convert a known weight of the *protoxide* of iron into *peroxide.* For this change protoxide of iron requires half an equivalent of oxygen, which is supplied in the present process by the decomposition of half an equivalent of water by the chlorine of the chloride of lime.

" Half an equivalent of chlorine, therefore, or 221.8 parts, effects this change upon a whole equivalent, or 439 parts of protoxide of iron, which quantity of protoxide is contained in one equivalent, or in 1728 parts of crystallized protosulphate of iron. Therefore, 221.8 parts of chlorine can peroxidize 1728 parts of crystallized protosulphate of iron (or 10 grains of chlorine can peroxidize 78.1 grains of the crystallized protosulphate.) Now the process consists in discovering how much of the specimen of the chloride of lime is requisite to peroxidize 78.1 grains of the protosulphate, which quantity of the chloride must contain 10 grains of chlorine.

"In the first place, 78 grains of the pure protosulphate (clean crystals of the salt dried by strong pressure between folds of cloth) are dissolved in about two ounces of water, and the solution is acidulated by a few drops of hydrochloric or sulphuric acid. Fifty grains of the chloride of lime are weighed out, mixed well in a mortar with about two ounces of tepid water, and the mixture poured into an alkalimeter. The measure is filled up to 0, with the washings of the mortar, and the liquids are well mixed by agitation, the mouth of the alkalimeter being closed by the palm of the hand. This solution of chloride of lime is then gradually added to the solution of 78 grains of protosulphate of iron, until the latter is completely peroxidized, which is discovered by means of the red prussiate of potash. This salt gives a precipitate of Prussian blue with a salt of the protoxide of iron only, and not with a salt of the peroxide; so long then as it produces a blue precipitate, protoxide of iron still exists in solution, and more chloride of lime must be added. In applying red prussiate as the test, it is convenient to have a plate spotted over with small drops of its solution, which are touched with a drop of the liquid to be tested, taken out on the point of a glass stirrer, stopping short exactly at that point at which the red prussiate of potash ceases to afford Prussian blue.

"The number of measures poured from the alkalimeter is carefully observed. The richer in chlorine the specimen of chloride of lime is, the less, of course, is required. As this amount, whatever it may be, but which, for example, we will suppose to be 70 measures, contains always 10 grains of chlorine, it becomes a simple matter to calculate the per centage of chlorine in the specimen."

This mode of operating offers some serious inconveniences, and is productive of error.

The first is, that it is very difficult to have pure sulphate of protoxide of iron, for it oxidizes with great facility; and unless in the hands of a chemist, or one well acquainted with its nature, great errors may arise in employing it as a standard.

A second objection arises from the necessity of having the salt in a fit state of dryness, which is not easy to be ascertained by a commercial person; and lastly, the disadvantage of not being able to judge with promptness the exact point when the oxidation is complete.

This is why I would employ Gay Lussac's method, whose standard liquors can be kept a great length of time without undergoing any change; and further, because we are enabled readily to perceive the instant of saturation, either by natural or artificial light.

This system is founded on the readiness with which *arsenious acid* is converted into *arsenic acid*, under the influence of chlorine, which in decomposing water gives rise to hydrochloric acid, and the oxygen acting upon the arsenious acid transforms it into arsenic.

The plan pursued consists in dissolving arsenious acid in hydrochloric acid, and then diluting this acid with water until a given volume of chlorine, say a litre, will transform an equal volume of this solution of arsenious acid into arsenic.

Here lies the difficulty which prevents this method from being popularised, because is requires much experience in manipulation to get exactly a given volume of chlorine in an equal bulk of water, none but a Chemist, or those having much practice, could attain this object by Gay Lussac's method. One of his plans is to prepare a quart of chlorine, and to have it slowly dissolved in a weak solution of potash, which object is obtained by dipping the neck of the bottle in the alkaline liquor, withdrawing the cork and allowing the liquid to flow in slowly. This method requires time and two or three complicated calculations.

His second plan is to prepare a quart of chlorine with a pure peroxide of manganese, or a manganese whose quality is known. But here again a difficulty presents itself to persons engaged in business, and it is here where I hope that I have been enabled to introduce a real improvement, by simplifying it to such a degree as to render it easily practicable to any one.

My method is to take a solution of chlorine of an undetermined strength, of which I easily determine the quantity of chlorine dissolved by pouring in a given quantity, say one cubic inch of standard liquor, made of 10 grains of pure silver, dissolved in pure nitric acid, and then diluted with water, so as to occupy 1000 grains; consequently each hundred grains of solution contains one grain of silver. Now, by the quantity of solution employed to form with the chlorine, chloride of silver, I can very easily ascertain the quantity, in grains, of chlorine that my solution contains in a determined bulk.

This method is very accurate, for it is well known how great is the insolubility of the chloride of silver, and the sensibility of its re-action. Owing to the heavy weight of the chloride, the liquid is rapidly cleared, whereby it is easily ascertained when the action is completed. By having two or three tubes filled with chlorine, the value of the chlorine solution may be readily tested to a very great nicety. Knowing that 5.1 grains of chlorine will transform seven grains of arsenious acid into arsenic acid, a standard liquor may be made of arsenious acid which will exactly contain seven grains of arsenious acid in 1000 grains of water.

This method of making a standard liquor is only necessary when great precision is required; but for commercial purposes, when the determination of a bleaching liquor to half or one per cent. of its real value, is quite sufficient, a standard liquor can be obtained by dissolving seventy grains of pure crystallized arsenious acid in one ounce of hydrochloric acid, and then diluting the whole with a sufficient quantity of water to give a total of 10,000 grains, consequently 1000 grains of distilled water will contain seven grains of arsenious acid, which will require 5.1 of chlorine to transform it into arsenic acid. This method of operating is very simple and easy, a fair sample may be taken from a cask from which fifty grains are weighed, to be well mixed with water in a mortar, and then poured into a 1000 grain measure, divided into one hundred divisions, or in other terms into an alkalimeter; the measure is then filled with the washings of the mortar up to the 0 of the instrument, so that each division will contain half a grain of chloride. If great accuracy is required, a given quantity of the liquid must be poured into a chlorimeter tube, which may indicate in tenths each division of the alkalimeter. On the other hand, there must be put into a vessel, with rather a narrow mouth, 1000 grains of the arsenious acid liquor, which contains seven grains of this acid, and which will indicate 5.1 of chlorine. This solution is coloured by a drop of sulphate of indigo, and whilst giving the liquor a revolving movement in the left hand, the chlorine mixture must be poured with the right.

When the blue colour becomes weak, a fresh quantity of blue must be added, and then proceed to add with great care the bleaching liquor, as the end of the operation is near, which point is indicated by the immediate disappearance of the blue colour.

To prevent the error of about from 1 to 2 thousandth, which the two drops of indigo may have introduced in the essay, a second operation is begun by pouring into a new portion of arsenious liquor, the quantity of chloride solution which is *nearly* requisite for the operation, and it is only *then* that the drop of blue sulphate of indigo is added. The number of measures employed is carefully observed. The richer in chlorine the specimen of chloride of lime proves, the less of course is required. To know the per centage which the number found indicates, the following method is adopted :—

Suppose that twenty-five divisions have been employed, which indicate 5.1 of chlorine, it must be calculated how many times the number of divisions employed will go in 100, namely, four times; then by multiplying 5.1 by 4, the result is 20.4 grains of chlorine, per cent. Should 20 divisions be used, 100÷20 gives 5; then 5.1 by 5 indicates 25.5 grains of chlorine per cent., and so on for any other number found.

In addition to the advantage of determining with ease the exact moment when the operation is at an end, this method affords, after a little practice, a very rapid mode of ascertaining the value of a bleaching liquor, and of being able to prepare a large bulk of standard liquor, which, by its non-deterioration, can be employed with safety for a long period, for by taking one thousand grains of it the value of a bleaching liquor can be determined in a short space of time.

M. Gay Lussac also proposed the employment for standard liquors of the yellow prussiate of potash, and the nitrate of mercury, transformed by a little chloride of sodium into protochloride; but standards made with those substances are in time susceptible of undergoing changes, which might lead to errors, besides, like the protosulphate of iron, they do not present a rapid indication of the moment when the operation is completed.—*Pharm. Jour.*

ART. LXXIV.—EXPERIMENTS ON VALERIANIC ACID.

By Dr. L. Aschoff.

Rabourdin was the first who discovered that the dried root of valerian yields a greater proportion of valerianic acid if, during distillation, some sulphuric acid be added to the water and Dr. Riegel verified this observation.

