Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

- [ ] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [x] Bound with other material/ Relié avec d'autres documents
- [ ] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [ ] Showthrough/ Transparence
- [x] Quality of print varies/ Qualité inégale de l'impression
- [ ] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

Title on header taken from:/ Le titre de l'en-tête provient:

- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

- [ ] Additional comments:/ Commentaires supplémentaires: Irregular pagination.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X		14X		18X		22X		26X		30X	
	12X		16X		20X		24X		28X		32X

Original and Selected Papers.

ON SPECTRAL ANALYSIS APPLIED TO PHARMACY.

BY E. B. SHUTTLEWORTH.

A perusal of the interesting paper on this subject, read by W. W. Stoddart, F. G.S., F.C.S., at the recent meeting of the British Pharmaceutical Conference, induced me to repeat the experiments therein detailed, with a view of ascertaining whether the constancy of the spectra was such as could be relied upon; and whether the spectroscope could be applied with advantage to the detection of adulteration, and substitution, as suggested by the author.

The instrument used was constructed by D. K. Winder, of Toronto, and contained four flint glass prisms, having a refracting angle of seventy degrees. An ordinary coal oil lamp was employed as a source of light, with a small condensing lens for increasing the intensity when required. The liquids examined were, in all cases, contained in white glass bottles of 0·5 inch diameter, of the kind commonly known as one drachm homœopathic vials.

Two sets of experiments were made; one with the preparations diluted, as nearly as possible, to the same extent as recommended by Mr. Stoddart; the other, with the tinctures in an undiluted state, the condensing lens being employed to increase the light.

In comparing the results of the first set of experiments with those obtained by the author of the paper referred to, considerable differences were observed. Some of these were apparently traceable to a difference in the powers of the instruments employed; as in the cases of Tincts. Stramonii, Sennæ, and Lobeliæ, which exhibited well marked lines, though none were mentioned by Mr. Stoddart. The principal variation was found, however, in those instances where a partial absorption, or darkening were described, or where one color was stated to overlie another. An inquiry into the cause of this want of coincidence revealed the fact that the amount of absorption varies with the state of dilution of the substance under examination, and that the result is further modified by the intensity of the light. This was rendered particularly evident in the case of Tinct. Iodi. Mr. Stoddard describes the spectrum thus:—"Impervious to light, except in a thin stratum. When diluted, the blue and violet are absorbed, and part of the green much darkened." My observations were as follows:—

Undiluted:—All absorbed but part of the red, which appears as a bright band.

Moderately diluted:—Violet and blue absorbed; green partially so.

Dilute:—Violet absorbed, blue partially absorbed.

Very dilute:—Violet and blue partially absorbed.

Here we have four distinct spectra of the same preparation, each of which might be taken as characteristic, if the precise degree of dilution or intensity of light were given; but without which the indications, as a practical test for the recognition of the substance under examination, are of no value whatever. Many other instances of disagreement might be adduced, but, as it is probable that they all arise from the causes mentioned, it will not be necessary to allude to them.

The question to be settled is, What is the proper degree of dilution? Mr. Stoddart says the ratio should vary from two to ten times or more; Tinct. Hyos. Bienn. requiring three or four times its volume of proof spirit, to be seen to the best advantage. This is not my experience, as the spectrum of Tinct. Hyos. Bienn. appeared to the best advantage when undiluted. The chlorophyll lines in Tincts. Sennæ, Stramonii, and Lobeliæ, which were not noticed by Mr. Stoddart, were observed in the undiluted preparations. Instead of dilution, I should recommend an increase of the light by means of a condensing lens. In this way the greater number of the liquids can be examined in their ordinary state. The same intensity of light might be employed by different operators by selecting a standard of comparison. For instance, a degree of light which just rendered visible the red band in Tinct. Iodi. might be taken; this tincture is one of the best that could be chosen, as its color is constant, not being dependant on variable vegetable constituents.

From the experiments made (and the results were in all cases verified by Mr. Winder), I do not think the application of spectral analysis will result in much practical advantage to pharmacy. As a means of distinguishing between various preparations it is not of particular value, as the experienced eye can as readily recognize a tincture by its color in the bottle, as its spectrum in an instrument, although, perhaps, not with the same nicety. After a little experience, the spectrum of a liquid may be foretold by judging of its color. Greenish tinctures, as those from leaves, invariably show a dark line, or lines; yellowish or reddish tinctures always absorb more or less of the violet or blue. It is purely and solely a matter of color. The addition or subtraction of colorless substances does not affect, in any way, the spectrum, except a change of color is produced; and, as the activity of a preparation seldom depends on coloring matter, very little is to be expected from the spectroscope in detecting adulteration or substitution.

As a source of pleasure and interest to the pharmacist, however, this new application of spectral analysis promises much, scarcely less than the brilliant appearances of incandescent bodies. Indeed, the spectra of some liquids even rival in beauty some of the finest lines of the metals. A solution, in alcohol, of the coloring matter of ordinary grass, is particularly to be noticed as exhibiting chlorophyll lines of great distinctness. Some of the aniline colors, dissolved in alcohol, are also remarkably pretty. A somewhat uncommon appearance is given by the color known as "Bleu de Lyon." The middle of the spectrum is entirely absorbed, leaving the red and violet as bright bands; when very dilute, a line appears in the yellow, which is then visible.

A handy substitute for the side prism may be noted. When a comparison of two spectra is desired, it may be effected by bringing the bottoms of the vials containing the liquids together, before the slit. Of course, it is necessary for the bottles to be quite full, and corked.

On the Process for Preparing James's Powder.*

BY MICHAEL DONOVAN, ESQ.,
HONORARY MEMBER OF THE COLLEGE OF PHARMACY OF PHILADELPHIA, ETC., ETC.

More than two centuries ago a medicine was in repute made by burning shavings of hartshorn or of bones along with sulphuret of antimony, and continually raking or stirring them together until the sulphur was burnt off, and the powder had become light grey or ash-coloured. It was known as Lile's and Schawanberg's fever powder, and was much used about the middle of the seventeenth century.

In 1746, Dr. Robert James, a physician of talent and eminent learning, finding the powder to be an excellent medicine, and having made a trifling alteration in the process of preparing it, secured a right to the exclusive manufacture by a patent. The conditions of obtaining a patent were that the petitioner shall make oath that he is the sole inventor, and that he has deposited in Chancery a true and precise specification of the mode of producing the article for which he seeks the monopoly. But Dr. James was not the sole inventor, nor did his specification disclose his process; nor could the powder, thenceforward called "James's Powder," be prepared by the means which he pretended were sufficient: he concieved that his best security was secrecy. Dr. James, therefore, virtually had no patent right.

For a long series of years nothing was certainly known of the composition of the powder until the investigation was undertaken by Dr. George Pearson, who in 1791 gave an account of it to the Royal Society, and a communication which was published in the 'Philosophical Transactions.'

A medicine founded on the experiments of Pearson, and intended as a substitute for James's Powder, was introduced into the

* From the Pharmaceutical Journal, London.

London Pharmacopœdia of 1783 under the name of Pulvis Antimonialis. It was accordingly used by apothecaries as a succedaneum on account of the high price of the real James's powder; but it never obtained the confidence of practitioners; and hence the origin of the adjunct used in prescriptions, *verus*. Indeed, it never deserved their confidence, being, as directed in the Pharmacopœia, an almost inert substance.

Dr. Pearson informs us that all the parcels of James's powder, that he had seen would be called white powders, but no two of them were white in the same degree; they had either "a shade of yellow, or stone colour, and none were perfectly white, or so white as some specimens of Pulvis Antimonialis of the shops. Some parcels had a brassy taste, others no taste. Dr. Pearson having formed a powder from bone-ashes and crude sulphuret of antimony possessed of properties similar in kind to every one of those ascertained to belong to James powder, with scarcely any difference in the degree of them, considered that they were the same. Beside this synthetic proof, he adduced the evidence of analysis, and made experiments in proof before competent judges." He says, "it is very probable that no degree or duration of fire applied in open or close vessels alone can produce a calx of the same kind as that in James's powder, nor, perhaps can such a powder be composed by fire applied in close vessels to calx of antimony mixed with calcined bone; but if calx of antimony, duly calcined, be mixed with calcined bone, and exposed to air, in a due degree of fire, for a sufficient length of time, and then in a still greater degree of fire be applied to it in close vessels, such a compound may be formed as James's powder. . . . No such white powder is formed by a mixture of any calx of antimony and bone ashes, exposed to any degree of fire in close vessels, without previous exposure to fire and air."

Pearson concludes from all his experiments that James's powder consists of phosphate of lime and a peculiar calx of antimony, different from all others, composing a triple compound in the proportion of about 57 parts of calx of antimony and 43 of phosphate of of lime, or a double compound of the same elements.

The admitted medical efficacy and the high price of James's powder induced the various colleges of physicians to introduce into their pharmacopœias a process for imitating it. They took for their guide the investigations of Pearson, and dictated formulæ which apparently did not much differ from the prescription of that accomplished physician. This preparation called Pulvis Antimonialis, proved an utter failure, having neither the composition nor the medical effects of the powder of James. In the manipulation of the manufacturers, the chief object seemed to be the production of a powder as white as snow,—the very quality which it ought not to possess if intended to resemble the powder of James, which at that time was always slightly yellow, or cream coloured, or even stone-coloured, as we learn from Pearson.

I made a number of trials of the process of the three British Pharmacopœias (1816), but could not obtain the powder white like the Pulvis Antimonialis of the druggists, or like the James's powder then in use. The roasted materials introduced into the skittle-pot, with another inverted, both luted together, were maintained at a white heat in an air-furnace for two hours. When cold, the included matter was found converted into a dense, close-grained, buff-coloured mass, as hard as limestone and very heavy. Being again heated to whiteness, it became a deep olive-brown, harder than before.

I repeated the process on new materials, heating them similarly in a different air-furnace, and obtaining an olive-brown semivitrified mass with dark streaks, harder than the former mass, a small portion of a white enamel appearing on the side of the skittle-pot.

It was plain, therefore, that the heat was too high, and that the use of the air-furnace originally directed by Pearson, and adopted in all the pharmacopœias, was an error. I, therefore, repeated the process, and placed the skittle-pot containing the powder in a common fire grate, heaping coal round and and over it. In due time the skittle-pot became red-hot, and in this state was kept for an hour and a half or two hours. When cold, it was found to be a snow-white powder, covered by a congeries of crystals a quarter of an inch thick. Thus one important fact was acertained.

On repeating this method several times, and using an iron ladle in a common coal fire, the resulting powder, instead of being uniformly white, proved in some instances to be buff-coloured; but occasionally the snow-white powder was obtained. As the failure was not due to the final heating, it must have originated while the materials were in the iron ladle. Various experiments convinced me that the heating in the ladle is the most important part of the whole process; and at length it became evident that when the heat, accompanied by continued stirring or raking, was maintained until the powder changed from dark brown to a light yellowish-grey, the final heating in a skittle-pot brightened it, or the greater part of it, to a perfect white. The light yellowish-grey colour here mentioned will be best understood by comparing it to the dust of a Bath brick, often used for cleaning dinner knives, but a little paler.

But to heat the powder while in the ladle fully to this colour, but not beyond it, was the difficulty.

During these experiments I preceived that when the quantities of the two ingredients were as large as ten ounces of each, the resulting powder when taken from the skittle-pot never proved white, but generally dark grey, interspersed with a deep yellow-colored portion. The fact pointed to the conclusion that the ladle was too small for that quantity of materials, that due raking during the heating was impeded, and that the desulphuration was accordingly imperfect. A hemispherical ladle capable of holding a gallon being procured, a charge of ten ounces of each was placed on the fire and continually raked for several hours, at first without any intermission, and at length with short intervals of rest, until the proper colour was attained. This matter, being finely powdered was introduced into a proportionately large skittle-pot and exposed to a well-built coal fire in a common grate, and kept red-hot for three hours. When cold, the top portion proved to be a thin cake of dark-coloured matter; under that was a small quantity of yellow portion; and the remainder snow-white.

