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CANADIAN
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Original and Selected Papers.

NOTE ON THE CONTRACTION OF ALCOHOL AT LOW TEMPERATURES.

BY E. B. SHUTTLEWORTH.

Although everyone is aware that liquids are subject to expansion by heat, there are few persons who recognize the importance of the fact as applied to the common operations of measuring. It is true that with most liquids, and especially those which contain a large proportion of water, the difference in bulk caused by a variation of ten or twenty degrees of heat, is almost inappreciable. In the ordinary operations of pharmacy, where extreme accuracy is not required, and where the bulk of the liquid is inconsiderable, the effects of temperature may be disregarded. There are, however, instances where want of attention to this would lead to appreciable and serious errors. This occurs when the quantity of the liquid is large; or the variation from the standard temperature is considerable, and more especially, when the liquid to be measured contains a large proportion of alcohol, as the dilatation of spirit, by heat, is triple that of water. The attention of the writer was lately directed to the practical bearing of this subject by the following incident.

In the early part of December last, a firm doing business in Toronto, shipped to a country customer, a quantity of alcohol. It is possible that, during transportation, the spirit was exposed to a temperature of twenty degrees below zero, Fahrenheit. In this condition it was received by the purchaser, who at once proceeded

to measure it, and found a deficiency of about 7 per cent of the volume indicated by the excise guage. It was thought that the effect of the extreme cold might have something to do with the apparent loss, and for the satisfaction of all parties, it was concluded to refer the matter to the writer for decision.

The published tables of the expansion of alcohol by heat do not go lower than a temperature of 30° F., and the statements of authorities as to the general rate of expansion for each degree of heat do not correspond. According to Tralles, alcohol expands between —26 C. and +37 C., with tolerable uniformity; the dilatation is given at 0·00047 of the volume for each degree, Fahrenheit. From the tables of Guy Lussac, the average rate of contraction between +74·14 C. and O.C. may be calculated at 0·00059 for each degree, Fahrenheit. As the rate of expansion of alcohol varies with the amount of dilution, it is probable that this want of coincidence is due to the spirit used for experiment not being of the same degree of strength.

Being therefore unable to find any data which suited my purpose for the calculation of the expansion of spirit of the desired degree of strength, and at a sufficiently low temperature, I determined to make a few experiments, which, though performed with apparatus of a somewhat imperfect description, would still afford results sufficiently accurate for practical purposes.

A burette graduated into 250 equal divisions, was employed as a dilatometer. As the tube thermometers at command could not conveniently be immersed in the liquid, an ordinary thermometer, of the kind used for general purposes, was suspended, side by side, with the burette. The spirit used was of the strength usually sold, being 65 over proof on Sykes' scale, corresponding with sp. gr. .820, and containing about 91 per cent, by weight, of absolute alcohol, or 94 per cent, by volume. The burette was filled with this spirit at a temperature of 60° F., and was subjected to exposure in situations where the temperature appeared constant.

A number of observations were made in this way at temperatures ranging from 60° F. to 10° F. Recourse was then had to a mixture of snow, common salt, and nitrate of ammonia, whereby the thermometer fell to—20° F. These observations were repeated three times, but on comparing the results it was found that there were

some very wide discrepancies, which could only be accounted for by the supposition that the temperature of the tube, and that indicated by the thermometer, were different, owing, perhaps, to currents of air. The second method tried gave more satisfactory results. A five gallon wide-mouthed jar was filled with a mixture of alcohol of 65 over proof, and snow—the quantity of the latter being slightly over that which the spirit would dissolve. This gave a temperature of 20 degrees below zero F. The tube and thermometer were immersed in the mixture, and the volume of the alcohol noted at the increase of every five degrees, until the temperature of the apartment in which the experiments were made, was reached. (60° F). The result is given in tabular form. As no allowance was made for the expansion of the glass tube, the figures given will therefore only represent the *apparent* expansion of the liquid; in order to ascertain its *absolute* expansion, a correction must be made. This will not be necessary for ordinary purposes :—

TABLE EXHIBITING THE VOLUME WHICH 100 GALLONS OF ALCOHOL, 65 OVER-PROOF, AT 60° F., WILL HAVE WHEN MEASURED AT DIFFERENT TEMPERATURES.