Dr. Aschoff, when examining these statements, certainly also obtained a large quantity of this valerianic acid, namely, from 15 pounds of the root 18 drachms and 2½ scruples, and at the same time the distilled water was still so acid, that several ounces of crystallized carbonate of soda were saturated by it. This fact induced him to suspect that the liquor must contain, besides valerianic acid, another acid. In order to convince himself of this he distilled a fresh portion of valerian root with water, without the addition of acid, until the last distilled portions no longer offered an acid reaction. The acid obtained was only valerianic acid. Upon this the residuary root in the still was mixed with 4½ ounces of sulphuric acid and again distilled. This second liquor reacted again strongly by acid, and required about five ounces of carbonate of soda to saturate it. The soda salt thus formed contained acetic and formic acids. Both these acids are fixed by lime in the root of valerian, and hence they remain in the residue, if the root be only distilled with water. The addition of sulphuric acid, therefore, in the distillation of valerianic acid is not advisable.

Dr. A. found, moreover, that if the root had only been distilled with water, the residue in the still always retains a strong acid reaction, which arises from some resinous substance and free malic acid.

The time of gathering and the age of the root have an essential influence upon the quantity of the valerianic acid yielded. The author found that the root, which had been gathered in the spring in dry places, dried and preserved for a few months, yielded the largest proportion of valerianic acid.

Dr. Riegel says, the *crystallized valerianate of ammonia* can be sublimed; but Dr. A. did not succeed in this, even after repeated experiments. The valerianate of ammonia is best obtained by saturating the oily acid with dry ammoniacal gas, and then applying a gentle heat in order to remove the excess of ammonia.

The valerianate of ammonia thus obtained forms white feather-like crystals, having a feeble acid reaction. As long as the fluid saturated with ammonia does not colour the litmus red, no crystallization ensues. The crystals, heated in a retort, melt at 25° R. without developing ammonia. On applying a greater heat a white vapour rises which colours litmus red, and condenses on cooling into oily drops, which even after many months do not yet show a disposition to harden. If the crystallized valerianate of ammonia be heated in dry ammonical gas, the atmospheric air being excluded, small crystals form on cooling, which melt again on the access of air. The valerianic acid appears according to this to form with ammonia two combinations, which have not yet been analysed.

Ibid, from Buch. Reper.

ART. LXXV.—ON THE MANUFACTURE OF ARTIFICIAL GUM

By M. Emile Thomas.

During a lengthy stay in England, I had occasion to occupy mself with the manufacture of artificial gums. The facts which I collected, either from my own observations or from official communications, may, I trust, prove somewhat interesting to the Society of Encouragement, and I therefore hasten to communicate the same.

Since the discovery of diastase by Messrs. Payen and Persoz, and owing to the successful applications, made by the former of these gentlemen, of the various products from starch under the influence of that powerful reagent, a new discovery has been made in this branch of industry, viz., dextrine or artificial gum.

During the last two years, especially, the manufacture of dextrine has made immense progress in France, England, and Germany. I will not here recapitulate the various uses to which this product may be advantageously applied; but I would observe, that the rapid development of a new branch of industry nearly always occasions, as in the present instance, the substitution of an economical product, of an easy and quick manufacture, for an expensive product, obtained by an uncertain manufacture.

In this case dextrine has replaced exotic gum for nearly all the purposes to which it was applied.

Dextrine is now met with in commerce in three distinct forms, viz., in the form of a white, brilliant, and pearly powder; as a syrupy solution; and in the form of exotic gum, in greater or less perfection, either broken into small fragments, or made into rolls of various sizes.

Some short time ago, dextrine was only produced in the state of powder; and if some manufacturers have sought to give to it the appearance of the product for which it is to be substituted, they may have been induced to do so from the conviction that the only way to supersede the old plan was by humouring and even deceiving its disciples with the outward appearance of the new product. In this way our learned professor, M. Payen, who was formerly a manufacturer of some eminence, introduced borax of French manufacture, by giving it the dusty appearance of the Dutch crystals of borax, rounded and polished by the friction during their conveyance.

It has since been discovered that the gummy form of dextrine possessed many great advantages not at first contemplated. I shall allude to this presently, but would first observe, that there appears to be one disadvantage attending this form. Some intelligent persons were apprehensive that, taking advantage of the resemblance, exotic gum would be adulterated with artificial gum; fortunately this is impracticable, as the smell and taste of potato oil, which is always given out by artificial gum, are sufficient to betray its presence; and thus, if the purchaser suspects a fraud, he can easily detect it.

Dextrine may be manufactured either by the use of acids, or by means of the diastase contained in malted barley. I will examine these various processes in succession.

By Sulphuric Acid.—The dextrine produced possesses the disadvantageous property of being deliquescent, *i. e.* absorbing the humidity of the atmosphere. This method is therefore never employed, as, besides this disadvantage, the products are often coloured.

By Nitric Acid.—This method is now most generally followed for obtaining dextrine in the state of powder. I have thought proper to observe on this head, that the acid employed must be perfectly pure, and for this reason—that nitric acid, as is well known, is obtained by the decomposition of nitrate of soda, obtained in the natural state from the coast of Bolivia, by means of sulphuric acid; now this salt always contains a portion of sea salt, which, together with the sulphuric acid and nitric acid, generates chlorine. Although but a small portion of this chlorine is contained in the acid, and consequently in much less proportion in the dextrine produced by that acid, it is nevertheless sufficient to considerably diminish the brilliancy and depth of the colours prepared with the dextrine. Several printers upon paper and fabrics have observed this, without being able to account for it otherwise than by attributing it to the inferior quality of the gum.

By Hydrochloric Acid.—This process is only employed to my knowledge by Messrs. Saint Etienne, who first render the starch soluble, as in the former process, by means of a small dose of acid, and by torrefaction or rather desiccation, at a high temperature.

The powder thus obtained is afterwards thrown upon a metallic sieve, and submitted to the action of a jet of steam, which damps the dextrine to such an extent as to render it transparent without liquefying it; so that it will require but very little drying afterwards. This process possesses the disadvantage of requiring great ability on the part of the workmen charged with the hydration of the dextrine. The manipulation necessary for this operation is not acquired without great difficulty; so much so, indeed, that M. Saint Etienne, jun., who directs the working of his process in England, has not yet been able to find any person capable of undertaking this part of the work. Messrs. Saint Etienne prefer to use hydrochloric acid.

By Diastase.—This process seems the most worthy of attention in all respects; as, by adapting to it some modifications, which I have tried on a large scale, it will be found to be the one giving the most perfect results. I will therefore describe it fully.

The fecula must be rendered soluble in vats, heated by steam in such a manner that the temperature may be easily raised or lowered. The fecula is first mixed with 4 times its weight of water, previously heated to about 122°; for this purpose the fecula is gradually introduced into the vessel or boiler containing the hot water. In London, I employed copper boilers, with a double bottom, capable of containing about 400 gallons; and at one operation, about 600 lbs. of fecula, mixed with 1200 quarts of water, were decomposed. The temperature must be kept at about 140° until the whole mass is converted into starch; 2 per cent. by weight of very white malted barley must then be added, and also the mucilage produced from 1 per cent. of linseed.

If a greater proportion of malt than that which I have mentioned were added, the decomposition would doubtless be more rapid; but a larger quantity of glucose would be formed, and the gum would be more coloured. With regard to the utility of the mucilage of linseed, it imparts tenacity to the gum. Instead of this substance I attempted to use lichen; but it did not answer, although the products were much whiter, by reason of the mucilage depositing itself upon the sides of the boiler, and preventing the liquid from boiling. It is, besides, not so strong as the linseed mucilage.

The mixture must be kept at a temperature of about 122° or 140° until all the starch is again dissolved; the temperature should then be suddenly raised, taking care however not to exceed 167°, but keeping as near that temperature as possible, in order to cause the diastase to act as powerfully as possible. It will then be necessary to stir the mixture well until the decomposition is almost complete; this may be ascertained by the deep blue tint the mixture assumes, and by the action of the solution of iodine, which in that case will colour the dextrine of a violet, approaching to red, without any mixture of blue.

It is unnecessary to say, that, during the decomposition, the liquid must be kept constantly in motion. The operation lasts about an hour and a quarter; that is to say, a quarter of an hour for the formation of the paste, one for its dissolution, and the other three-quarters for rendering it soluble.

I much prefer this method of forming the paste to adding the malt, as the reagent spreads much more uniformly throughout the mass, and does not at once fall to the bottom of the vessel in which the operation is performed.