On trying so large a charge as sixteen ounces of each ingredient in the large ladle it proved to be unmanageable; the carbon at an early period ignited; the mass softened, collected into dark-coloured lumps, which could not be raked notwithstanding much effort. Finding it impracticable, I took out the charge when cold, and being powdered, it was returned into the ladle in four different portions, each of which was separately raked while heating, until the proper colour appeared to be attained. The whole of the powder being charged into a very large skittle-pot, was heated in a well-built and well-supplied fire for several hours. The powder, when cold, was found to be yellow throughout; for the proper proportion between the quantity of matter and the containing iron ladle had not been observed, the necessity of which was thus amply proved. It is a certain fact that a large quantity in a small ladle will never afford a white powder.

By reversing the conditions of the process, that is, by acting with due care on a small quantity of materials in a very large ladle, we are pretty sure of bringing the charge safely through its first stage of danger. Thus when four ounces of hartshorn-shavings and the same weight of sulphuret of antimony were well raked in a ladle of the capacity of a gallon, until the requisite colour was attained, and when heated in the skittle-pot for an hour or more in the usual manner, the powder almost always turned out white, generally snow-white, but sometimes with the cream-coloured tinge noticed by Pearson. Under the condition of small charges in a very large ladle, the snow-white colour was sometimes produced by a very hot fire in fifteen minutes after the skittle-pot had become red-hot but with a fire not so hot, a much longer time was necessary.

After following up these experiments for some time, I found that much trouble and anxious watching would be saved by raking the bone-shavings, without the sulphuret of antimony, until the ammoniacal fumes, the sulphur, and the extremely fetid gases had been expelled; and making proper allowance in subsequently apportioning the antimony.

Adopting this method, six ounces of calcined hartshorn-shavings mixed with four ounces of sulphuret of antimony, were raked over a graduated fire, in my largest ladle, until the powder had assumed the usual yellowish-grey hue. It was then transferred to a small skittle-pot, which, being placed on a stand in a large fire grate, coals were built round and over it, and a cover applied. The skittle-pot was kept red hot for six hours. When cold, it was cautiously examined. No part of the partially cohering powder was white; it was almost all dark grey, but much darker towards the top; the portion at the very top was full of particles of metallic antimony, and even small masses of it which had assumed a somewhat rounded form. The dark grey colour of the whole mass seemed to be caused by intermixture of thousands of minute shining particles of the metal with the phosphate of lime. Round the mouth of the skittle-pot and on its cover was a small accumulation of white powder, some of which was minutely crystallized, and was deposited by the dense white smoke which issued from the skittle-pot every time the cover was removed, and ceased when it was replaced. At the bottom of the skittle-pot was a small quantity of yellow powder. It was remarkable that although many processes had been conducted in this fire-grate in all respects in the same manner, except that the fire had been maintained for two hours only, the powder had always turned out white, a significant fact which seemed strongly to indicate that the heating had been continued too long, and perhaps too intensely. It also agreed with the two cases already described, in which the intense heat of the furnace during two hours had produced the same injurious effect. It corresponded also with the fact already stated, that a portion which had been adequately raked was rendered perfectly white in the crucible by fifteen minutes' red heat in a strong fire, the same effect not being producible by a weaker heat for a much greater length of time.

In due time, after finishing a quantity of my James's powder, I was anxious to know something of its medical effects, and with this view gave it to several friends for trial, and used it also in my own person. But in most of the cases tried, the powder had a rough action, producing sickness, and sometimes vomiting. I had used equal quantities of bone-ashes and sulphuret of antimony as directed by Pearson, and followed in the pharmacopœias, but this proved to be too much of the sulphuret. I therefore made new trials of the process with half the quantity of antimony. In these proportions the difficulty and uncertainty of the process were greatly diminished; the powder almost always turned out snow-white, and when used as a medicine in due doses was for the most part easily borne in the *primæ viæ*. But it is very probable that Dr. James employed a less ratio of sulphuret of antimony even than one-half; he sometimes prescribed his powder in doses of ten grains every six hours, and even twenty grains at once, without much effect on the stomach, bowels, or skin.

There is a slight objection to conducting the process of roasting in an iron ladle, and raking with an iron rake; minute particles of protoxide of iron are found in the resulting powder, very small in quantity, but unpleasant in appearance. This may be remedied by substituting an earthen dish, and it was such a vessel that Pearson used in his experiments; but the iron ladle is far more convenient.

I believe that James's powder may be prepared in the following manner:—Let any quantity, say eight ounces, of bone-shavings be heated in an earthen-ware dish or an iron ladle, over a moderate fire, and frequently stirred or raked during its incineration. When burnt to a black powder and amoniacal fumes are no longer perceptible, let four ounces of levigated sulphuret of antimony be thrown in, and let stirring with an iron rod from the bottom and all parts be immediately commenced and rapidly continued, so that the sulphureous fumes shall have a *free* issue and be no longer discoverable. This is most important.

During the desulphuration the heat should be kept as low as may be sufficient to cause the discharge of the vapour. In the dark, the powder should show a thin, blue flame, as faint as possible; but as often as this flame disappears, the heat should be gently raised until it again appear. But neither the bottom of the ladle nor the powder should be allowed to become red-hot while vapours are discharged, or while there is blue flame from the burning sulphur. At length even a higher heat will not expel any more sulphur. During this roasting, innumerable bright spiculæ of metallic antimony will sparkle through the powder. The ladle and its contents may be allowed to become red-hot for two or three minutes, the raking being continued. If the process has been rightly conducted, the powder, at this stage, will have assumed the colour of the dust of bath brick.

The contents of the ladle should now be powdered, sifted, transferred to a skittle-pot, its cover laid on, and the whole placed on a stand in the fire-grate, and lumps of coal are to be built round and above it in such a way as to permit a free current of air to pass through. The skittle-pot and its contents will thus be brought to a uniform bright red-heat, which may be maintained at that degree for about an hour, more or less, according to the quantity. The skittle-pot is then to be taken from the fire, and should the powder prove to be pure white, except perhaps a thin layer at the top, it only requires to be reduced to the finest powder in an earthen mortar, and sifted through a fine silk sieve. Should the powder not prove white, it may be returned to the skittle-pot, placed in the fire as before, and continued in a state of ignition for half an hour, according to the judgment of the operator.

In the first part of the process, the sulphuret of antimony is slowly decomposed; its sulphur burns, and exhales in the state of sulphurous acid. The antimony, now insulated, appears in small brilliant spiculæ, which, as the heat increases, gradually disappear. In the second part of the process, when the roasted matter is heated in the skittle-pot, antimony, while in the state of vapour combines with oxygen, and is converted into protoxide, part of which crystallizes in the upper part of the skittle-pot, or escapes as a thick, white smoke. The heat increasing, the protoxide is converted into antimoniate of antimony, which remains mixed or combined with the phosphate of lime.

If the heat be raised much above that of a good coal fire in a common grate, the mass will slightly cohere, and in some parts will become yellowish and vitreous. If the heat be still higher, as that of an air-furnace, the powder will change to an olive-brown mass as hard as stone.

All the time the powder is in the skittle-pot and very hot, protoxide of antimony is escaping or crystallizing on the cover, and hence the difference discoverable by analysis, and by the medical efforts of different parcels of James's powder. It therefore becomes an important and difficult question, what is the criterion by which the completion of the process is to be judged? I know of no other then this, that when the powder is white it is fit for use: any greater or longer-continued heat I believe to be injurious. It may not always happen that the whole charge will prove white; when it does not, the whitest parts are to be separated, and, if worth the trouble, the remainder may be slightly calcined again. But should the first charge, after being duly heated, prove dark-coloured throughout, it cannot be improved and may be rejected.

Before concluding this paper, I may mention some facts relative to James's powder which were communicated to me a great many years ago by a very old gentleman who had been an apothecary in Dublin, Mr. William Speer, the clever inventor of a well-known hydrometer for ascertaining the strength of excisable spirituous liquors. It was as follows:—

In 1758 Dr. Anthony Relhan, a Fellow of King and Queen's College Physicians in Ireland, practised in Dublin, and was one of the physicians of Mercer's Hospital. The Fellows refused to meet him on account of his employing James's powder in his practice, although the decree against antimonials by the French College of Physicians had been long before repealed. In consequence, he wrote to Dr. James, who advised him to go to London to practise, which he did. Becoming intimate with Dr. James, the latter, during several interviews, communicated the process practically to him, his patent-right having expired. In 1760, Relhan returned to Dublin, and being acquainted with Mr. Ducros, an eminent apothecary, then residing in William Street, he communicated the process to him confidentially. Ducros prepared the powder in presence of Relhan, and it was repeatedly administerad in Mercer's Hospital and other places, with exactly the effects of James's powder. Mr. Speer was apprentice to Mr. Ducros, and on his death in 1868 susceeded to his business. the widow gave up to Mr. Speer a MS. book containing the account of the Pulvis Jacobi, which he retained over after. The following is the process:—"Take one pound of hartshorn-shavings; boil them in a large quantity of water, and dry them by a slow fire. Rub them to a fine powder. Then put an equal weight of the hartshorn and powdered crude antimony into a crucible, and set it on a moderate fire, stirring it with a long rod of iron for six hours or as long as it smokes."

I have repeated the above process several times, but never could produce the snow-white powder with which we are familiar; the resulting colour being generally that of bath brickdust already described, but on a few occasions paler. Yet the statement of Mr. Speer is I think supported by facts. Dr. Pearson says, "It is probable that this powder was made for several years with merely the heat necessary to carry off the sulphur and calcine the bone, in an open vessel, and consequently it was of a light clay or ash colour. Its property of turning white in a greater degree of fire appears to have been a subsequent discovery." But in this greater degree of fire the powder discharges copious fumes of protoxide of antimony, and becomes less active as a medicine; and at length assuming the hard, vitreous state, it loses all medical power. On one occasion, when I had obtained the powder from the iron ladle paler than usual, I took several doses of it without any striking effect, which proves at least that, in this state, it is innoxious; its taste was most disagreeable, whereas the white powder is tasteless. I imagine that in this form the powder would prove to be in its most active state; that it was in this form that Lilo's and Schawanberg's powder obtained its celebrity; and that the subsequent process of whitening it by fire deteriorates its medical efferts more or less according to its degree and continuance. But is of little use to insist on this part of the subject in the present day. If the whitening process in the skittle-pot were relinquished, and the light ash-coloured powder from the ladle were accepted, we should probably have an efficacious medicine of uniform or little-varying strength.

Clare Street, Dublin.

Poisoning by Carbolic Acid

Has occurred in England. On the 5th of February, Dr. Machin was called to a hospital where three women had, by mistake, bathed themselves with a sponge with carbolic acid to cure the itch. A few minutes after the operation they complained of burning headache, dizziness, and soon became unconscious. Although ablutions with warm water and soap were ordered, one of the women died, without being restored to consciousness, in the course of four hours. The second became conscious, and attempted to vomit; an emetic was administered, and afterwards a cup of strong coffee, which brought some relief, but in spite of all remedies she died the third day. The third patient recovered. The carbolic acid employed was black and oily, and apparently impure. Only six ounces of the acid were used. *Journal of Applied Chemistry.*

Hydriodic Ether and its Uses.*

BY W. A. WETHERBEE, M. D.

Within the past few years the attention of pharmaceutical and other chemists, through the continent of Europe, and subsequently in this country, has been called to the nature, chemical properties, and therapeutical uses of this compound, which had previously been known only in the laboratory of the theoretical and experimental chemist. It is composed of iodine (I), and the radical, ethyl ($C^4\ H^5$), and is therefore the iodide of ethyl, and represented by the formula, $C^4\ H^5\ I = 155.3$. To obtain it, we very cautiously, and little by little, mix ten parts by weight, of pure resublimed iodine, five of alcohol, and one of phosphorous, and distil into a receiver kept cool by surrounding ice. The safest way to effect the combination of these ingredients, is to place the phosphorous and alcohol in a matrass or flask, and gradually raise the temperature to 108° F., in order to melt the former, and then to add the iodine, in small quantities at a time, through a glass tube, closed at the lower end, but having a number of very small lateral perforations near the bottom. The mixture is then stirred with this tube, which is allowed only to reach almost to the bottom of the stratum of alcohol, and therefore only admitting the latter, which gradually dissolves the iodine, thus rendering the reaction moderate and comparatively safe. About four-fifths of this mixture is then distilled at a temperature of about 150°. The distillate invariably contains an excess of alcohol, which, however, may be easily separated by washing with pure distilled water. The supernatant liquid is decanted, and the ether dried with a little chloride of calcium.