TEMPERATURE.		Volume of Spirit.
Centigrade.	Fahrenheit.	
15·55°	60°	100·0
12·77	55	99·7
10·00	50	99·4
7·22	45	99·2
4·44	40	98·8
1·66	35	98·6
— 1·11	30	98·3
— 3·88	25	98·0
— 6·66	20	97·6
— 9·44	15	97·3
—12·22	10	97·0
—15·00	5	96·6
—17·77	0	96·3
—20·55	— 5	96·0
—23·33	—10	95·7
—26·11	—15	95·4
—28·88	—20	95·2

From this it will be seen that in falling in temperature from +60 to —20, or 80 degrees, the diminution of volume is 0·0480, making the average contraction for each degree to be equal to ·0006 of the volume. This agrees within .00001 with the average deduced from the table of Gay Lussac. This table will be found useful as giving the expansion from 60° F. to the boiling point of alcohol, and is therefore reproduced. In using this table as a continuation of that given above, a simple calculation will be necessary, as the volume of the alcohol is assumed as 1000, at a temperature of 173° F.

TABLE SHOWING THE CONTRACTION OF ALCOHOL IN EVERY FIVE DEGREES, FROM ITS BOILING POINT TO ZERO C. *(Gay Lussac.)*

TEMPERATURE.		Volume of the Alcohol.
Centigrade.	Fahrenheit.	
74·14°	173°	1000·0
73· 4	164	994·4
68· 4	155	988·6
63· 4	146	982·5
58· 4	137	975·7
53· 4	128	970·8
48· 4	119	965·3
43· 4	110	969·7
38· 4	101	954·3
33· 4	92	949·1
28. 4	83	944·0
23· 4	74	939·0
18· 4	65	934·0
13· 4	56	929·3
8· 4	47	924·5
3· 4	38	919·9

There does not appear to be any necessity for pointing out the application of this subject to the every-day life of the druggist. It is evident that in purchasing alcohol, measured at temperatures below the standard, an amount of spirit is gained proportionate to the decrease of temperature. In measuring alcohol for use, or sale, at temperatures below 60° F., the loss follows the same law. Thus, a 50 gal. barrel of alcohol filled at the standard temperature, will only furnish 49 gals. at ordinary winter temperatures, say 25° F. This will account for many apparent shortages, although in the case cited at the commencement of this paper there must have been a small amount of leakage.

NITRITE OF AMYL.*

BY ALFRED B. TANNER.

The author first gives an account of the introduction of this new remedy into medicine, and particularly of its use in angina pectoris, as advocated by Dr. L. Brunton, and as an antidote to the effects of an overdose of chloral, ergot, &c., suggested by Dr. Talfourd Jones, who also believes it to prove a reliable remedy for the collapse and cramps of cholera.†

Nitrite of amyl was discovered by M. Balard in 1844. An account of the physical and chemical properties of this interesting ether is then given, and the various processes are reviewed which have been suggested for its preparation, after which the author continues:

The process with which I have been in the habit of preparing nitrite of amyl, and of which I now intend giving you a description, is one which I think will be found convenient for its preparation on a small scale, and of sufficient purity for medicinal use. I do not claim any originality for it, as it is probable that many may have thought of it although not put it into practice. So long ago as July last year, while making spirit of nitrous ether by the Pharmacopœia process, the idea occurred to me that, with some modification, this might be made a convenient one for the preparation of nitrite of amyl. A demand for the latter arising just then, I put it into practice. In Mr. Maisch's paper in the April number of the Journal,‡ he states that the same idea occurred to him, but that he found it not to answer, and this I think may be easily accounted for. The process for spirit of nitrous ether, as you are all aware consists in distilling, at a certain temperature, a mixture of rectified spirit, sulphuric and nitric acids in certain proportion, and copper wire; the distillate consists mainly of a mixture of nitrite of ethyl and ethylic alcohol. Now, by substituting amyl alcohol for the rectified spirit in this process, you get nitrite of amyl among other products; but Mr. Maisch appears to have overlooked one fact, viz., that rectified spirit contains 16 per cent. of water, and that the amylic alcohol he used was nearly anhydrous. He states that the amylic alcohol, *i. e.* the purified substance, was mixed with sulphuric acid, the mixture introduced into a retort, together with some copper wire, and, after cooling, H N O_3 was added. In a very few moments the evolution of gas was observed, the liquid became hot without the external application of heat; and the reaction very rapidly increased to such a violence that the entire charge was lost, it being impos-

*Abstract of a paper read at a meeting of the Liverpool Chemists' Association, and published in the Pharmaceutical Journal of London, November, 1871.