The liquor must now be removed from the decomposing vats, and left in pans to settle for from 6 to 18 hours, according to the external temperature. During this time a slight fermentation will be perceptible, but it must be checked by adding alum in the proportion of 10 grms. for every 25 gallons of liquid. It is essential to allow this time for the mixture to settle, as it prevents two serious evils: viz, the colouring of the gum while baking, and a singular phenomenon so often observed in evaporating viscous liquids, viz., their being quite still, and which I have ascertained is caused by the formation of a very thick sediment on the sides of the evaporating vessels.

The liquor, when drawn off after settling, will mark about 10° B., and it is evaporated by raising it very slowly to the boiling-point; which precaution is indispensable, for the perfect clarification is accelerated by checking the first boiling, as in refining sugar. This clarification is effected without any foreign agent, by the coagulation of the vegetable albumen contained in the malt and the linseed mucilage. As scum will continue to rise to the top of the mucilaginous syrup during the most of the time of baking, it will be necessary to remove it carefully; and if the boiling is too much accelerated, the gum will first become thick, and afterwards will be coloured. When a solid pellicle of gum is formed at the surface of the syrup, the baking will be completed, at which time the syrup will mark about 35° B.

If it be desired to keep the gum in a liquid form, the baking must be stopped at 30° while boiling; the syrup must then be poured into well-closed vessels, previously rubbed with oil of turpentine, and the surface of the gum covered with a thin layer of that oil. This method succeeded pretty well for preventing the fermentation of the liquid gum.

When it is desired to solidify the gum, the boiling syrup is poured into small flat tin vessels, placed upon a hot air stove, kept at a temperature of from 72° to 90° F. At the end of 24 hours the gum will acquire the consistency of jujube paste; it is then cut up into small oblong pieces with a pair of shears, and these pieces are rolled out upon a polished table, with a wooden roller, dusted with pulverized artificial gum, and afterwards placed upon wooden frames, and left for three or four days to dry. The gum would be much better dried by letting the syrup run upon a cylinder heated to 110° or 120°; but the economy of this process is questionable. The artificial gum thus prepared is easily dissolved, and makes a very clear solution; over dextrine in the state of powder, it possesses the advantage of being more readily packed; and over liquid gum, the advantage of not fermenting.

The experiments which I have made with the various products of starch have led me to other inquiries upon analogous substances, and principally upon ligneous fibre and cellular tissue, which, as is well known, according to the experiments of M. Payen, are of the same composition as starch. At a future meeting I hope to communicate to the Society the results of some experiments upon the steeping of textile fibres, by means of processes analogous to those employed in manufacturing dextrine or sugar.

I will conclude by some observations upon an improvement which may be introduced in the manufacture of starch by washing. In the manufactory at Habertonford Mills, in the county of Devon, where M. Saint Etienne is superintendent, he is occupied in the production of starch by M. E. Martin's process, which consists, as is well known, in washing the paste obtained by means of wheaten flour under the action of a current of water and a mechanical softener. For this process it is essential that flour may be easily procured. Not having this facility, M. Saint Etienne conceived the idea of steeping the grain whole in water for two or three days, and then crushing it between rollers, and thus forming the paste. But this method was attended with a serious evil, viz. that the starch was not deposited, especially in summer. M. Saint Etienne attributed this to the quality of the water, but I convinced him that it was owing to the fermentation and partial germination of the corn, which being so long in contact with the water formed successively diastase and dextrine, and thus rendered the water which was used for washing the starch viscous. At my suggestion, he constructed an apparatus of wood, lined with lead, and having filled it three parts full of corn, he then added water sufficient to cover it. This apparatus was submitted to a constant heat of 50° C. as the maximum, with a pressure of from 15 to 20 atmospheres, and in four or five hours the grain swelled so as to completely fill the apparatus. A great quantity of water being thus absorbed, a paste could easily be formed by passing it between wooden rollers. Paste thus obtained may be used for making starch, care being taken to leave it to settle for two hours longer than the paste made with flour before softening it; there is then less fear of fermentation, and about 10 per cent. more available paste will be obtained than by grinding.—*Newton's London Journal,* from *Bul. Soc. Enc.*

ART. LXXVI.—ON SOME SPURIOUS SORTS OF OPIUM.

By M. Batka.

The high price of this drug, caused by its scarcity, is a great inducement to adulterate it, or for making substitutes for it; and offers a large field for discoveries in pharmacognosy.

The opium, which I have now before me, consists of pieces like that from Smyrna, strewed over, as is usually the case, with the flowers of Rumex, but not wrapt in leaves. It is moreover as shiny as the Egyptian, only of a darker colour. Having been exposed for some time to the air, it is now almost without smell, very hard without being stony, does not become soft in the hand like genuine opium, feels like sand between the teeth, has a bitterish, but not bitter taste, glistens when broken, but is mixed with many light spots like *Resina garannæ.* When tested for resin by friction it shows no electricity; it carbonizes in the flame without melting, and the smell which it then emits has a remote resemblance to that of frankincense, as it also does when triturated or dissolved.

It is easily triturated, whilst the genuine opium becomes more or less viscid; the powder is brownish and dry; the cold watery solution froths strongly as if from gum—the warm solution does the same, is brown, reddish if held against the light, but becomes cloudy on cooling. Litmus is without reaction on the watery solution; by alcohol an abundant precipitate is thrown down from the filtered solution, in which litmus becomes red after some time standing. The filtered watery solution by evaporation yields gum which burns to ashes. On burning the resinous residue it burns with a sooty flame and a resinous odour, leaving behind a coal which glowed and incinerated, evolving a disagreeable smell like that of animal glue. I thought it worth while to make a qualitative analysis of this opium, the result of which was:—

25 per cent. of matters insoluble in water and alcohol, consisting of:
    7 per cent. of combustible matters, containing carbon and nitrogen.
    18 per cent. of incombustible substances, viz. sand, traces of iron, lime, and lead.
64 per cent. of substances soluble in water=*Gum.*
9 per cent. of substances soluble in alcohol=*Resin.*
2 per cent. loss.

100 without any trace of morphia or meconic acid.

This so-called opium is, according to this analysis, decidedly an artificial composition, or rather a daring imposition, for there is not a trace of opium in it.* It was offered

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* By treating the watery solution with dilute acetic acid, saturating with excess of carbonate of potash, filtering, then testing the sediment with nitric acid, no trace of morphia was obtained; the absence of meconic acid was proved by precipitating by sugar of lead, and testing with chloride of iron. By caustic potash and ether no trace of Merk's porphyroxin was discovered.

to me under the title of a "secondary sort (*beisorte*)" which immediately roused my suspicions. It had very likely been kept with opium, for it had at first the smell of this substance, which it had afterwards lost.

Another adulteration, under the name of "*Egyptian opium*," I saw in London, where I examined, under the denomination of "unrated goods," a box with cakes of catechu, which was there imported and consumed as Egyptian opium.

The Egyptian opium has, as is well known, a brown, bright, glistening colour, and by fracture presents here and there lighter, orange-coloured, clouded spots. The opium which I saw, and which I immediately recognised as a product, quite similar to Bengal catechu, by the bitterish and afterwards sweetish taste, resembled this opium perfectly both externally and internally.*

I must also mention another opium-like artificial product which I received in London through the kindness of Dr. Babington, from Calcutta, under the name of "*Dikki Malei from the Malabar Coast of India.*" Martius mentions something similar to this, when speaking of the Smyrna opium, but quite different from what I have received: this consists, namely, of rather equally formed opium-like cakes of two inches square, 3′ to 4′ thick, hard and dark, with spots on the surface, shining like gum; when rubbed they develope distinctly a smell of sealing-wax (perhaps arising from the mentioned *tichi* oil?) the fracture was like that of guaiacum, greenish yellow, and resinous, with brownish catechu-like spots (from the betel nut?). It is of a very peculiar astringent taste, sticking to the teeth, and leaving behind, when chewed, an orange-yellow powder, which

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* An experiment with the mixed sulphates of iron produced the well-known greenish discolourization, and when treated with an excess of sulphuric acid, gelatine, and emetic tartar, which cause no perceptible reaction, the *tannin* was discovered.

contains, however, no rice flour, but only gum resin.* Merk observes in his chemical diagnosis of opium, that the opium obtained under the name of *Constantinople opium* contains the greatest proportion of sulphate of morphia. I have, therefore, always used acetate of baryta as a reagent in the examination of opium, in order qualitatively to determine the best sort; and, in fact, only the best Smyrna opium reacts upon it, and the Patna, Benares, English, Grecian, and Egyptian opium are at the utmost only clouded by it, but throw down no precipitate.—*Pharm. Jour. from Buch. Reper.*

ART. LXXVII.—ON POISONING BY VEGETABLES, OR THEIR PROXIMATE PRINCIPLES IN GENERAL, AND BY OPIUM OR MORPHINE IN PARTICULAR.