On the large scale, and for practical purposes, we believe that another safer and cheaper method is now generally employed, which is the following: Muriatic acid in its gaseous form, that is, deprived of the water in which, in its liquid state it is dissolved, is conducted into absolute alcohol until the latter has become saturated, and this solution is placed with iodide of potassium in a retort, from which, after standing twenty-four hours to permit a thorough reaction, it is distilled and washed free from alcohol, and dried as in the first process. The residue, after distillation, will be chloride of potassium, KCl. One hundred parts of alcohol will absorb about sixty-eight parts of the muriatic acid gas, and the quantity of the iodide of potassium used should be exactly sufficient to convert this amount of gas, in its union with the potassium of the iodide, into chloride. The reaction of the gas with the alcohol being attended with evolution of heat, the liquid should be kept surrounded with ice or some other freezing mixture.

As produced by either of the methods above named, Hydriodic ether is a colorless uninflammable liquid, of a specific gravity of 1.94, or nearly double that of water, of a sharp, pungent taste, and of a penetrating ethereal odor. Its boiling point is at 148° F., and the specific gravity of its vapor is 5.4. At a red heat it is decomposed, giving off the purple vapors which are peculiar to iodine. When exposed to the action of the atmosphere for any length of time, it assumes reddish tints from the liberation of iodine, a change which may be easily prevented by introducing a globule of metallic quicksilver into the bottle containing it. It is nearly insoluble in water, but very soluble in alcohol, from a solution in which it is precipitated by the addition of water. It is also easily soluble in simple ether.

When placed in contact with metallic zinc, the latter unites with the iodine, forming iodide of zinc, and leaving the radical *ethyl* in the form of a colorless gas, having a faint, ethereal odor, of a specific gravity of a little more than 2, and burning with a brilliant white flame. At the temperature of 37°, and under a pressure of 2½ atmospheres, it is reduced to a colorless, transparent liquid, which is soluble in alcohol. The isolation of this radical requires a temperature of a little more than 300°. Common ether is the protoxide of this compound, represented by the formula, $C^4\ H^5\ O = 37$, and alcohol is the same when hydrated ($C^4\ H^6\ O^2 = 46$). Besides its use in the chemical laboratory as a reagent for the purposes named, it has within the past few years attracted the attention of physicians, especially in America and England, as a remedial agent, to be administered by inhalation, in many cases in which the use of iodine is indicated. It is given in doses of 12 or 15 drops, inhaled from a napkin or sponge. In these doses, it is a gentle stimulant, and anti-spasmodic, but in larger quantities, and when inhaled for a considerable time, it becomes a powerful anæsthetic agent.

It is especially adapted to diseases of the lungs and bronchial tubes, and hence it has been most successfully administered in cases of bronchitis, phthisis, asthma, catarrh, and their kindred diseases. It increases the appetite, produces an increased pulse, and is said to produce great vivacity of spirits and activity of thought.

When prepared with phosphorous, as by the first formula, it is sometimes nauseating to the patient, on account of remaining traces of that substance, but when prepared by the other method, and of pure materials, it is free from any such objection, as any excess of chlorine would be completely expelled by the degree of heat which is necessary for distillation. The alcohol employed in its preparation should be of the purest quality, and especially should it be deprived of all traces of fusel oil, as is also indispensable in the manufacture of chloroform.

If, as has been represented, this compound has all the virtues of iodine, bringing the patient under all the beneficial influences of the latter, without any of its unpleasant effects, then we cannot too earnestly encourage its use by the medical faculty, and would call upon manufacturing chemists to prepare a suitable stock for the market, of a quality which shall not tend to throw the article into bad repute.

* From the Journal of Applied Chemistry.

Manufacture of Refined Potash.

The salts are broken into fragments the size of an egg, and lixiviated in water. The lixivium should mark from 20° to 25° on the Beaume areometer; it is passed into cauldrons, where, by successive evaporations, crystallisations, and solutions, the separation of the salts is effected.

In the first set of cauldrons, the lixiviate is evaporated until it marks 40° on the Beaumé areometer; at this density, most of the sulphate of potash is precipitated. The liquid is left to settle, and decanted into crystallising pans, where the greater part of the chloride of potassium crystallises when quite cold.

The mother liquor is evaporated in the second set of cauldrons until it marks 45°, during which process it precipitates carbonate of soda. After settling, the lixiviate is again passed into the crystallising pans, where, on cooling, a new deposition of chloride of potassium takes place. The lixivium is again heated in the third set of cauldrons, and rendered sufficiently concentrated to mark either 50, 51, 52, or 53 areometric degrees. Carbonate of soda is still deposited; the liquid in the crystallising pans, when cool, still precipitates chloride of potassium, and when evaporated to dryness, yields commercial refined potash, generally containing from 78 to 82 per cent of carbonate of potash. In order to obtain potashes refined to a still higher standard, these are dissolved at 80°, and the solution evaporated to 61 or 63 areometric degrees. Carbonate of soda is deposited, and the liquid obtained, when evaporated and calcined, yields potashes from 88 to 94 per cent of carbonate of potash.

It has been shown that the greatest part of the sulphate of potash contained in the salts was deposited during the first evaportion of the lixivium. This salt, polluted in the first instance by the impurities of the lixivium, contains, besides the alkaline carbonates, chloride of potassium. By means of rakes, the salt is taken up as it precipitates, placed to drain in vessels of perforated sheet iron, dissolved, and subjected to a fresh crystallisation. Commercial sulphate of potash is thus obtained.

The chloride of potassium successively deposited during the different phases of evaporation of the lixivium is left to drain, and, when deprived of the liquid which moistens it, is saleable. After the second or third cooling, it is not, however, sufficiently pure to be introduced into trade, and must be collected and restored to the first set of cauldrons, there to be operated upon anew.

The carbonate of soda produced by evaporation of the lixivium purified after desiccation by means of successive solutions and crystallisations, repeated two or three times. The soda-salt thus obtained furnishes, after calcination, commercial white-soda.—M. Gaston Tissandier, in *Chemical News.*

Chromic Acid.

Is perhaps the best, and certainly the least painful, of all caustics. It is extremely well adapted to destroy all morbid growths or excrescences. Not painful, and not liable to spread like most caustics, it has been successfully used to destroy cancroid excrescences on or near the *os uteri.*

CANADIAN PHARMACEUTICAL SOCIETY.

PRESIDENT, - - - WM. ELLIOT, ESQ.

The regular meetings of the Society take place on the FIRST FRIDAY *evening of each month, at the Mechanics' Institute, when, after the transaction of business, there is a paper read, or discussion engaged in, upon subjects of interest and value to the members.*

The Society admits as members, Chemists and Druggists of good standing, and their assistants and apprentices, if elected by a majority vote, and on payment of the following fees:

Principals - - - - - $4 00 per Annum
Assistants & Apprentices, 2 00 "

The JOURNAL *is furnished* FREE *to all members.*

Parties wishing to join the Society may send their names for proposal to any of the members of the Society. A copy of the Constitution and By-laws of the Society will be furnished on application.

HENRY J. ROSE, *Secretary.*

THE CANADIAN
Pharmaceutical Journal.
E. B. SHUTTLEWORTH, EDITOR.

TORONTO, ONT., NOVEMBER, 1869.

Correspondence and general communications, of a character suited to the objects of this JOURNAL, are invited, and will always be welcome. The writer's name should accompany his communication, but not necessarily for publication.

Subscriptions will not be acknowledged by letter, as our sending the paper may be taken as sufficient evidence of the receipt of the money.

All communications connected with the paper to be addressed, post-paid,
"EDITOR CANADIAN PHARMACEUTICAL JOURNAL, TORONTO."

TINCTURES.

In glancing around the shelves of a drug store one cannot fail to be impressed with the extent of the class of spirituous compounds designated tinctures; nor is the idea erroneous, as it is probable, that of all the divisions of officinal preparations, the class *Tincturæ* is the most numerous and important. The druggist is, perhaps, more particularly interested in his tinctures than in any other part of his stock; their bright appearance is secured by careful filtration; sediments are not so much as heard of; while the ever clean and polished bottles, guiltless of finger marks, or stalactitic incrustations, maintain a constancy of level, in regard to their contents, despite the most exhaustive demands, and, like the widow's cruse of oil, are always full.

Tinctures can boast of considerable antiquity, although, when compared with the ointments and infusions of ancient times, they might even be termed modern, as, in the sense in which the word is now understood, they could not certainly have existed previous to the discovery of alcohol. This period is variously stated. Rhases, an Arabian, who lived in the ninth century, is said by some to have been the discoverer of brandy, and several pharmaceutical preparations, of which alcohol was the vehicle, are attributed to him. In Watts' *Dictionary of Chemistry*, the credit is given to Abucasis, who lived in the twelfth century; while others attribute the discovery to Raimond Lullius; or to Arnold, of Villa Nova, a chemist who resided at Montpellier, in 1300; but Brande thinks that inasmuch as the Egyptians seem to have derived their chemical knowledge from Oriental nations, and as the process of distillation was known to them, at a very remote period, it is likely that they were also acquainted with alcohol. However, this may be, it is probable that as soon as the solvent properties of alcohol became known —and they could not long be concealed—one of the first applications would be to the healing art.

But not until later years have tinctures assumed that prominence which they now enjoy. Even in the sixteenth century—if the description of the great dramatist may be taken as characteristic of that period—the apothecaries' shop presented a very different aspect to the present.

"About the shelves
A beggarly account of empty boxes,
Green earthern pots, bladders, and musty seeds,
Remnants of packthread, and old cakes of roses,
Were thinly scattered, to make up a show."

The absence of liquid preparations is particularly noticeable, and as it is evident that the Apothecary of Mantua made as much display as possible, it may be presumed that tinctures formed but a slight part, if any, of his stock.

Unfortunately, our library is very deficient in works of antiquity—even Gray, of respected memory, is not at hand, or we might trace out, in detail, the history of tinctures to the present time. Suffice it to say, however, that in this day there is no class of preparations in more general favor or request. The number appears to be increasing, though an effort in the direction of curtailment seems to have been made by the compilers of the first British Pharmacopœia; but in the edition of 1867 we find fresh accessions. The number of tinctures at present officinal, according to this authority, is sixty-five. In the United States there is a decided leaning towards fluid extracts, some druggists even making their tinctures from these preparations. This practice cannot be too strongly condemned; as, at best, the composition of the tinctures is exceedingly uncertain and variable, and that of the fluid extracts is still more so, from the great number of processes employed in their manufacture, and the great temptation on the part of manufacturers to turn out articles deficient in strength. It is a comparatively easy matter to judge of the quality of a crude drug, by its appearance, but this is next to impossible in the case of fluid extracts.

Until recent years, the process of maceration was alone employed in the manufacture of tinctures. The introduction of the method of displacement by M. Boullay & Son, of Paris, in 1833, has, however, effected a gradual but complete revolution in its favor. The process quickly gained notice in France, and was embraced at once by many of the leading pharmaciens. In Great Britain the subject received considerable attention, but it was not until 1864 that the authorities officially recognized the process. In the edition of the P. B. for that year, we find percolation adopted in 39 out of 56, the whole number of tinctures then officinal. But the abandonment of maceration by the P. B. is, after all, only partial; for, as if afraid to trust wholly to displacement, it directs the previous maceration of the ingredients for forty-eight hours, and the final expression of the drug. The authorities of the United States think differently; relying on the skill of the operator, they trust to percolation, alone, for a thorough exhaustion. It is not our province, in an article like the present, to discuss the relative merits of these methods; we intend, at a future period, to treat the matter at length, as it is a subject at which we feel particularly interested.

NEW SUBSCRIBERS.

We ask the assistance of our friends in obtaining subscribers for the coming year. The JOURNAL has, so far, met with a fair share of encouragement, but there are still some druggists whose names are not on our list. We have never made any special effort in the way of obtaining subscribers, by canvassing, or otherwise, relying for success on the merits of the undertaking, and the efforts of our friends. We have no desire, however, of hiding our light under a bushel, and although the JOURNAL was instituted as the organ of the Pharmaceutical Society, and for the benefit of its members, we should like to have a good outside circulation as well. The new year offers the best time for subscribing, as a new volume will be commenced at that time. We might also intimate, that a goodly number of subscriptions fall due at that period, which we hope to renew.

THE Pharmaceutical Society of Great Britain purpose publishing a "Year Book of Pharmacy," to contain abstracts of all papers on pharmaceutical subjects, issued during the year, whether at home or abroad. The "Annual Report on the Progress of Pharmacy," in the "Proceedings of the American Pharmaceutical Association," is suggested as a model, but it is intended to make the abstracts more in detail than usual with that publication. The work is to be bound with the Annual Proceedings of the Conference, which will then make a book of about 500 pages, octavo.

The recent meeting, at Exeter, of the British Association for the Advancement of Science, has been made the subject of a book, of a burlesque character, entitled *Exeter Change*; edited by Snug the Joiner; in which the deliberations of the Association, and its learned members, are treated in a satirical, though exceeding good humored and non-offensive manner. The style of Professor Tyndall, is very cleverly imitated in the paper "On the Alcoholic Compound termed Punch." The paper closes with the following:—

"Experiment has proved that the juice of three or four lemons, and three-quarters of a pound of loaf sugar dissolved in about three pints of boiling water, give saporous waves which strike the palate at such intervals that the thrilling acidity of the lemon-juice and the cloying sweetness of the sugar are no longer distinguishable. We have, in fact, a harmony of saporific notes. The pitch, however, is too low, and to heighten it, we infuse in the boiling water the fragrant yellow rind of one lemon. Here we might pause, if the soul of man craved no higher result than lemonade. But to obtain the culminating saporosity of punch, we must dash into the bowl, at least, a pint of rum and nearly the same volume of brandy. The molecules of alcohol, sugar, and citric acid collide, and an entirely new series of vibrations are produced—tremors to which the dullest palate is attuned.

"In punch then, we have rhythm within rhythm, and all that philosophy can do is to take kindly to its subtile harmonies. It will depend in some measure upon previous habits, whether the punch when mixed will be taken in excess or in moderation. It may become a dangerous ally of gravity and bring a sentient being to the gutter. But, on the other hand, it may become the potent inner stimulus of a noble outward life."

Tinct. Ferri Acet.

J. Deane and T. Jefferson (Proc Br Ph. Con., *Pharmaceutical Jour*) having realized the instability of the above preparation, and the difficulty of preparing it on short notice, propose the the following:—

Liq. Ferri Persulph. 2½ oz. (fluid).
Liq Ammoniæ q. s.

The precipitated oxide of iron, after being thoroughly washed and pressed as dry as possible, is to be dissolved, without heat, in 520 grains, or, approximately, 9 fluid drachms, of glacial acetic acid, and the solution diluted with distilled water to 5 fluid ounces. One part of this, with three parts sp. vini rect., will represent the tinct. ferri acetatis, B. P. In this way a very elegant and convenient preparation may be obtained, which will keep for a considerable time, samples so prepared having been kept over twelve months without any change beyond the formation of a small quantity of a crystalline deposit which, however, is entirely soluble on dilution with either sp. vini rect. or aq. destillata; the solution is in fact, slightly supersaturated, but it was found that any attempt to make a more dilute solution, such as twice or thrice the strength of the tincture, interfered with its keeping properties.

CANADIAN PHARMACEUTICAL SOCIETY.

The regular monthly meeting of the Society was held in the Mechanics' Institute, on Friday evening, 6th inst.; the President in the chair. The change of the night of meeting caused a perceptible improvement in the attendance.

After reading and adoption of the minutes of last meeting, the following new members were elected:

PRINCIPALS.

JAS. AYLSWORTH, Tamworth.
CORNELIUS DAWSON, Warkworth.

ASSISTANT.

CHAS. T. BELL, Tamworth.

The President regretted that the application of Mr. Dawson had not been brought up sooner, owing to his absence from Toronto at the last meetings of the Society.

Mr. R. W. Elliot, on behalf of the Committee on Legislation, reported that he had seen the member of the Ontario Legislature who had charge of the Bill, and it was expected soon to be placed in the hands of a special committee of the House, in view of which the Society should examine the Bill carefully. From a reference to the English journals, we found some small impediments in the working of the British law, which it would be well to guard against; and then we had received many hints and opinions from our own non-resident members that demanded our attention, so as to have the Bill as perfect as possible.

The clauses of the Bill were then read over and discussed.

With regard to the name, it was decided, on motion, that the Society shall be called "The Ontario College of Pharmacy."

A revision of the Committee mentioned in Section was rendered imperative by the death and removal of some of the members composing it, and the names of Mr. S. J. Parker, Owen Sound; Mr. A. W. Kempt, Peterboro', and Mr. Jas. Browne, Ottawa, were substituted for Mr. Jas. H. Parker, Mr. Gilmor, and W. M. Massey.

The dates were altered, and the time for registration was extended to July 1st, 1860.

The advisability of having a clause inserted in the Act, requiring the formulæ of all the patent medicines sold in Canada, wherever made, placed in the hands of the Registrar of the Society, was then discussed, and it was decided to authorize the Committee to endeavor to obtain its insertion.

Mr. Shuttleworth then read several letters he had received since last session, regarding proposed alterations in the Act. Many of the opinions were thought impracticable. One proposal, that only members of the Society should be allowed to vote for the first Council, received an animated discussion; but the majority thought that it would tend more to popularize the Council, and increase the confidence of Parliament, to have all *bonâ fide* druggists allowed to vote. The question of what constituted a *bonâ fide* druggist, suggested by a correspondent, was thought to be easily ascertained; or if a specific test was desirable, the written testimony of two or more physicians as to a druggist's ability to make up ordinary prescriptions, would be satisfactory.

The suggestion that druggists be exempted from jury service was urged, and the Vice-President said that he believed the English law of exemption was authority here, as he had himself been exempted by a learned judge on that ground.

The following committee was then appointed by the meeting to attend at the special committee of the Ontario Legislature: President, Vice-President, Treasurer, Messrs. R. W. Elliot, Shapter, and Shuttleworth.

The Treasurer, on behalf of the Lecture Committee, brought up the question of Lectures for the season. He said that the number in attendance at the last course was said to be fourteen, and to place that number in attendance at the University or Victoria College would cost some two hundred and eighty dollars; and, after stating the financial condition of the society, left it for the meeting to decide whether to authorize a continuation of the chemistry course of lectures or not, the Mechanics' Institute having decided not to ogranize chemistry lectures unless the Society came to some similar arrangement to last year's. The subject was freely discussed by the members present.

Mr. Shuttleworth gave an account of a system of teaching adopted by Mr. Schacht, and described by him in a paper "On Pharmaceutical Education," read at the British Pharmaceutical Conference. The plan consisted in the taking of a popular work on chemistry, such as, Roscoe's, and studying one or two chapters each night, explaining it fully, and cross examining on it. This had been found to work admirably, and Mr. Shuttleworth concluded by offering his services to conduct such a class in his own house. In reply to a question as to remuneration, he said that it would be quite gratuitous on his part. This offer was received with warm approval by the meeting, and on motion of Mr. Elliot, the sum of $75 was placed at the disposal of the Lecture Committee, to defray any necessary expenses, as books, apparatus and prizes, for the class, in adopting which, many members spoke in favourable terms of the ability of Mr. S. to conduct such a class successfully.

Meeting adjourned.

HENRY J. ROSE, Secretary.

NOTE ON THE BLEACHING OF ALMOND OIL FOR USE IN TOILET PREPARATIONS.

BY E. B. SHUTTLEWORTH.

Two varieties of oil of sweet almonds occur in commerce; one colorless, which is expressed from the almonds deprived of their cuticle; the other, and by far most common variety, is of a yellow color, more or less deep, which is derived from the brown skin of the almond.

As cold cream, and other toilet preparations are frequently prepared by the druggist, and as it is indispensable that these articles should be perfectly colorless, the bleaching of the oil becomes a matter of necessity. This has generally been effected by agitation with fuller's earth, and exposure to direct sunlight. As the method is very tedious, a readier process was sought by the writer. All the ordinary bleaching mixtures were tried, including that of Engelhardt, (*Polytech. Jour. v. Dingler*), viz., potassium bichromate and chlorhydric acid; the general result was decomposition of the oil. Filtration through animal charcoal removed a great part of the color, and may be used where perfect bleaching is not required. The best results were obtained with potassium permanganate, although when a strong solution is used the oil is attacked and a mixture formed very slow of separation, and colored brown from the deposition of oxide. A dilute solution—1 part of the salt to 9600 parts water—will be found best. The following process is suggested:—Dissolve 1 grain of permanganate in 20 ounces of cold water; agitate with an equal bulk of the oil; separate by means of a funnel, and wash with water. If the color is not entirely removed, repeat the process with fresh solution. Filter through paper, if necessary.

Progress of Modern Chemistry.

We extract the following from the address of the President of the British Association to the Chemical Section, as embodying an account of the principal changes which chemical philosophy has undergone during the past ten years:

It is always an excellent recommendation to a theory or hypothesis when, amongst the cultivators of the science to which it pertains, very little difference of opinion exists as regards its admissability and scientific value. This is, in a high degree, the case with regard to the atomic theory. The vast majority of chemists, I believe, accept this theory as the most suitable exponent of the fundamental truths of their science, and certainly, if the quality of the tree may be judged by its fruit, there is no other view which furnishes a clearer image to our minds of the chemical constitution of bodies, and, at the same time, conducts to the discovery of so many important facts and relations. By Dalton's profound hypothesis, all bodies are supposed to be composed of atoms of infinitely small dimensions. But these atoms are supposed not to be single; two or more of them are held together by certain forces, and thus constitute what is called a molecule. One atom of carbon, one atom of calcium, and three atoms of oxygen, joined together by the force called chemical affinity, constitute a molecule of carbonate of lime. Vast numbers of such molecules, bound to each other by the force of cohesion, form a visible piece of chalk. If a chemist wishes to examine a body, his first endeavor is to ascertain of what sort of atoms the body is formed. This is a mere matter of experiment. He next determines how many of such atoms are contained in each molecule of the body, and, finally, he ascertains how these atoms are arranged, or, more correctly, combined within the molecule; for it is quite clear that a substance like saltpetre, which contains one atom of nitrogen, one of potassium, and three of oxygen, may have these atoms arranged in very different manners, and still have the same composition. We might assume the potassium and nitrogen in more intimate union, nearer to each other than they are to oxygen, or we might consider nitrogen and oxygen more closely packed together, and, so to speak, attached as a whole to the potassium; in both cases, saltpetre would have in each molecule the same number of atoms, and the weight of the molecule would be the same. The three determinations just mentioned are of fundamental importance to the chemist; not that such inquiries are the only ones which interest him, for we shall, in the sequel, notice others of almost equal importance.

Nor must it be supposed that questions of this nature are of quite a modern date; for Leucippus, 500 B.C., appears to have sought to explain the nature of things, by the assumption that they are formed by the union of small particles, which latter received the name of atoms from Epicurus. It is true the notion of atoms, as conceived by the Grecian philosophers, is not quite the same as ours, but their speculations contain our notions pretty much in the same way as the acorn contains the oak tree.

The determination of the quality of the atoms in a molecule, or the analysis of the latter, has not undergone any changes during the last few years; and the same may be said about finding of the relative weight of a molecule, or the determination of the number of atoms which are contained in it. With regard to the latter point, however, it may be mentioned that Avogadro's hypothesis, according to which equal volumes of gaseous substances, measured at the same temperature and pressure, contain the same number of molecules, guides us chiefly in assigning to each molecule its relative weight and its number of atoms. This hypothesis has won more and more the confidence of chemists, and it is now admitted to hold good in nearly all well-examined cases.