By M. Ch. Flandin.

This memoir is divided into two parts. In the first, the author proposes two new analytical processes, both based upon the two following experimental facts,—1st, that the proximate principles of poisonous vegetables, such as morphine, narcotine, brucine, strychnine, &c., are not decomposed

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* According to a superficial examination the *Dikki Malei* cakes consist of :

95 per cent. substances insoluble in water, viz.:
60 resin.
35 other organic substances and sand.
5 per cent. *tannin* and gum, soluble in water.
100

when in contact with animal matters at a temperature of 211° F., or a few degrees above it; 2d, that ammonia precipitates the vegetable alkalies from their acid solutions when present, to the extent of a thousandth part and less.

The two processes have this in common, that at first whatever the matters for analysis may be, they must be dried in a sand-bath at a temperature not exceeding 239° F. They are then broken up, and afterwards powdered in a machine described in the first volume of the author's "Traité des Poisons," p. 414.

The matter thus prepared is treated, according to the more or less dry or coagulable state of the products, either with water acidified with 0.025—0.05 acetic acid, or with absolute alcohol, to which, according to the nature of the proximate principle to be sought for, a small quantity of powdered oxalic or tartaric acid is added. This addition of acid, which can, or rather ought to be made either before or after the treatment with alcohol, serves to transform the vegetable alkaline base into an extremely soluble salt or supersalt; because this salt has to be subsequently taken up by cold water, so that the base may be precipitated by ammonia.

In the analysis of the urine, the treatment must be special; but it is easily described. The liquid should be evaporated to the consistence of an extract, this completely dried by adding powdered alumina, and the solid, when perfectly pulverized, treated with cold water acidified with 0.02–0.05 acetic acid. The solution is precipitated by ammonia, the precipitate washed and collected.

In using these processes, it is no longer the extracts of animal matters which are subjected to the chemical reactions adopted for detecting the vegetable bases sought for; these bases are obtained in a pure state, or in the form of crystals. The author uses a small peculiar filter, described by M. Danger, by which the smallest quantity of any precipitate may be collected without loss, which is of great importance in delicate researches like the present.*

In the second part of the memoir, the author has applied the preceding researches to the study of opium, or rather one of its immediate principles, morphine. He has given various compounds of this base to several species of animals, cats, dogs, rabbits, birds, and a monkey.

An important fact resulting from these experiments is, that morphine is tolerated in enormous doses by the above animals. Is not this poisonous base decomposed, neutralized by the gastric fluids, under the influence of the vital force? It is known, on the one hand, that morphine is decomposed by certain powerful acids, e. g. nitric acid; the author has shown, on the other hand, that the same decomposition is produced by the action of a chloride or alkaline hypochlorite and a weak acid; the chloride of lime and the hypochlorite of soda produce this effect when acetic, oxalic and tartaric acids, &c., are present or act as immediate agents. The result of the latter decomposition furnishes a new reaction, which must be added to the most characteristic cheminal reactions of the alkaline vegetable bases. Thus morphine, under these circumstances, yields a fine yellow colour; narcotine, a red colour; brucine, a rose-red colour; whilst strychnine undergoes no change. There is nothing, therefore, which should occasion surprise in the fact, which the author thinks he has established by direct experiments, viz. that morphine may be decomposed or burnt during the process of digestion or the act of respiration.

But, admitting this to be the case, it is not less true, that, according to the doses taken, the whole of the morphine is not suddenly transformed or destroyed, either in the digestive canal or in the torrent of the circulation. The author has found this poisonous substance in the fæces of the animals; also in their urine, and even in their internal viscera.

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* See Traité des Poisons, &c., p. 397.

Thus, in the case of a monkey, which for thirty days underwent a course of this substance, and during this interval took 30 grms., or an oz. of morphine, a decigramme was obtained in crystals from the urine. The author sums up in the following proposition: The vegetable poisons, especially morphine, are capable of being partly neutralized when mixed with the vital fluids or exposed to the influence of the vital forces; but the portion which produces the morbid effects, the portion which kills, remains undecomposed in the organs, and chemistry is capable of detecting it.

This proposition appears to involve an extremely interesting consequence. Infanticides produced by substances called *abortive* are real cases of poisoning, which may be confined to the product of conception, just as they may sometimes extend to the mother. Strictly speaking, all poisons, according to this view, are abortive substances. The poisonous substance is, as it were, directly transported to the organs of conception by absorption, the uterus, during pregnancy, by means of its peculiar function, exerting a kind of eliminating power. A small dose, incapable of killing the mother, suffices to destroy the fœtus; and when this is dead, abortion is the consequence.

In making experiments upon the mineral poisons, and especially arsenic, the author has seen rabbits abort, and found the poison in the young ones. These experiments have been renewed in studying the effects of morphine. Two rabbits which had taken the poison with their food aborted, as did also a bitch poisoned by subcutaneous absorption. Unfortunately, these experiments could not be made complete or conclusive; for the rabbits devoured almost all their little ones, and the bitch ate the placentæ in her case. The author thinks it highly probable that, as in the case of arsenic, the poisons reach the products of conception, and that chemistry may discover them when used as instruments of crime in cases of abortion; moreover, that poisoning is a phenomenon of absorption, and that the agent of crime remains in those parts where it has produced its pathologic or mortal effects.

The author also proposes the use of weak acids, mixed with chlorides or alkaline hypochlorites, as antidotes to morphine, narcotine and brucine. The vegetable acids have been considered as counter-poisons to opium and the vegetable alkalies in general. Chemically speaking, the dilute vegetable acids are very powerful solvents of the proximate principles, as morphine, narcotine and brucine. Are they not counter-poisons merely because they meet with alkaline chlorides in the economy? As necessary adjuvants to these acids, it would then be very useful to conjoin the special chlorinated compounds which have been mentioned. These theoretical inductions must however be confirmed by experience.—*Chem. Gaz., from Comptes Rendus.*

ART. LXXVIII.—ON THE PREPARATION OF THE IODIDE OF LEAD.

By M. Boudet.

When iodide of lead is prepared by precipitating acetate of lead by iodide of potassium, a certain quantity of iodide of lead always remains dissolved in the liquid. Lepaire, who long since drew attention to the fact, states that this remainder of iodide of lead may be precipitated by the addition of a few drops of nitric acid, while basic acetate of lead sends down tribasic iodide of lead, and sulphuric and muriatic acids liberate iodine. On evaporating the liquid, it leaves, according to Lepaire, a white residue, which on treatment with water again deposits protiodide of lead.

The experiments made by the author on this subject confirm the previous statements. In order to discover whether the acetate of potash, which is formed by the double decomposition, is the cause of the increased solubility of the iodide of lead, the author triturated iodide of lead together with some acetate of potash. The mixture, after having deliquesced to a syrup from the absorption of moisture, soon became perfectly white, and had no reaction upon blue litmus-paper. After some length of time, silky needles of the protiodide of lead and potassium separated; on adding water to the mixture, the yellow iodide of lead was precipitated, and the liquid became acid. This liquid subsequently afforded with basic acetate of lead a yellow precipitate, and nitric acid and very dilute sulphuric acid likewise threw down some yellow iodide of lead. When the white syrupy mixture of acetate of potash and iodide of lead was previously extracted with alcohol, the white residue deposited, on the addition of a weak acid, a yellow protiodide of lead, and the filtered liquid gave, on the addition of nitric acid, a precipitate of the same compound. When, on the other hand, iodide of lead was boiled with an aqueous solution of acetate of potash, the author obtained a colourless acid liquid, which deposited white silky crystals of the protiodide of lead and potassium, while an insoluble yellowish-white residue of the oxyiodide of lead was left. Hence it appears that wherever acetate of potash and iodide of lead come in contact with each other, the precipitate never contains the whole of the iodide of lead formed; but, on the contrary, there is always a loss due to the protiodide of lead and potassium remaining in solution. No such loss occurs on precipitating iodide of potassium with nitrate of lead.—*Chem. Gaz. from Journ. de Pharm. et de Chim.*

ART. LXXIX.—ON THE REMOVAL OF THE BITTER TASTE OF SULPHATE OF MAGNESIA.

By M. Combes.