Our views relative to the combinations of atoms in molecules, and our methods of ascertaining this arrangement have, however, undergone great alterations, and received great additions during the last ten or fifteen years. To a considerable of these changes I will now, for a short time, invite your attention. Since our modern views, however, originated, in a great measure, from the study of organic bodies, and since the majority of chemists now devote their time and labor thereto, I shall confine my remarks principally to the organic branch of the subject.

Eighteen years ago, Prof. Williamson read before the members of this Association a remarkable paper, which contained the germ of our modern chemical views, and was the cause of many discoveries. He proposed to regard three large classes of bodies, acids, bases and salts, from the same point of view, and to compare their chemical properties with those of one single elected substance. For this term of comparison he chose water. Now water is composed of three atoms—two of hydrogen and one of oxygen. Williamson showed that all oxygen acids—all oxygen bases, and the salts resulting from a combination of the two—can, like water, be considered to be composed of three parts, or radicals, two of the radicals playing the part of the hydrogen atoms in water, and the third that of the atom of oxygen, thus:

$\left.\begin{matrix}H\\H\end{matrix}\right\}O$	$\left.\begin{matrix}K\\H\end{matrix}\right\}O$	$\left.\begin{matrix}NO\\H\end{matrix}\right\}O$	$\left.\begin{matrix}NO\\H\end{matrix}\right\}O$
Water.	Potassic hydrate.	Hydric nitrite.	Potassic nitrite.

Potassic hydrate is water which has one of its atoms of hydrogen replaced by an atom of potassium; hydric nitrite is water which has one atom of hydrogen replaced by nitric oxide; and potassic nitrite is water with one of its hydrogen atoms replaced by nitric oxide, and the other by potassium. This speculation, as every chemist knows, is well supported by experiments; it embraces three large classes of bodies which, till then, had been considered as distinct. M. Gerhardt, in 1853, extended Williamson's views, by distinguishing two other types of molecular structure, represented, respectively, by hydrogen and ammonia, and succeeded, by help of the radical theory, in arranging the majority of the then known substances under one or the other of the three types already mentioned.

Like every theory which is in harmony with experience, the above considerations led to results of unexpected importance; for it soon became apparent that the radicals which thus replace hydrogen in water are not all of the same chemical value. If we place together the formulæ of hydric nitrite and carbonic acid—

$\left.\begin{matrix}NO\\H\end{matrix}\right\}O$	$CO\}O$
Hydric nitrite.	Carbonic acid.

we perceive at once, that the atomic group NO has replaced one atom of hydrogen in one molecule of water, and carbonic oxide, CO, two atoms of hydrogen in one molecule of water. Nitric oxide (NO) is, therefore, said to be equivalent to one atom of hydrogen. The radical of phosphoric acid (PO) is found to be equivalent to three atoms of hydrogen. Professor Odling was one of the first to observe this difference in the equivalence of atoms, and groups of atoms, or compound radicals, as they are termed, a difference which he marks, as shown in the following examples :

Radicals.

Equivalent to one atom of hydrogen.		Equivalent to two atoms of hydrogen	
Nitric oxide	$(NO)'$	Carbonic oxide	$[CO]''$
Methyl	$(CH_3)'$	Methylene	$[CH_2]''$
Ethyl	$(C_2H_5)'$	Ethylene	$[C_2H_4]''$

The notion of equivalence enabled Professor Kekulé to form most interesting speculations on the constitution of organic bodies, and to explain the relation between composition and equivalents of such radicals as methyl, CH_3, ethyl, C_2H_5, methylene, CH_2 ethylene, C_2H_4 and acetylene, C_2H_4.

If from one molecule of marsh-gas, CH_4, one atom of hydrogen is abstracted, the residue, CH_3, called methyl, can combine with an atom of hydrogen again, and produce the original marsh-gas molecule. But methyl, instead of combining with an atom of hydrogen, can unite with an atom of chlorine, or an atom of bromine—that is to say, the place of the atom of hydrogen can be taken by an atom of chlorine or bromine. Methyl being thus equivalent to an atom of hydrogen, is said to be monovalent. If from a molecule of marsh-gas two atoms of hydrogen are removed, the residue CH_2, called methylene, can again unite with two atoms of hydrogen, or, instead of hydrogen, two atoms of chlorine or bromine, and from the compounds CH_4, $CHCl_2$, CH_2Br_2 respectively. Methylene, therefore, being equivalent to two atoms of hydrogen, is termed divalent. The radical CH, left after the abstraction of three atoms of hydrogen from marsh-gas, is able to reproduce with three atoms of hydrogen one molecule of marsh-gas, or to combine with three atoms of chlorine, and form chloroform, $CHCl_3$. The residue, CH, is thus trivalent equivalent to three atoms of hydrogen. But carbon, formen [CH], metylen, CH_2, methyl, CH_3, not only combine with hydrogen, chlorine, or other elements according to their equivalence, but also amongst themselves, and thus produce the so-called hydrocarbons, native as well as artificial. Methyl combines with methyl and produces dimethyl, or better known as ethylic hydride, $CH_3+CH_3=C_2H_6$; methylene combines with methylene, and forms ethylene, $CH_2+CH_2=C_2H_4$. Methylene is divalent, and methyl monovalent; therefore methylene combines with two equivalents of methyl and forms propylic hydride, C_3H_8, $CH_2+2CH_3=C_3H_8$. Six equivalents of formen are supposed to be contained in benzol [C_6H_6], $6CH=C_6H_6$.

The Strength of different samples of Donovan's Solution.*

BY W. HEATHFIELD, F.C.S.

Great as has been the value to medicinal practice of the preparation suggested by Dr. Donovan, and designated by his name, it has been open to the serious inconvenience that those contributors to pharmaceutical science who have proposed alterations in the formula for its manufacture have either recommended an alteration in the original strength, or have advised such a variation in the mode of manipulation as to alter the character, such as was contemplated by the distinguished physician who first proposed its introduction, and then generously gave the formula to the profession.

These are, at least, five published formulæ for Donovan's solution, to be found in the archives of pharmaceutical contributions, and not one of which is precisely in accordance with the other. On examining the products which are the results of these processes, they vary considerably, and all differ in analytical constitution from that proposed by Dr. Donovan, and thus that reliance on uniformity of strength which the physician and the dispenser alike should secure, is entirely merged in the aim to improve or modify.

The formulæ that have been chiefly recommended are as follows:—

1. *Donovan.*

Arsenic metal	6·08
Mercury	14·82
Iodine	49·
Alcohol	q.s.
Water	℥ 8

2. *Pereira.*

Arsenic	6·08
Mercury	15·38
Iodine	50·
Alcohol	ʒ 1
Boiling water	℥ 8

3. *Dublin Pharm.*

Pure arsenic	6·
Mercury	16·
Pure iodine	50½
Water	℥ 8
Alcohol	ʒ ½

4. *Soubeiran.*

Teriodide of arsenic	35 grs.
Biniodide of mercury	35 "
Water	℥ 8

And a writer in the 'Pharmaceutical Journal,' with a view of avoiding the inconvenience resulting from the noncombination of the iodine with the arsenic, which, he states, frequently occurs, giving the following:—

5.	Arsenious acid	7·92
	Iodide of mercury	36·24
	Hydriodic acid	30·49
	Distilled water	℥ 8 ʒ 6

"Mix and make up to its original volume."

"The hydriodic acid is best prepared by decomposing a known weight of iodide of barium with sulphuric acid."

Although the three first of these processes were recommended by very high authority, it will be perceived that they vary in the proportions of their ingredients; and, as it is admitted that there is some patience required and difficulty in effecting the complete combination of the arsenic with the iodine, M. Soubeiran proposed the direct union of the iodides of the metals. But, independently of the deviation from the strength originally contemplated by Dr. Donovan, M. Soubeiran's form is open to the objection that the iodides of mercury and arsenic vary in the proportions of moisture they contain, and thus lead to varying results. To alter a mode of manipulation may be perfectly legitimate, but to alter proportions of a preparation intended for public use, without leave of the introducer, is scarcely right. Great confusion has arisen in pharmacy from such a practice, and many very excellent preparations have been pronounced a failure, and been superannuated, owing to the difficulty entailed on a dispenser in attempting to determine which of many under one name is intended by the physician, and thus those, which for many reasons he may not see fit to use, become shelved. Dr. Donovan had in view a preparation which he seemed to have perfected, and the formula for which he most liberally published. He admits the difficulty of producing the combination with celerity, but he is fairly entitled to claim for a process which, if an alteration be made, shall not involve a variation in the proportions which he sets forth. When Dr. Donovan first made the solution, he found that it generally proved to be of a very pale yellow, and then only when seen in large quantity, sometimes being as pale as water. When a few grains of iodine were added, it became yellow; but when exposed to ordinary daylight, it resumed its original colourless appearance; and further additions of iodine presented the same phenomenon. Dr. Donovan's formula is entitled to all commendation; and, provided the materials are pure, and with due attention to the manipulation, a preparation of definite composition, and having invariable properties, may be obtained. Thus:—

Pure arsenic resublimed	6·08
Pure distilled mercury	14·82
Iodine resublimed	49·
Alcohol,	ʒ 1 or q.s.
Water	℥ 8

The arsenic should be in the finest possible condition; the more minute, the more rapid the combination with the iodine. This combination should be first made with the arsenic by the addition of a little water, sufficient of the iodine being used for a perfect union; this should be carefully dried, and the remainder of the process completed by the entire and effective combination of as much of the alcohol as may be required. The proportion of water being added to make up eight ounces, there should result a solution of a permanent character, both physically and chemically. Dr. Donovan found that when the trituration of the ingredients was continued until the alcohol became as thick as treacle, he obtained the most effective and complete solution. This may be left to the operator, provided it be borne in mind that there should be no residue whatever. The process of Dr. Donovan may be advised for adoption, with these precautions, until the framers of any future Pharmacopœia see fit to authorize the recommendation of any other.

Coal Naphtha and Benzole compared wit Petroleum and its Products.*

BY PROFESSOR VAN DER WEYDE, M. D.

Benzole, which has lately been introduced as a gas carbonizer, was originally obtained from the benzoic acid found in gum benzoes, hence the name. Later it was found to be produced in great abundance by the distillation of coal tar. This tar, being distilled, gives a black oil, called *dead oil*, which, by re-distillation, produces coal naphtha. This coal naphtha contains about seven per cent. of pure benzole, which it is quite difficult and laborious to obtain pure, for which reason most so-called benzoles are only coal naptha, consisting of a mixture of several hydro carbon oils, having some solids in solution, but all possessing a similar degree of volatability. These substances are, besides the benzole, tuluol, cymol, cumol, then a few solids in

* From the Pharmaceutical Journal, London. Read before the British Pharmaceutical Conference, 1869.

* From the Journal of Applied Chemistry.

solution, called napththalin, anthracen, and finally phenylic and chrysolic alcohol. The latter substances are, however, perhaps rather a product of subsequent treatment than an educt.

The pure benzole is a hydro carbon, like the petroleum products, but of different chemical combination, containing, by weight, 12 parts of carbon to one of hydrogen, while the petroleum products contain only about five parts of carbon to one of hydrogen. Being richest in carbon, it has more power to increase the luminosity of gas than the same amount of petroleum naptha; in fact, common air passed through it becomes combustible, and burns, according to Gmelin, with a smoky flame.

Notwithstanding this equal volatility, it is much heavier than petroleum naptha, its specific gravity being 0.85 for water = 100; this corresponds with 35° of Beaume's hydrometer. Any petroleum product of this specific gravity is not volatile enough to make its vapor combustible at the common temperature, and even at 180° Fahr.; and will not burn well in a lamp, being, therefore, only used for a lubricator. Some natural petroleum of Western Virginia and Ohio, of exactly this specific gravity, give, by distillation, no naptha at all, and only little kerosene, and, therefore, are only used for lubricators. The so-called paraffin oil, obtained at the latter stages of the distillation of petroleum, when all the naptha and kerosene has previously been driven off, is too greasy and thick to burn well; it is therefore kept separate, and sold as a lubricator; its specific gravity ranges from 30° to 35 Beaume, and is thus about equal to benzole.

Common kerosene of a specific gravity of 0.79, corresponding with 48° Beaume, is not even volatile enough to be used as a cabonizer, and will not make air combustible when blown through it, and will not burn without a wick. Benzole, notwithstanding its greater specific gravity, is just as combustible as petroleum naptha, or so-called benzine, and *it cannot be handled with as much safety as ordinary kerosene oil.* The boiling point of good kerosene oil is about 140° Fahr., while it gives of combustible vapors at 110° and above, not below. The boiling point of benzole is 177°, while it gives off combustible vapors at the common temperature, like benzine from petroleum.

It may be set down as a rule that any fluid which can communicate illuminating vapors to air or gas, at the common temperature, will give off combustible vapors, which, when mixed with air in the right proportion, may make an explosive mixture. In this respect benzole is equal to the petroleum naphtha, or benzine. However, as its boiling point is some 100° higher than the latter substance, it is less volatile, and comparatively safer, though not absolutely safe, nor as entirely free from explosive vapors as good ordinary kerosene oil.

The specific gravity of benzole vapor is 2. 77, that of gasolin = 0.39 (air = 1.00); the latter vapor has more expansive tension, that is, will expand further, consequently will take fire from a greater distance. If we take three open vessels, one containing kerosene, the second benzole, the third gasolin, and approach a flame to each of them, the gasolin, will take fire at a short distance, the benzole will take fire at a shorter distance, the kerosene will not take fire at all, even when plunging the fire in it—it cannot burn without a wick, except above 110°, (benzole will only refuse to ignite without a wick below 40°, gasolin will take fire without a wick at 20°, and even below, if of a high grade.) This is a simple practical test of the comparative safety of these three important substances, now so extensively introduced for illuminating purposes.

The New Hypnotic, Chloral.

In a lecture recently delivered by Herr Liebreich before the Berlin Medical Society, the following statements are made.

The form best adapted for administration is the hydrate, $C_2HCl_3OH_2O$. This substance is white and glistening, has a pungent odor, a bitter taste, and is easily soluble in water. When injected under the cutis it causes no local irratation. Liebreich thus employed it in a number of cases in the treatment of insane persons. In a dose of 1.35 grammes, it usually brings on a sleep of five hours duration. In the case of a patient affected with melancholia and stupor, 3-5 grammes dissolved in a wineglass of water and given by the mouth produced a sleep of sixteen hours. In a case of very painful inflamation of the wrist-joint, about 2.5 were given, followed by hynopsis and anæsthesia to an extent sufficient to allow of bandaging the wrist, which had been impossible before. In all the cases the sleep was natural in character.

Von Langenbeck, in a lecture upon the application of hydrate of chloral to the treatment of delirium potatorum, describes a case of comminuted fracture of the humerus, followed by violent delirium tremens; 0·42 gram. of opium with brandy, were given during twelve hours without effect. Gangrene appeared threatening, and exarticulation was thought of. Von Langenbeck ordered 4 gram. of hydrate of chloral, to be swallowed in one dose, and afterwards 2 gram., to be injected three times in quick succession. A sound sleep followed, lasting sixteen hours, from which the patient awoke free from his threatening symptoms. Von L. thinks he has observed favorable effects in a case of trismus traumaticus. It was stated at the time by Von Bardeleben, that he had likewise observed excellent effects in many cases from internal doses of 2-5 grammes. A good formula is the following:—

℞ "Hydrate of chloral," 2 grammes:
Aquæ distillatæ,
Syrupi simplicis, āā 15 "
M. S. for one dose.

—*Allg. Med. Centr. Ztg.*, Nos. 64 and 65, *in Boston Medical and Surgical Journal.*

Note on Sulphurous Acid.*

BY WENTWORTH LASCELLES SCOTT, F.C.S., ETC.

Having had some little experience in relation to the manufacture of the above acid, both in quantities of a few ounces, and upon a very extensive plan, I can scarcely corroborate those contributors to the "Pharmaceutical Journal" who have spoken of the extreme difficulty of preparing "sulphurous acid, B. P." I have recently superintended the erection of some apparatus for the production of the acid upon rather a large scale, at the works of a well-known manufacturing firm,* and, except in some minor details, the arrangements present no particularly novel points.

A uniform pressure of 3 lbs. per square inch is maintained by means of a water-column, and the process goes on continuously, the acid in the first receiver-jar being drawn off when sufficiently strong, and its place accupied by the weaker fluid contained in the last jar of the series; this, in its turn, being refilled with distilled water. As only the purest and most compact varieties of carbon are permitted to be used in the retort, which is of cast iron, and constructed specially for the purpose, the stoppages for clearing out, etc., are few and far between. Oil of vitrol, containing 74 per cent. of anhydrous acid, is found more convenient in practice than either a weaker or stronger variety; as when *too* concentrated acid is employed, a portion of it is liable to entire reduction, and sulphur incrustations are formed in unpleasant abundance, while upon the other hand, a dilute vitrol causes the evolution of sulphuretted hydrogen. A little carbonic oxide is generally to be detected amongst the gases evolved but its presence is in no degree objectionable.

For washing the gas, simple water is of course sufficient, but the addition of some sulphite of lead, and a few pieces of charcoal, gives a purer acid. I quite agree with those previous writers who are of opinion that a 5 per cent. solution of sulphurous acid is of ample strength for all ordinary purposes, but, at the same time, I cannot admit the existence of any insurmountable difficulties in the way of preparing it of 1½ times or even twice the above strength.

The following table shows the mean specific gravities at 60° F. of pure solutions of sulphurous acid, containing from 0·5 per cent. up to 10 per cent. of the anhydrous acid. I believe their accuracy may be depended upon, the determinations having been made by oxidation and conversion into the barium salt of sulphuric acid:—

Per C't of SO_2	Sp. Gr. at 60°	Per C't of SO_2	Sp. Gr. at 60°.	Per C't of SO_2.	Sp. Gr. at 60°.
0.5	1 0028	4.0	1 0221	7 5	1.0401
1.0	1 0056	4 5	1 0248	8.0	1.0426
1.5	1.0085	5.0	1.0275	8.5	1.0450
1.0	1.0113	5.5	1.0302	9.0	1.0474
2.5	1.0141	6.0	1.0328	9.5	1.0497
3.0	1.0168	6 5	1 0353	10.0	1.0520
3.5	1.0194	7.0	1.0377		

I have hastily examined eight specimens of "sulphurous acid B. P." purchased of various retailers; I give the specific gravities and percentages of SO_2 of each, the differences between these and the corresponding figures in previous table being due to *sulphuric* acid:—

No. of Sample.	Sp. Gr. at 60°.	Per C't. of SO_2.	No. of Sample.	Sp. Gr. at 60°.	Per C't of SO_2.
1	1 022	3 4	5	1 042	7.8
2	1 017	2 7	6	1.031	4.9
3	1.019	2.4	7‡	1.016	2.5
4†	1.022	0.1	8	1.024	3.7

Several substances appear to exercise a *preservative* action upon sulphurous acid, or in

* From the Pharmaceutical Journal, London. Read before the British Pharmaceutical Conference, 1869.

* William Bailey and Son, Wolverhampton.
† Made from impure water.
‡ Either very old or improperly prepared.

other words retard its oxidation, among them grape-sugar, formic acid, camphor, and more especially aldehyde; and I think it might be worth while to ascertain, firstly, the exact amount of influence exerted by the last two, and secondly, whether the addition of either, in small quantities, would present any very serious objections.

Sulphuric acid is naturally a very unwelcome ingredient; but *old* sulphurous acid containing it may be restored for all practical purposes by the cautious addition of a solution of sulphite of barium in sufficient quantity to precipitate *very nearly*, but *not quite* all the sulphuric acid as insoluble sulphate of barium the latter being afterwards separated by filtration or decantation. I lay perhaps rather more stress upon the the use of sulphite of barium than I should have done if I had not seen the extremely pernicious effects of some of the acid ordinarily sold, when used in the form of "spray" for throat affections, owing merely to the presence of an undue proportion of the higher oxide of sulphur.

New Process for Deodorising Alcohol without the use of Heat or Redistillation.

A new process for effecting this object has been recently indicated by Dr. Artus, and described by him in the last number of the *Vierteljahrsschrift für technische Chemie*. In it he makes use of charcoal impregnated with alumina, which is prepared as follows: The charcoal is first granulated and reduced to fragments of about the size of a split pea. These are sifted so as to separate the finer from the coarser portions. For ever ten pounds of coal one pound of common alum is dissolved in fifteen pounds of water, and, in a separate vessel, one pound of carbonate of soda in five pounds of water. The granulated charcoal is thrown into a wooden vat, and while it is being stirred, it is watered first with the solution of alum, and afterward with the soda. The vessel in which this operation is performed must be able to contain at least double the quantity of material that is to be introduced into it, as the addition of the carbonate of soda causes effervescence, and considerable foaming through the evolution of carbonic acid gas. After the whole of the solution of soda has been added and the whole well mixed, the mixture is allowed to rest for twelve hours, when it is thrown on a strainer, and the liquid allowed to drain off. The charcoal thus aluminized is first dried in the air, after which it is introduced into closed retorts or iron vessels, where it is heated to a red heat. When cold two and a half pounds of this prepared coal is the proportion needed for every German *eimer*, or about one hundred gallons (four and a half hectolitres) of crude alcohol.

The manner of using this deodorizer is to place the coal within plaited straw mats, and to sink it, by means of heavy weights, in the liquid to be deodorized. After a period of twenty-four to thirty-six hours, the coal is taken out, submitted to a second calcination, and again introduced into the liquid. The same operation is repeated a third and last time. The spirits, after being allowed to remain at rest for a period of four weeks, are found to be free from every trace of the fusel-oil they originally contained. The expense of the process is small in proportion to the profits and advantages to be derived from it. No redistillation or rectifying is required. —*Manufacturer and Builder.*

Notices from Foreign Sources.

(From the Chemical News.)

Evolution of Ammonia Gas from Mushrooms.

M. El. Borscow.—The author says that, many years ago, the late Professor Sachs observed that when a glass rod, moistened with dilute hydro-chloric acid (specific gravity 1·12) was brought near vigorously and healthily growing mushrooms, there appears a white vapor, evidently due to the formation of chlor. ammon. This fact has been confirmed by Dr. G. Lehman, while the late Alexander von Humboldt stated that mushrooms constantly give off, not only ammonia, but also hydrogen. The author of this paper has thoroughly investigated this subject, taking due care to eliminate all sources of error from his experiments by every precaution modern science can suggest and successfully apply. Several engravings would be absolutely necessary for the proper understanding of these researches; but we briefly notice the following results:—(1) different kinds and species of mushrooms give off, while growing vigorously, weighable quantities of ammonia; (2) this evolution of ammonia is not confined to full-grown mushrooms only, but also to the young individuals, and even to some varieties of mushroom spawn; (3) this evolution of ammonia is a proper function of the living organism of these cryptogamic vegetables, and is very little, if at all, influenced by exterior causes; (4) there is no direct relation between the quantity of ammonia and that of carbonic acid given off during a given period of time. The quantity of ammonia given off during a certain length of time bears no direct relation to the weight of the substance from which it is given off.—*Bulletin de l'Académie Imperiale des Sciences de St. Petersbourg*, Vol. xiv., No. 1.

New Reagent for Brucine.

M. Cotton.—When, to a solution of brucine in nitric acid, hydrosulphide of sulphide of sodium is added, in concentrated solution, the mixture becomes, first, violet, next green-colored, provided the alkaloid is in excess. Morphia does not give any similar reaction under the same conditions; dilute acids render it rose-colored, while sulphuretted hydrogen is given off; 2 milligrms. of brucine impart, in this manner, a decided coloration, even to half a litre of water.—*Journal de Pharmacie et de Chemie*, July 1869.

Recent Researches on the Essence of Roses.