It has long been a desideratum to remove the bitter taste of that valuable purgative salt, the sulphate of magnesia. After a number of trials, I have at last suceeded in effecting this by the simultaneous administration of tannin or coffee; the former however is an active agent. 1½ gr. of tannin, when boiled for three minutes with an ounce of the sulphate and about 1½ pint of water, entirely conceals the taste of the salt. The peculiar astringent taste of the tannin may be removed by an agreeable aroma. In roasted coffee we have both the advantages combined. The following are the best proportions:—

Take of Sulphate of magnesia, 1 oz.
Powder of roasted coffee, 2½ drms.
Water, about 16 oz.

Boil well for two minutes (not in a tinned vessel), remove from the fire, and let the mixture infuse for some minutes, so as to allow time for the development of the aroma; then filter, or merely strain off. It must be sweetened to the taste. This fluid does not impart the slightest taste of the bitterness of the sulphate. The salt does not undergo any decomposition by this process.

It should be observed that the infusion is not capable of removing the bitterness, nor will the addition of the salt to the filtered decoction answer the purpose.

Should it be required to increase the amount of the sulphate without augmenting the proportion of coffee, 2 or 3 grs. of tannin should be added to the boiling decoction. The aroma of the coffee masks the disagreeable taste of the tannin. Orange-flower water is also useful in concealing the flavour of tannin.—*Ibid from Ibid.*

ART. LXXX.—ON THE MOST ADVANTAGEOUS METHOD OF EXTRACTING IODINE FROM DILUTE SOLUTIONS.

By J. Persoz.

Now that iodine is so extensively used in medicine, and that its price is constantly on the increase, the want is felt more than ever of extracting it with the greatest economy both from the waters which contain it naturally, as from those of baths into the composition of which it enters, and even from the urine of the patients submitted to a course of iodine. Soubeiran, finding the process previously followed for the extraction of the iodine from the mother-waters of the Varech sodas too tedious and expensive, proposed to precipitate this body by sulphate of copper, to which a certain quantity of iron filings was added, with a view to reduce the periodide of copper to the state of protiodide. Subsequently the protosulphate of iron was substituted for the iron filings.

The irregularity of the results obtained by both these processes must have struck every one who has tried them; it is therefore not surprising that a more certain method has been proposed as a substitute. MM. Labiche and Chantrel have described one which is based upon the insolubility of the iodide of starch, but which in practice presents a difficulty which these gentlemen seem to have overlooked. In fact, iodine combines with starch only when it is in a free state; it is consequently requisite to liberate it from its combinations by means of chlorine, and this presents an insurmountable difficulty.

Having been called upon to examine this question, I found, in the first place, that the protacetate of iron, substituted for the protosulphate, produces a more rapid reduction; but as it is impossible to reckon upon a regular precipitation of the protiodide of copper, owing to the influence which the respective proportions of the solutions employed exert, I had recourse to sulphurous acid, a powerful reducing agent, and whose action upon the peroxide of copper, which it reduces partially to the state of protoxide, was pointed out by M. Chevreul. A few words will suffice to render this kind of reaction intelligible. If 1 grm. of persulphate of copper be dissolved in 150 centigrms. of water, and to this solution 1 grm. of sulphate of soda be added, the liquid acquires a green colour, and becomes turbid. As the formation of a precipitate should be avoided, and at the same time the liquid decolorized, the requisite quantity of sulphurous acid to obtain this double result is added; on letting fall a drop of a solution of iodide of potassium into it, it immediately becomes opalescent, the turbidness goes on increasing, and in the course of an hour a white, slightly-pinkish precipitate of the protiodide of copper is formed, which is readily collected by boiling the liquid for a few minutes, and then decanting.

Accordingly, in treating ioduretted waters, sulphurous gas should be passed into them until they exhale a faint odour, in order to convert all the iodine which may exist in the state of iodate into ioduretted hydrogen; then to prevent the formation of the precipitate from the mutual action of the sulphite of soda and the persulphate of copper; and lastly, to cause the reduction of the peroxide of copper. For this purpose, therefore, there is successively dissolved in the liquid under treatment 1 part of persulphate of copper and 1 part of bisulphite of soda, calculating approximatively the amount of the first for the quantity of iodine supposed in solution, upon the fact that about 3 parts of the persulphate of copper are required for 1 part of the iodide of potassium or sodium. The liquid is then left to itself or boiled, according to whether the precipitate is desired immediately or after a few hours. On letting the precipitate form in conical vessels, it is easy to collect it into a small volume; in every case it is brought upon a filter, washed, dried, and the iodine extracted by one of the known processes. Calcining the protiodide of copper, previously mixed with 2 equivs. of peroxide of manganese, may be successfully employed. The reaction above described is so readily produced, that we have no doubt that in future all ioduretted waters, even the weakest, will be treated by this process; and that it will likewise be successfully employed for the analysis of mineral waters containing bromine and iodine.

Chem. Gaz. from Jour. de Pharm.

ART. LXXXI.—ON THE ACTION OF VOLATILE OILS ON THE SULPHATES IN AN AQUEOUS MENSTRUUM.

By Mr. William Bastick.

In making some experiments in reference to the best method of preserving the aromatic distilled waters of the Pharmacopœia, I was induced to try the results arising from a mixture of volatile oils with water, obtained from a spring, containing a considerable quantity of sulphate of lime, and other salts in solution, but no organic matter, and having neither acid nor alkaline reaction.

The various oils were mixed with different portions of water, and kept in bottles in a moderately warm place for about two months. At the end of that time the waters were examined, and found to be saturated with sulphuretted hydrogen, the presence of which was readily ascertained by the smell, and by precipitation of the metallic bases usually adopted for that purpose.

On removing the sulphuretted hydrogen by precipitation with a metallic salt, the whole of the volatile oils were found to have disappeared; no trace of them could be discovered by the taste or smell; and on examining the waters for sulphuric acid, by means of muriate of barytes, no precipitate could be obtained but what was soluble in nitric acid, clearly showing the entire decomposition of the sulphates in the original water. After boiling the waters to free them from sulphuretted hydrogen, they were found to possess an alkaline reaction, and to evolve carbonic acid on the addition of an acid.

The waters had not become mucilaginous, as is usually the case when decomposed, but to the eye preserved the same appearance as when first prepared.

In fact, the metamorphoses appear to have been brought about by the mutual reaction of the elements of the sulphuric acid, of the salts, and the volatile oils. The sulphur of the sulphates, forming with the hydrogen of the oils, sulphuretted hydrogen, and the carbon of the volatile oil combining with the oxygen of the sulphuric acid, producing partially, if not wholly, carbonates of the bases with which that acid was previously combined.

It is quite evident that the only source of sulphur must have been the sulphates, as the water originally contained no trace of sulphuretted hydrogen, and the volatile oils used were such as peppermint, dillseed, &c., and are composed only of carbon, hydrogen, and oxygen.

I will take this opportunity to observe that the remarks of Mr. Warington upon distilled aromatic water, published in this Journal, are fully borne out by my own experience, as to the inutility of the spirit directed to be used by the Pharmacopœia in their preparation, and to the still worse method of preparing them extemporaneously by means of carbonate of magnesia. The simplest and best plan of obtaining quickly the distilled waters used in Pharmacy, is by merely agitating the volatile oils with distilled water in such proportions only as the water will take up. The quantities of volatile oils ordered by the Pharmacopœia are in excess, but by the methods there prescribed the excess is removed in the processes of filtration or distillation.

Pharm. Journ.

ART. LXXXII.—CIRCULAR OF THE NEW YORK COLLEGE OF PHARMACY RELATIVE TO THE ADULTERATION OF DRUGS.

The undersigned, a Committee of the Trustees of the College of Pharmacy, of the city of New York, respectfully solicit your attention to the proceedings of the Board, on the 9th inst., viz.:

"At a special meeting of the Board of Trustees of the College of Pharmacy, of the city of New York, held August 9th, 1847, convened for the express purpose of taking into consideration the best measures to prevent the introduction, throughout the United States, of sophisticated and misnamed Chemical and Pharmaceutical preparations—it was unanimously

"Resolved, That the officers of this Institution be requested forthwith to call the attention of the Secretary of the Treasury of the United States to the fact that large quantities of spurious medicinal preparations are being introduced daily into this country, not only to the prejudice of the custom house revenue and the honest importer, but in the sequel jeoparding the health and lives of all those who require medical aid throughout the land. That the Secretary of the Treasury be respectfully requested to apply the most stringent regulations within his power, to check this alarmingly growing evil.

"It was further Resolved, That the Philadelphia College of Pharmacy, and other colleges of Pharmacy and of Medicine, be officially requested to unite with us, in presenting memorials to Congress, to devise means to suppress this most dangerous fraud, by making all such sophisticated articles liable to forfeiture."