M. Fluckiger.—Chemically considered, the essential oil of roses is a mixture of an oil containing oxygen, to which alone the smell and perfume is due, and a solid hydrocarbon, a stearopten absolutely devoid of smell, and composed according to the formula $C_{16}H_{16}$. This hydrocarbon is soluble in chloroform, fuses at 32° and boils at 272°. Potassium does not act upon this substance; treated with a mixture of bichromate of potassa and sulphuric acid, it yields, faintly, a smell of acroliene; with fuming nitric acid, butyric, formic, fumaric, valerianic, and succinic acids are formed.—*Ibid.*

New Apparatus for the Concentration of Sulphuric Acid.

M. Cottelle.—It is a well-known fact that the concentration of sulphuric acid in platinum vessels is an expensive process, owing to the high price of the first purchase of these apparatus, and the expense attending any soldering or repair. The author has had made a column, lined inside with fire-bricks, and made outside of good ordinary bricks; it rests on a large pedestal. This column is open at both top and bottom; but in these openings are fitted fire-clay stoppers. The inside of this apparatus is fitted with previously calcined pumice-stone; inside the lower portion of this column, openings are made between the bricks, through which a current of highly heated air is forced. From the top, the acid which has to be concentrated is made to trickle on the pumice-stone, and, meeting with a current of highly heated air, the superfluous water is driven off, and the acid, on arriving at the bottom, is in a concentrated state, and runs off in properly arranged vessels.—*Ibid*

Anti-Rust Varnish, or Varnish for Iron and Steel Rods.

Take the following ingredients, 1, 2, 3, in a pounded condition, and digest them by a regular heat till melted, then add the turpentine very gradually, stirring all the while.

1. Resin	120 parts.
2. Sandarac	180 "
3. Gum lac	60 "
4. Essence of turpentine	120 "

The mixture should be digested until complete solution has taken place, then add

Rectified alcohol.......... 180 parts.

Filter through fine cloth, or thick bibulous papers, and preserve in well-stoppered bottles or cases. It will be found very effective in preserving things from rust.—*Manufacturer and Builder.*

Molybdnum and Chromium.

These metals can, according to Loughlin, be easily prepared as follows.—A mixture of one part of pure molybdic acid and one and a half of cyanide of potassium is placed in a porcelain crucible, and the lid luted on; this is placed in a large crucible, and the interstices having been packed with animal charcoal, the entire arrangement is exposed to a strong white heat for twelve hours; when cold, the inner crucible is found lined with a white silver-like metal not acted upon by hydro-chloric acid, but readily dissolved by nitric acid, and having a specific gravity of 8·56. By substituting oxide of chromium for molybdic acid, metallic chromium is obtained.—*Engineer.*

To Clean Paint.

There is a very simple method to clean paint that has become dirty, and if our housewives should adopt it, it would save them a great deal of trouble. Provide a plate with some of the best whiting to be had, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which, wash the part well with clean water, rubbing it dry with a soft chamois. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than using soap, and does not require more than half the time and labor.—*Manufacturer and Builder*

Bleaching Sponges.

The white sponges seen on the stands of our street peddlers, are bleached in the following manner:—The softest, finest specimens are selected, and the sand removed from the cavities by shaking; they are then washed in hot water, and, after squeezing out the water, are placed in a bath of dilute hydrochloric acid, and allowed to remain for half an hour. They are then taken out, and, after another washing in hot water, are placed in a fresh bath of dilute acid, to which has been added six per cent. of disolved hyposulphite of soda, and there allowed to remain twenty-four hours. The sponge is finished by washing in water, and drying.—*Medical Record.*

Chemical Weather Glass.

A good weather guide is made by placing in a glass tube or narrow phial two drachms of camphor, a half drachm of pure saltpetre, a half drachm of muriate of ammonia, and two ounces of proof spirits. In dry weather the solution remains clear; on the approach of a change minute stars will rise up in the liquid, and stormy weather is indicated by great disturbance.

New Remedy for Toothache,

The *Lancet* says toothache can be cured by one drachm of collodion to two drachms of Calvert's carbolic acid. A gelatinous mass is precipitated, a small portion of which, inserted in the cavity of an aching tooth, invariably gives immediate relief.

Camphor Ice—No. 1.

Take of—
Spermaceti, . . 4 oz.
White wax (pure),............... 8 "
Oil of sweet almonds .... 1 pint.
Melt together by a gentle heat, add, of
Camphor (in small pieces) . . 4 oz.
When dissolved stir until partly cold, and add essential oil of bitter almonds and expressed oil of mace, two fluid drachms, and pour into moulds.—*Pharmacist.*

Camphor Ice—No. 2.

Take of—
Hard, clarified mutton suet,. 8 oz.
Spermaceti,.......................
Wax, of each . .. ... ½ "
Camphor, ... 1 "
Proceed as before.—*Ibid.*

Extract of Lime Juice and Glycerine.

Take of—
Olive Oil (best),..................
Lime water, of each........... 4 oz.
Oil of lemon,...................... 1 fl. dr.
Mix.—*Ibid.*

Leather Varnish (French.)

Shellac................ ....14 grammes.
Turpentine Vernic..... 5 "
Alcohol....................40 "
Ext. Logwood........... 1 "
Potas Chromate......... q. s.
Dissolve the potash and ext. logwood with a little sulphate of indigo in the spirit, and add the other ingredients.

Ingrowing Toe Nail.

Dr. Babb (*Medical Times and Gazette*) has used "with uniform success" in ingrowing nail, a saturated solution of the persulphate of iron. Success depends upon the thoroughness with which a bit of cotton saturated with it is insinuated between the nail and the fungous flesh, the cotton being also turned back over the flesh on the outside.—*Scientific American.*

New Test for Blood Stains.

Upon the authority of the London *Lancet*, an important test for blood had been discovered in Austria; consisting of the application of tincture of guaiacum and ozonized either, which produces a beautiful blue tint with blood or blood stains. The test is excessively delicate; and we happened to be present at a lecture given by Mr. Bloxam, in which he showed some experiments with it, and added that, in the case of a blood stain twenty years old, he had extracted a single linen fiber with an almost inappreciable amount of stain on it. The characteristic blue colour was immediately induced by the test, and readily detected by microscopical examination. The testimony of so able a chemist leaves no doubt as to the value of the discovery. Ozonized ether, we may remark, is merely a solution of peroxide of hydrogen in ether.

M. Argago was the first to observe that a wire, when traversed by a powerful current, and plunged into iron filings, retained around it considerable quantity—a mass of the thickness of a quill.

Notes and Queries.

PRESERVATION OF GARLIC.—In answer to the inquiries made on this subject in the September number of the JOURNAL, we may say that the same query was proposed by the American Pharmaceutical Association, and was answered by A. P. Sharp, *Proc. Am. Pharm. Assoc.*, 1864. The plan proposed is the following. Collect, at the proper season, the quantity required; remove all superfluous leaves, stems, &c.; place the garlic in well-stopped bottles, and pour upon it a small quantity of alcohol—about two ounces to a quart jar. The vapor of the alcohol is absorbed by the bulbs, entirely destroying their vitality; hence all tendency to germinate is destroyed, and on this the preservation principally depends. The author says that garlic treated in this manner has been kept for years, and at the same time its virtues have been maintained to the last, as far as indicated by either taste or smell.

Changes.

A. V. Palmer, late manager of the business of Alexander & Co., Barrie, has commenced a new business, under the style of A. V. Palmer & Co., Barrie.

DESTRUCTION OF THE DISTILLERY OF GOODERHAM AND WORTS BY FIRE.—Our readers are, doubtless, by this time, aware of the above event, we may, however, say, that it is the hope of the enterprising firm, to resume business in the course of three or four months. At the present time, some four hundred men are at work removing the debris, and it has been found that the injury done to the walls is not so great as was at first supposed, and that the upper stories only will require rebuilding.

Trade Report.

During the past month trade has been such as to merit no special remark, being, on the whole, quiet, but varied occasionally by great activity for a day or two.

The destructive fire at Messrs. Gooderham & Worts' distillery has had the effect of raising the price of Alcohol very materially, and quotations for that article cannot be given with any degree of certainty.

The supply of Sulphuric Acid has also been affected by a like catastrophe having taken place at the chemical works in London. This, with a rise in the United States market, together with other causes, induces holders to be very firm in making sales.

Those articles which are in favor or the buyer on last month's quotations are Bismuth and its preparations, Camphor, Socotrine Aloes, Oil Lavender, English, Oil Peppermint, E. I. Rhubarb; and Castile Soap, Opium, and Morphia are quoted much lower, but the downward tendency has been stopped, and they have since advanced slightly. Those articles which are against the buyer are Alcohol, Vanilla Beans, Hyosciamus and its preparations, Gum Tragacanth of all grades. Quinine is tending uppards, having advanced 1d. per oz. in England, quotations here being unchanged.

In Dyestuffs we quote Magenta Crystals considerably lower; all other kinds remain firm.

The high price of American exchange will seriously affect the price of Dyestuffs, Naval Stores, and all other cheap goods usually bought in the American market.

NOTE.—The notes quoted in our price list are constantly varying, and are intended to show the limits within which a retail druggist should supply himself. The range of prices is caused by the difference between cash and credit, whole packages and smaller lots, and, in some cases, difference of quality.

PERFUMERY.

HANDKERCHIEF Extracts, Jockey Club, Frangipanni, Patchouly, West End, Musk, Spring Flowers, Mignonette, New Mown Hay, Sweet Pea, and all the popular scents.

Extra Quality.—6 oz. Octagon Cut; 3 oz. Octagon Cut; 1½ oz. Plain, stoppered.

Best Quality.—1½ oz. Plain, stoppered.

No. 1 Quality.—1½ oz. Squat Cork'd; 1 oz. Stone Jug; 1 oz. Glass Jugs; ¾ oz. Panel; ½ oz Squat; ⅓ oz. Squat; ⅓ oz. Oval; ¼ oz. Squat

Hair Oils, Pomades, Tooth Washes, Tooth Powders, Colognes, Lavanders, Sachets, Camphor Ice and Roll, Toilet Vinegar, Milk of Roses, etc., in all the popular styles.

Price Lists on application to

LYMAN, ELLIOT & Co.,
1-1y. 157 *King Street East, Toronto.*

WHOLESALE PRICES CURRENT.—NOV., 1869.

Drugs, Medicines, &c.	$ c.	$ c.
Acid, Acetic, fort	0 12 @	0 15
" Benzoic, pure	0 28	0 35
" Citric	0 83	0 90
" Muriatic	0 05	0 07
" Nitric	0 11½	0 15
" Oxalic do	0 26	0 32
" Sulphuric	0 04¾	0 07
" Tartaric, pulv.	0 36	0 45
Ammon., carb. casks	0 17	0 19
" " jars	0 18	0 20
" Liquor, 880	0 18	0 25
" Muriate	0 12½	0 15
" Nitrate	0 45	0 60
Æther, Acetic	0 45	0 50
" Nitrous	0 22½	0 25
" Sulphuric	0 48	0 55
Antim. Crude, pulv	0 10	0 12
" Tart. "	0 50	0 60
Alcohol, 95%	1 77½	2 00
Arrowroot, Jamaica	0 21	0 22
" Bermuda	0 45	0 65
Alum	0 02½	0 03½
Balsam, Canada	0 32	0 40
" Copaiba	0 75	0 80
" Peru	2 90	3 00
" Tolu	1 20	1 40
Bark, Bayberry, pulv	0 20	0 25
" Canella, "	0 17	0 20
" Peruvian, yel. pulv	0 42	0 45
" " red "	1 50	1 60
" Slippery Elm, g. b.	0 18	0 20
" " flour, pkt's	0 28	0 32
" Sassafras	0 15	0 18
Berries, Cubebs, ground	0 30	0 40
" Juniper	0 06	0 10
Beans, Tonquin	0 60	1 10
" Vanilla	9 40	9 60
Bismuth, Alb.	5 60	6 40
" Carb.	5 60	6 40
Camphor, Crude	0 43	0 48
" Refined	0 57	0 68
Cantharides	1 06	1 10
" Powdered	1 14	1 20
Charcoal, Animal	0 04	0 06
" Wood, pow'd	0 12	0 15
Chiretta	0 55	0 65
Chloroform	1 30	1 50
Cochineal, S.G.	0 90	1 15
" Black	1 30	1 75
Colocynth, Pulv.	0 50	0 80
Collodion	0 55	0 60
Elaterium oz.	4 50	5 00
Ergot	1 08	1 15
Extract, Belladonna	2 00	2 20
" Colocynth, Co.	1 25	1 75
" Gentian	0 50	0 60
" Hemlock, Ang.	1 12	1 25
" Henbane, "	2 90	3 00
" Jalap	5 00	5 50
" Mandrake	1 75	2 00
" Nux Vomic...oz	0 60	0 70
" Opium "	Variable.	
" Rhubarb	7 50	—
" Sarsap. Hon. Co	1 00	1 20
" " Jam. Co	3 25	3 70
" Taraxicum, Ang	0 70	0 80
Flowers, Arnica	0 26	0 35
" Chamomile	0 36	0 45
Gum, Aloes, Barb. extra	1 00	1 10
" " " good	0 50	0 55
" " Cape	0 15	0 20
" " " pow'd	0 25	0 30
" " Socot	0 75	0 90
" " " pulv.	0 90	1 00
" Arabic, white	0 60	0 65
" " " pow'd	0 57	0 65
" " sorts	0 31	0 37
" " " pow'd	0 50	0 60
" " com. Gedda	0 13	0 16
" Assafœtida	0 35	0 40
" British or Dextrine	0 13	0 15
" Benzoin	0 48	0 55
" Catechu	0 15	0 20
" " pow'd	0 25	0 30
" Euphorb, pulv	0 32	0 40
" Gamboge	1 40	1 60
" Guaiacum	0 32	0 50
" Myrrh	0 48	0 60
" Sang Dracon	0 60	0 70
" Scammony, pow'd	5 60	—
" " Virg. "	14 50	—
" Shellac, Orange	29	0 32

Drugs, Medicines, &c. Continued.	$ c.	$ c.
Gum, Shellac, liver	0 24 @	0 28
" Storax	0 65	0 75
" Tragacanth, flake	1 05	1 40
" " common	0 32	0 35
Galls	0 32	0 37
Gelatine, Cox's, 6d.	1 10	1 20
Glycerine, com.	0 25	0 30
" Vienna	0 35	0 40
" Price's	0 65	0 75
Honey, Canada, best	0 16	0 20
" Lower Canada	0 12½	0 13
Iron, Carb. Precip.	0 20	0 25
" " Sacchar	0 40	0 45
" Citrate Ammon.	0 90	1 00
" " & Quinine oz.	0 43	0 48
" " & Strychnine "	0 17	0 25
" Sulphate, pure	0 08	0 10
Iodine, good	4 50	5 00
" Resublimed	5 60	6 00
Jalapin oz.	1 50	2 00
Kreosote	1 60	2 50
Leaves, Buchu	0 30	0 50
" Foxglove	0 25	0 30
" Henbane	0 35	0 40
" Senna, Alex	0 30	0 60
" " E. I.	0 12½	0 20
" " Tinnevilly	0 20	0 30
" Uva Ursi	0 15	0 20
Lime, Carbolate brl.	5 50	—
" Chloride	0 04½	0 06
" Sulphate	0 08	0 12½
Lint, Taylor's best	1 12½	1 25
Lead, Acetate	0 14	0 17
Leptandrin oz.	0 60	
Liq. Bismuthi	0 50	0 75
" Opii, Battley's	7 60	9 00
Lye, Concentrated	1 50	2 00
Liquorice, Solazzi	0 37	0 45
" Cassano	0 23	0 40
" Other brands	0 14	0 25
Liquorice, Refined	0 35 @	0 45
" " Hessin's doz	2 00	
Magnesia, Carb 1 oz.	0 20	0 25
" " 4 "	0 17	0 20
" Calcined	0 65	0 75
" Citrate gran.	0 40	0 50
Mercury	0 65	0 75
" Bichlor	0 70	0 80
" Biniodid oz.	0 25	0 35
" Chloride	0 90	1 00
" C. Chalk	0 45	0 60
" Nit. Oxyd	0 90	1 00
Morphia, Acet.	—	—
" Mur. about	6 50	—
" Sulph.	—	—
Musk, Pure grain oz.	21 00	
" Canton	1 00	1 20
Oil, Almonds, sweet	0 48	0 55
" " bitter	14 00	15 00
" Anniseed	4 00	4 50
" Bergamot, super.	6 50	7 00
" Carraway	4 00	4 20
" Cassia	3 00	3 20
" Castor, E. I.	0 16	0 20
" " Crystal	0 22	0 25
" " Italian	0 26	0 28
" Citronella	1 50	1 75
" Cloves, Ang.	1 00	1 10
" Cod Liver	1 40	1 50
" Croton	2 50	3 00
" Geranium, pure, oz.	2 00	2 20
" Juniper Wood	0 90	1 00
" " Berries	6 00	7 00
" Lavand, Ang	17 60	19 20
" " Exot	1 40	1 60
" Lemon, super.	3 30	3 60
" " ord.	2 70	2 80
" Orange	3 00	3 20
" Origanum	0 65	0 75
" Peppermint, Ang.	15 00	17 00
" " Amer.	4 60	5 00
" Rose, virgin	7 75	8 00
" " good	4 40	5 50
" Sassafras	1 30	1 40
" Wintergreen	4 90	5 50
" Wormwood, pure	5 80	50
Ointment, blue	0 65	0 70
Opium, Turkey, about	9 60	—
" " pulv	11 50	—
Orange Peel, opt.	0 65	0 75
" " good	0 12½	0 20
Pill, Blue, Mass	0 70	0 75

Drugs, Medicines, &c. Continued.	$ c.	$ c.
Potash, Bi-chrom.	0 15 @	0 20
" Bi-tart.	0 25	0 28
" Carbonate	0 16	0 20
" Chlorate	0 40	0 45
" Nitrate	8 50	9 00
Potassium, Bromide	1 80	2 00
" Cyanide	0 70	0 75
" Iodide	3 80	4 50
" Sulphuret	0 25	0 35
Pepsin, Boudault's oz.	1 65	1 80
" Houghton's, doz	8 00	9 00
" Morson's oz.	0 82	1 10
Phosphorus	0 75	0 85
Podophyllin	0 50	0 60
Quinine, Pelletier's	1 67½	—
" Howard's	1 72½	1 80
" " 100 oz. case	1 60	—
" " 25 oz. tin	1 60	—
Root, Colomba	0 14	0 20
" Curcuma, grd.	0 12½	0 17
" Dandelion	0 25	0 35
" Elecampane	0 14	0 17
" Gentian	0 08	0 12½
" " pulv.	0 15	0 20
" Hellebore, pulv.	0 18	0 25
" Ipecac "	2 40	2 60
" Jalap, Vera Cruz	1 55	2 —
" " Tampico	0 90	1 —
" Liquorice, select	0 13	0 17
" " pow'd	0 12½	0 16
" Mandrake, "	0 20	0 25
" Orris "	0 20	0 25
" Rhubarb, Turky	4 40	5 50
" " E. I., China	1 25	1 75
" " " pulv.	1 50	1 85
" " " " 2nd	1 30	1 50
" " French	0 75	—
" Sarsap., Hond	0 45	0 50
" " Jam.	0 75	0 80
" Squills	0 10	0 15½
" Senega	0 40	0 50
" Spigelia	0 35	0 40
Sal., Epsom	3 00	4 00
" Rochelle	0 28	0 35
" Soda	0 02	0 03
Seed, Anise	0 16	0 30
" Canary	0 05½	0 07
" Cardamon	3 00	4 00
" Fenugreek, gr'd	0 10	0 15
" Hemp	0 06	0 07
" Mustard, white	0 14	0 16
Saffron, Amer.	1 25	1 50
" Spanish	14 00	16 00
Santonine	10 50	12 00
Sago	0 07½	0 09
Silver, Nitrate, cash	14 90	16 50
Soap, Castile, mottled	0 11½	0 14
Soda Ash	0 03	0 04
" Bicarb. Newcastle	4 00	5 00
" " Howard's	0 14	0 16
" Caustic	0 04	0 05
Spirits Ammon., arom	0 25	0 35
Strychnine, Crystals	2 30	2 75
Sulphur, Precip.	0 10	0 12½
" Sublimed	0 4	0 05
" Roll	0 03	0 04½
Tamarinds	0 15	0 20
Tapioca	0 20	0 23
Veratria oz.	0 25	0 30
Vinegar, Wine, pure	0 55	0 60
Verdigris	0 35	0 40
" Pow'd	0 45	0 50
Wax, White, pure	0 85	0 90
Zinc, Chloride oz.	0 20	0 25
" Sulphate, pure	0 10	0 15
" " com.	0 06	0 10
Dyestuffs.		
Annatto	0 40 @	0 60
Analine, Magenta, cryst	5 20	—
" " liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitriol, pure	0 08	0 10
Camwood, pure	0 06½	0 09
Copperas, green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 03	0 04
Indigo, Bengal	2 40	2 50
" Madras	1 15	1 20
" Extract	0 28	0 35
Japonica	0 05½	0 06½
Lacdye, pow'd	0 35	0 40
Logwood	0 02½	0 03

Dyestuffs—Continued	$ c.	$ c.
Logwood, Camp	0 02½ @	03½
" Extract	0 13½	14
" " 1lb bxs	0 15	—
" " ½lb "	0 16	—
Madder, best Dutch	0 16	0 18
" 2nd quality	0 14	0 15
Quercitron	0 03	0 05
Sumac	0 06½	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
Spices.		
Allspice	0 08½ @	0 10
Cassia	0 50	0 55
Cloves	0 15	0 16
Cayenne	0 18	0 25
Ginger, E. I.	0 12	0 14
" Jam.	0 28	0 30
Mace	1 05	1 10
Mustard, com.	0 20	0 25
" D. S.	0 40	0 45
Nutmegs	0 55	0 75
Pepper, Black	0 11½	0 12½
" White	0 20	0 22
Paints, Dry.		
Black, Lamp, com.	0 07 @	0 08
" " refined	0 25	0 30
Blue, Celestial	0 08	0 12
" Prussian	0 65	0 75
Brown, Vandyke	0 10	0 12½
Chalk, White	0 01	0 01½
" Red	0 05½	0 10
Green, Brunswick	0 07	0 10
" Chrome	0 20	0 25
" Paris	0 30	0 35
" Magnesia	0 20	0 25
Litharge	0 08	0 09
Pink, Rose	0 12½	0 15
Red Lead	0 06½	0 08
" Venetian	0 02½	0 03½
Sienna, B. & G.	0 10	0 15
Umber, "	0 07	0 10
Vermillion, English	0 90	1 00
" American	0 25	0 35
Whiting	0 85	1 25
White Lead, dry, gen.	0 07½	0 09
" " " No. 1	0 06½	0 08
" " " No. 2	0 05½	0 07
Yellow Chrome	0 12½	0 35
" Ochre	0 02½	0 03½
Zinc White, Star	0 10	0 12
Colors, in Oil.		
Blue Paint	0 12 @	0 15
Fire Proof Paint	0 06	0 08
Green, Paris	0 32	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1lb tins	0 14½	0 16
Putty	0 03¾	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25lb tins	2 35	—
" " No. 1 "	2 10	—
" " No. 2 "	1 90	—
" " No. 3 "	1 65	—
" " Com. "	1 30	—
White Zinc, Snow	2 75	3 25
Naval Stores.		
Black Pitch	4 50 @	5 50
Rosin, Strained	3 75	4 50
" Clear, pale	6 50	10 00
Spirits Turpentine	0 50	0 55
Tar Wood	4 00	5 00
Oils.		
Cod	0 65 @	0 70
Lard, extra	1 25	—
" No. 1	1 12½	—
" No. 2	1 00	—
Linseed, Raw	0 75	0 80
" Boiled	0 80	0 85
Olive, Common	1 25	—
" Salad	1 80	2 30
" " Pints, cases	4 20	4 40
" " Quarts	3 60	3 00
Seal Oil, Pale	0 80	0 85
" Straw	0 75	0 80
Sesame Salad	1 30	1 35
Sperm, genuine	2 40	—
Whale, refined	0 85	1 00