In accordance with our instructions, we respectfully ask your co-operation in a general call upon Congress, at its approaching session, for the passage of such a law as may effectually resist the villainy of manufacturers and importers of base compounds, counterfeit and misnamed articles, intended for medicine, so far at least as it can be done, in their passage through the Custom House, by competent inspection, forfeiture, and exposure of the shame now borne in secret by the participators in this traffic.

A few of many facts may be stated in illustration of the urgent necessity for such a law.

Bromide is imported and sold for iodide of potassium, some parcels being mixtures and others entirely bromide. The iodide is also adulterated frequently in large proportion with other salts of an entirely different character.

Blue pill is imported containing a per centage of mercury from 10 down to 7½, mixed with blue clay and Prussian blue, to give the proper density and colour. Two importations of this kind from the manufactory of William Bailey, of Wolverhampton, have been publicly exposed by this College in the newspapers, the first in the year 1845, and the second and worse lot during the present month. Its composition, according to the analysis of our Prof. Reid, is:

Mercury, - - - - - -	7. 5
Earthy clay, - - . - -	27. 0
Prussian blue used in colouring, - -	1. 5
Sand in combination with the clay, -	2. 0
Soluble saccharine matters, - -	34. 0
Insoluble organic matters, - - -	12. 0
Water, - - - - - -	16. 0
	100. 0

An account of the former, with the correspondence between our late President Adamson and Mr. Bailey, was also published in the American Journal of Pharmacy, vol. 11, (new series) p. 148. The latter appears in the New York Journal of Medicine for September.

Very large quantities of rhubarb, much decayed, the better parts of which are dark coloured, with scarcely any taste or smell, having probably been exhausted to make extract, come from England, invoiced there from 1½ to 3 pence sterling per pound. It is intended and used for powdering, colour being given to it by turmeric, &c.

The article called oxyd of zinc on the English labels, is generally carbonate of zinc, being imported at a price which precludes the possibility of honest preparation.

All that is received under the name of precipitated sulphur (or "lac sulphur," as the merchants commonly term it,) except when it is expressly ordered from an honorable manufacturer, contains from 80 to 95 per cent. of sulphate of lime.

Opium is often invoiced at one-third the value of good quality, and is found upon examination not to be worth even that. The same may be said of scammony.

Most of the foreign extracts are not what they profess to be, and cannot be relied upon in the treatment of disease.

The salts of quinine, morphine, and all the more costly chemicals, are greatly adulterated.

We are informed by the agent of an English manufacturer of chemicals, extracts, and many other preparations used in medicine, that it is a regular and systematic business, carried on by his principal and others in his line, to make articles for the American market of different qualities, one for the Atlantic cities, and another, very much inferior, "for the west," meaning thereby our western states. He gives us, for instance, the following quotations: "Compound extracts of colocynth 9*s.* 6*d.*; do. for the west 5*s.*"—the latter, as we are allowed to infer, containing no scammony at all, only the poorest sort of aloes, and but little, if any, colocynth, or extract from it. "Blue pill 3*s.* 9*d.*; for the west 1*s.* 8*d.*"

Is it wonderful that such enormous doses as we hear of, are taken, and indeed required at the west, and that disappointment everywhere is experienced by physicians in the action of medicines? And these examples are but few out of many that might be given. Our country is held an easy prey to the rascality of foreign counterfeiters, aided and abetted by domestic traitors, who trample down all considerations of the evils they inflict, or help to fasten upon their suffering fellow men, in this unrighteous pursuit of gain. We who have more of the prominent facts before our eyes, in this greatest drug mart of the Union, than come under the notice of others, and seeing the audacity with which this base trade advances, feel ourselves especially called upon to oppose it. We believe that stringent measures should be adopted by government to suppress it altogether, and to obtain the proper action on the part of Congress, it is but necessary to present the facts in connexion with the general corroborating testimony of Medical institutions and practitioners of medicine and pharmacy throughout the country, which we doubt not will be cordially tendered in support of our application.

We subjoin a copy of our proposed memorial, which, if it be agreeable to you to second our efforts, you will adopt if you think proper, or—as we should prefer—set forth your convictions in your own form. We would respectfully suggest early action, as more likely to prove successful; and also the advantage of adding the signatures of physicians and apothecaries in your neighborhood, as far as may be conveniently practicable. Any communications on the subject (which may be addressed to our President) will be fully acknowledged, and all information that we have, freely given.

We are yours very respectfully,
John Milhau, President.
Oliver Hull,
Geo. D. Coggeshall, } Vice Presidents.
W. L. Rushton,
Jas. S. Aspinwall, Treasurer.*
John Snowden, Secretary.*

New York, August, 1847.

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* Names entered by G. D. Coggeshall, Mr. A. being absent from the city. Dr. Snowden's authorised.

Attached to the above circular is a memorial to Congress embracing the views set forth in that document, which concludes with the following paragraph: "Your memorialists therefore pray your honorable bodies that a law be enacted declaring that all imported articles intended for medical use, which may appear to the proper Custom House Officer to be spurious, counterfeit, or adulterated, shall be subject to competent inspection, and if found to be of base character, confiscated and destroyed."

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

A Stated Meeting of the Philadelphia College of Pharmacy was held at their Hall, Ninth month 27, 1847. Present 22 members.

President, **Daniel B. Smith**, in the Chair.

The minutes of the Board of Trustees were read, by which we are informed that Jacob L. Baker, Alfred K. Scholl, and James H. Crew, all graduates of the College, have been elected Resident Members. The Board have also elected Edward McInall, of Wilmington, Delaware, and Edward S. Wayne, of Cincinnati, Ohio, Associate Members.

The Committee on Latin Labels report, that they have completed the printing of the edition authorized by the College at a former meeting; and they are continued to superintend the distribution, and report when prepared.

The following communication was accepted and the Committee discharged. The copies of the Constitution and

By-Laws which have not been appropriated, are directed to the care of the Librarian.

The Committee appointed to assist the Secretary in preparing for publication the Constitution of the College and a revised list of members, Report, That they have prepared from the minutes the amended Constitution, and a revised list of members, 750 copies of which have been published at a cost of twenty-two dollars, an order for which has been drawn upon our Treasurer.

According to the direction of last meeting, a copy has been furnished to each member, and the balance is now at the disposal of the College. The Committee ask to be discharged.

All which is respectfully submitted.

Samuel F. Troth, } Committee.
William Procter, Jr., }

Philada., Ninth month 27, 1847.

By the minutes of the Board of Trustees, a Circular and Memorial to Congress, prepared by the New York College of Pharmacy, has been forwarded to this College for its action. The circular detailing some of the impositions which are practised upon the public, by the importation and sale of adulterated drugs, and proposing that Congress should be memorialized upon the subject, was read, and elicited an animated discussion, in which some of the evils resulting from this wicked traffic were exposed.

On motion, the Corresponding Secretary was directed to acknowledge the receipt of the document, and to state that the subject will claim the serious attention of this College.

On motion of Professor Carson, it was Resolved, That a Committee be appointed to take into consideration the subject of the adulteration of drugs,—to enter into the whole subject, and report to an Adjourned Meeting of the College all the information that can be obtained, and the best means of checking or preventing this evil.

The College appointed on the Committee Daniel B. Smith, Charles Ellis, Ambrose Smith, Thomas P. James, Edward Parrish, and Professors Bridges, Carson, and Procter.

The edition of Patent Medicine Directions being nearly exhausted, it was, on motion of Charles Ellis, Resolved, That a new edition be printed, and that a Committee of three be appointed for that purpose, with authority to use any funds on hand which have arisen from the sale of directions and Latin labels, or which may be at the disposal of the Committee on the Sinking Fund.

On motion, the Committee on the Sinking Fund, consisting of Samuel F. Troth, Warder Morris and Joseph C. Turnpenny, were appointed.

The following communication was presented and read, and the members whose names are attached thereto were appointed to give attention to the subject embraced in the resolution.

To the Philadelphia College of Pharmacy.

We, the undersigned, members of the College, beg leave to call your attention to a subject of some importance to the interests of the Institution.

We allude to the Cabinet of the College, and think that an establishment with the reputation of the Philadelphia College of Pharmacy should have a collection of Materia Medica, Chemical and Pharmaceutical Specimens, commensurate with its magnitude—not only as affording an excellent basis for illustration in the School of Pharmacy, but as a means of comparison in cases of investigation.

When it is understood that the College possesses no Cabinet of Chemical and Pharmaceutical Specimens whatever—that its collection of the Materia Medica is extremely imperfect, (the illustration of the lectures depending almost entirely on the cabinets of the Lectures,) it cannot but excite surprise. A good collection is not the work of a year; and at every change in the teacher a new cabinet has to be rebuilt. One of the first steps taken by the London Pharmaceutical Society, after its organization, was the founding of a Museum; and in six years that have elapsed since its commencement, it has increased to a very respectable size, chiefly through the contributions of members. We believe if the College would provide a suitable place of deposit, in the shape of cases and glass jars or bottles, that the collection may be made up in a great measure by voluntary contributions; and by publishing to the world through the Journal the endeavours that are making, the invitation would be extended to all who felt an interest in the institution. Such a course, steadily pursued, would in a few years render the College independent of its lecturers, greatly advantage its School of Pharmacy, and eventually produce a Museum of which we may well be proud.

We therefore ask that you pass the following resolution:

Resolved, That a committee of five members be appointed, to take into consideration the best means to be adopted to form a Museum of Chemical, Pharmaceutical, and Materia Medica Specimens, and report at the next meeting.

Signed
Daniel B. Smith,
Charles Ellis,
William Procter, Jr.
Joseph Carson,
Robert Bridges.

On motion, the College proceeded to the election of eight Trustees. The tellers reported that the following named gentlemen had received the requisite number of votes, and they were accordingly declared duly elected.

Thomas P. James,
Jacob L. Smith,
James L. Elliott,
Robert Shoemaker,
William J. Jenks,
Caleb H. Needles,
Benjamin R. Smith,
Ambrose Smith.

Then, on motion adjourned.

Dillwyn Parrish, *Secretary.*

A Special Meeting of the Philadelphia College of Pharmacy was held Eleventh month 1st, 1847. Present 28 members.

Vice President, CHARLES ELLIS, in the Chair.

The meeting being called by the Committee appointed on the subject of the adulteration of drugs, &c., its object was introduced by reading the minute of the last Stated Meeting, and the resolution of Professor Carson appointing the Committee.

The Committee have given attention to the important subject entrusted to them, and are further continued.

They produced a memorial to Congress, which, after discussion and some amendments, was adopted, directed to be signed by the officers of the College, and at a suitable time forwarded to both Houses of the National Legislature.

The Memorial is as follows:

To the Honourable Senate and House of Representatives.

The memorial of the Philadelphia College of Pharmacy, respectfully represents :

That one of the chief objects of the establishment of their institution, was "to direct attention to the quality of drugs brought into the market," with a view to correct the evils arising from the introduction and sale of spurious and sophisticated articles.

That they have, from time to time, by the proper education of young men in their school of Pharmacy, by exposing frauds of various kinds when discovered, and by the publication of a *Journal*, which assumes a high tone in it exposition of these abuses, done much to correct the evils spoken of.

That it has now become notorious amongst druggists, that of late, important drugs and medicines are specially adulterated in foreign countries, for sale in this country, and pass daily through the Custom house, to be disseminated by ignorant or unprincipled dealers, to the great detriment of our citizens.

That whilst we are aware there are domestic abuses of grave character to correct, and which it is the ceaseless exercise of this and similar institutions to do away with, by elevating the character of the practitioners of Pharmacy, and disseminating a knowledge of these abuses, and the means of detecting them—a work which has more especially engaged us at this time,—we believe that Congress possesses the power in the enactment of a suitable law, to exert a highly beneficial influence on the character of imported drugs, by rendering it impossible to introduce them without undergoing inspection by a proper and qualified inspector, whose duty it should be to ascertain the real character of the drugs and chemicals destined for medical use, and keep such records, that honest dealers may ascertain at any time the character of the importations and take means of protection against imposition. We believe that such a law would within a moderate period, exhibit a very evident influence on the quality of importations; as it is generally only necessary that such sophistications be known, to be condemned by the majority of dealers.

Your memorialists therefore ask of your honourable bodies, that a law be enacted embracing the appointment of a proper inspector at each chief port of entry, whose duty it shall be to examine all the importations of drugs, medicines, and chemicals used as medicines, and, if necessary, have them properly tested; keep a full record of such inspections, including the names of the parties, which shall be open for consultation to the druggists, apothecaries, physicians, and others, concerned, or adopt such other measures as in your wisdom may seem best adapted to prevent the evil complained of.

On motion of Professor Bridges, it was Resolved, That copies of the Memorial passed this evening be transmitted by the Committee to the various Colleges of Medicine and Pharmacy of this country, with an urgent request that they will co-operate in obtaining the proposed results.

Then on motion adjourned,

Dillwyn Parrish, *Secretary.*

MISCELLANY.

On the Essential Oil of Bitter Almonds.—By Mr. R. D. Grindley.—There is a great discrepancy in the opinions that have been expressed by Chemists and Toxicologists, as to whether the pure oil of bitter almonds, or hydruret of benzoyle, be poisonous or not. By some the known poisonous properties of the crude oil of bitter almonds of commerce is ascribed entirely to the hydrocyanic acid which it contains, while others assert that the oil freed from prussic acid is still a violent poison. The experiments which are mentioned by Dr. Christison and Dr. Pereira would appear to have settled the question, and to have left no further doubt, that pure oil of bitter almonds possesses no poisonous properties; but the assertion of the opposite opinion in the *Outlines of Chemistry*, more recently published, by Dr. Gregory, has again created doubts on the subject.

As public attention has of late been so much directed to this substance, I felt desirous of making some experiments on it, and my results are as follows:—

At first I adopted the usual plan for removing the hydrocyanic acid, by distilling the commercial oil with a mixture of protochloride of iron and lime; the product was still contaminated with the acid, and several repetitions, conducted with every precaution, were attended with no better success; I then adopted, by the suggestion of Mr. Redwood, the following method which proved most satisfactory. The oil was mixed with an equal quantity of water, and digested in a water-bath with binoxide of mercury, and small quantities of lime and protochloride of iron; time having been alowed for the decomposition of the acid, the whole was introduced into a copper retort, and subjected to distillation; the product consisted of pure hydruret of benzoyle, while bicyanide of mercury, benzoate of lime, chloride of calcium, and oxide of iron, remained in the retort, with benzoine and any excess of the ingredients employed.

The process is founded upon the strong affinity which exists between mercury and cyanogen, so that when binoxide of mercury and hydrocyanic acid are digested together, they are both decomposed, bycanide of mercury and water being formed. The protochloride of iron, which with the lime yields protoxide, is introduced to prevent the formation of benzoic acid, from the oxidation of the oil; for the same reason, care should be taken to conduct the process with as little access of air as possible. The oil thus procured was pure and colourless. No trace of nitrogen could be detected by Lassaigne's test, which I found to be exceedingly delicate, affording indications of the presence of that body in extremely minute quantities of morphia, narcotine, &c.; it consists in adding to a very small quantity of the substance to be tested, in a small German glass tube, a fragment of potassium, about the size of a millet-seed, and heating the tube in the flame of a spirit-lamp, until the organic substance is completely carbonized, the carbonaceous residue is treated with cold water, and to the clear decanted liquor, a drop of a solution containing the mixed oxides of iron is added; a dirty green precipitate is immediately formed, which, if nitrogen be present, is changed into a bright blue, on the addition of a drop of hydrochloric acid.

Five drops of this pure oil were administered to a rabbit, and no effect being produced, ten more, dissolved in olive oil, were given to the same animal the following day, still without any injurious results, except slight irritation, attributable to the acridity of the oil; thus giving satisfactory evidence of the fact that essential oil of bitter almonds when *pure*, does not possess poisonous properties.

The extreme difficulty of freeing the oil from the hydrocyanic acid by the usual process, seems to account for the contradictory results of former experiments; and when we reflect on the numerous fatal consequences attending the use of this article for domestic purposes, and the simplicity and economy of the above process, it becomes important that manufacturers of this article should give their attention to the subject, and endeavour to supply the public with a preparation at once perfectly harmless, and still possessing the agreeable flavour for which it is so highly esteemed.

The following letter, relating to this subject, from the *Manchester Guardian* of June 19th, has been forwarded to us by a correspondent:—

Caution to Druggists and Housekeepers.

To the Editor of the Manchester Guardian.

Sir—I think it my duty to give publicity to the following case, not with a view to censure any one, but to caution druggists and housekeepers against the practice of vending and employing for culinary purposes, the essence of bitter almonds, without due *printed* instructions as to the quantity to be used, and the danger of deviating from the instructions given:

I was called professionally to a lady labouring under symptoms which induced me to inquire into the diet taken on the previous day, when a statement was given, proving that some custard of which she had partaken had acted poisonously (though, happily, not fatally,) her symptoms having been such as are familiar to medical men as the effect of an over-dose of prussic acid. Bitter almonds in substance, and in the form of essence, likewise the kernels of stone fruit, contain this acid in different proportions, which fact should be known, as it is much to be feared that these articles are used ignorantly with respect to their dangerous properties. In mentioning the case of my patient to a medical man, he informed me that a friend of his had had placed before him some custards, which seemed to be superimpregnated with bitter almonds. On questioning the cook as to what she had used, she replied, "Nothing but almond water, which is a harmless thing; I'd drink a bottle full of it!" "Would you?" replied the gentleman, "then bring me the liquid and the cat; when on pouring a small quantity of the liquid into the animal's mouth, poor puss instantly expired. The object of this notice, then, is to caution druggists especially against selling bitter almonds, or the preparation entitled *essence* of the same, without explicit *printed* directions as to the quantity which may be safely used (if the pampered appetite require that they should be used at all) as adjuncts to custards, puddings, and such like articles of diet.

CHIRURGICUS.

Pharmaceutical Journal.

On Vanilla and its Culture. BY DESVAUX.—The cultivation of vanilla requires a damp but warm climate and a good soil. Hence a ground with low shrubs, which give little shade, is best adapted. It is not necessary to till the ground in any way, but the slips of vanilla are planted at the root of a tree or shrub on the approach of the rainy season when they creep up around the trunk. Once a year the plantation is cleared of the exuberant shrubs, and in the third year the plants bear fruit. The inhabitants of Misantla, twenty-four leagues north-west of Vera Cruz, are the only persons of the republic of Mexico, engaged in the cultivation of this plant. They distinguish five sorts:

1. *La Corriente*, of which there are two kinds: one with a delicate fine skin, rich in seeds and pulp, and the other of an inferior quality and with a thick skin; the *Lec*, *Ley*, or *Leg*, of some parts of South America, the genuine vanilla of commerce. Perhaps *Vanilla aromotica*, Sw.?

2. *La Sylvestre*, or *Cimarrona* [wild vanilla]; the fruit is smaller than the foregoing; it grows in the shade, or among the shrubs, its fruit therefore is less developed than that of the cultivated vanilla, with which it is identical. Some call it Simarona.

3. *Mestiza.* The unripe fruit is green, with brown spots; more cylindrical than the genuine, and easily dehiscing on becoming dry.

4. *La Puerca.* The fruit is much smaller than the first kind, and in the unripe state is dark green; when drying, it evolves an offensive smell, from which it is also called *hog vanilla* (*vanille de cochon.*)

5. *La Pompona* (*v. pompona*, Schiede.) The fruit is shorter and thicker than No. 1, and has a very delicate epidermis. The smell is pleasant and is particularly obvious when becoming dry, but is not so agreeable as that of the first sort; in time it loses its smell, and hence is but little valued. This probably is *Bova thick vanilla* (*v. bouffié*) of some authors, and is known in France under the name of *Vanillon.*

The harvest begins about the month of December, and the yellowish green colour of the fruit, which was formerly green, indicates its ripeness. Often, however, the fruits are gathered before they are ripe, partly by the proprietors, partly also by persons who like to reap what others have sown. The pedunculus is always left on the fruit. After the harvest the fruits are allowed to dry a little till the pedunculus loses its green colour, whereupon the dressing of the vanilla commences in the following manner:—Straw mats covered with woollen blankets are spread on the ground; when the latter are well warmed through by the sun, the fruits are spread on them, so that they are equally exposed to the sun. Then they are wrapped in the blankets, placed in boxes, covered with cloths, and still further exposed to the sun. Within twelve hours they should have assumed a coffee-brown colour; if this is not the case, the process is repeated on the following day. Should the weather be unfavourable, artificial heat is employed. In order to make the quality of the vanilla still more perfect, they are again daily exposed to the sun on mats for about two months. Practice soon teaches the cultivator to know when the fruits are sufficiently dry, to which point particular attention must be paid, as they otherwise lose in weight and quality. When the dressing is finished, the fruits are tied up in bundles of fifty and packed in tin boxes. It happens, however, not unfrequently, that inferior sorts, such as the *puerca* and *pompona*, are placed in the middle of the bundles, instead of the genuine sorts; of which five kinds are distinguished, viz., *primiera*, which must be twenty-four centim. long, and proportionately thick, and filled with pulp to the pedunculus; *chica fina*, which is shorter than the foregoing, so that two fruits are counted for one; *sacate*, which is less thick than the first, and at the base not quite filled with pulp; *resacate*, which is small, dry, and four are reckoned for one; these are the fruits which have been gathered before they were ripe; and *basura*, the most inferior sort, the fruit of which is very small, spotted, and cut or broken.

Formerly, and even at the time when the Spanish colonies were independent, the value of the crop amounted in the district of Misantla to no more than 50,000 st. yearly; in the year 1844, however, it yielded two millions; in 1845, three millions, and a further increase of a million may be expected in 1846. Impositions, robberies, &c., appear to be very common in the vanilla trade. Schiede, in his botanical reports from Mexico, (Linnæa, von Schlechtendahl, vol. iv., 1829) says, that besides Misantla, the cultivation of vanilla is carried on also in Papantla, Nautla, and Colipa.—*Pharm Jour., from the Ann. d. Sciences.*

Test for Anhydrous Alcohol. By Casoria.—In order to determine whether alcohol contains water, let a sample of it stand for some time in a well-closed vessel, with anhydrous sulphate of copper. If water be present, the latter assumes a blue colour; but it remains white if the alcohol be free from water.—*Pharm. Journ.*

Production of Nobili's Coloured Rings, from Zinc, by Galvanism. By A. A. C. Walter.—A cup having been filled with a concentrated solution of chloride of zinc, a platina wire from the zinc pole of a strong voltaic battery was dipped into it, and then a silver-plated copper disc, fastened to the platina wire of the copper pole, was introduced into it. Nobili's coloured rings appeared on the plated surface, which, however, soon became dim again. At the same time, foliaceous vegetations of glittering metallic zinc precipitated from the wire of the zinc pole, which soon extended to the copper plate. The latter having been removed, and the wire of the copper plate again introduced, the vegetative formation of zinc soon lost its metallic appearance, and changed into a granular mass of a gray colour, which entirely dissolved after a short time.—*Ibid, from Central Blatt.*

How to distinguish Stains of Blood from other Stains.—Peroz found that blood-stains are blackened by hypochlorous acid, while most colouring substances are bleached by it. Brame adds, that the hypochlorous acid should be free from the perchloride of mercury, as it is easily obtained by Williamson's method, or by agitating fresh chlorine-water with peroxide of mercury. The same author advises removing the stains with faintly-alkaline water, and then performing the experiment in a glass tube. The solution then appears, at a certain degree of concentration, red by reflected light and greenish by transmitted light. M. Buchner states, that the presence of mercury does not appear to interfere in the least with the reaction of the acid, and that the blood-stains instantly become brown, but not black. Chloride of lime or chloride of soda and an addition of muriatic acid may also be employed.—*Chem. Gaz., from Liebig's Annalen.*

On the Use of Artificial Ultramarine for Colouring Sugar.—In France, artificial ultramarine is employed for giving to dragées, bonbons, &c., a pretty blue colour. But if the latter contain some acidulated juice, they assume a very disagreeable taste of sulphuretted hydrogen, although the colour remains equally brilliant. Chevallier succeeded in preventing this, without prejudice to the colour, by boiling the ultramarine before employing it, with water acidulated by acetic acid, and then washing it with hot water.—*Pharm. Journ. from Journ. de Chem. Med.*

Pharmacy in China.—The Chinese are in advance of the English in the regulations established for the practice of Pharmacy, as none but qualified men are allowed to engage in business as Pharmaceutists in China, which is not yet the case in England.

The Emperor of China has decreed, by a law passed in May, 1846,

1. That the proprietor of every Pharmaceutical establishment shall be required to have a diploma, signed by three members of the Academy of Medicine, who shall testify to his competency, after having satisfied themselves by an examination.

2. That every Pharmaceutist shall be required always to keep camphor, rhubarb, and liquorice, in his shop.

3. That purgative salts, calomel, laudanum, arsenic, and other similar substances, shall be only sold when ordered by the prescription of a medical man, or sanctioned by a magistrate.

The Pharmaceutist is also required to keep a sufficient supply of *Ginseng root*, and to superintend the growth of the plant furnishing this very costly, but favourite Chinese remedy.—*Pharm. Jour., from Repertoire de Pharmacie.*

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