†British Medical Journal, Sept. 30th, 1871.

‡Amer. Journ. Pharm., 1 71, p. 146.

sible to condense any of the vapors in Liebig's condenser, or to retain much of the liquid forced over into the receiver. I may add that I have repeated this experiment with exactly the same results; nearly the whole charge was forced over into the receiver, and, while there, the action again commenced, and increased to such violence that I have no doubt it would have forced itself back into the retort again if their mutual positions had been favorable. As it was, I was obliged to introduce it to the open air, for the whole house became filled with the vapor, and every one who respired it became suddenly red in the face. Upon one of my assistants it had a very remarkable effect; it seemed to affect the muscles at the back part of the neck, and drew the head backwards, but this soon passed off. I should quite expect that the reaction would be just as violent in making spirit of nitrous ether, if we used anhydrous alcohol instead of 84 per cent. as ordered. In preparing the nitrite of amyl by the process I employ, it is of the utmost importance that the amylic alcohol be as pure as possible. Amylic alcohol, as you all know, is formed during the fermentation of potatoes, rye, barley, and the marc of grapes; and when these are distilled it communicates a very pungent, and to many repulsive, odor and taste to the spirits. It is considerably less volatile than either ordinary alcohol or water, having a boiling point, when pure, of 132° C.; in consequence of this property, it accumulates in the last portions of the liquids that are distilled. Its name is derived from *amylum*, starch, —this being the most abundant constituent of potatoes. Liebig states that amylic alcohol is formed principally in the fermentation of alkaline or neutral liquids, and its production in the potato mash may be prevented in great measure by adding crude tartar to the fermenting liquid. Its formation never occurs in acidulous fermenting liquors which contain tartaric, racemic, or citric acids. The addition of hops to the liquid has a similar effect in checking the development of amylic alcohol, or fusel oil, as it is generally termed. It is, when pure, a colorless limpid liquid, of a penetrating and disagreeable odor, exciting headache and coughing when its vapor is inhaled. It is sparingly soluble in water, though it mixes in all proportions with alcohol, ether, and essential oils. It is not easily inflammable, but burns with difficulty, giving a bluish flame. Its specific gravity, when pure, is ·818, and boiling point 132° C. Amyl alcohol is not acted upon by the atmosphere, except it be in a very thin layer, or under the influence of spo[illegible] platinum, when it is oxidized into valeric acid, $C_5H_{10}O_2$, which acid bears the same relation to amylic alcohol that acetic acid, $C_2H_4O_2$, does to ordinary alcohol. Fusel oil, as met with in commerce, is usually a clear yellowish liquid, with a peculiar penetrating odor, varying, of course, with the substance from which it has been produced. It has a specific gravity of from ·840 to ·850, and is largely contaminated with the lower alcohols of this series; so far as my experience goes,

it is only about half pure amyl alcohol. As I have before stated, it is of the utmost importance, in the preparation of nitrite of amyl, that the amylic alcohol be as pure as possible, for it is much easier to purify this than to purify the nitrite produced from it in its impure state. For this purpose, the best process is first to agitate the fusil oil with about an equal bulk of a strong solution of chloride of sodium; this usually reduces its bulk about 16 or 20 per cent. and also considerably lowers the specific gravity. This washed product is separated and introduced into a retort furnished with a thermometer; that portion of the distillate which passes over before the temperature reaches 125° C. consists mainly of the lower alcohols of this series, and whose boiling points are below that of amylic alcohol, for the boiling point rises in proportion as the compound is richer in carbon. The distillate collected between 125° C. and 140° C. is collected apart, and redistilled until it has a boiling point near 132° C.; this may then be considered pure enough for our purpose. This is then introduced into a glass retort containing some copper wire, and furnished with a safety tube, and one-tenth its bulk of $H_2S\,O_4$ added. The same quantity of $H\,N\,O_3$, diluted with an equal volume of water, is next put in, and a very gentle heat applied until the temperature reaches about 65° C., when the reaction will commence and proceed in a perfectly manageable manner, until a bulk about equal to double the quantity of $H\,N\,O_3$ added collects in the receiver, the temperature in the meantime rises to about 98° C. The reaction ceases very quickly, as in the case of spirit of nitrous ether. The temperature having fallen somewhat, another portion of $H\,N\,O_3$, equal in bulk to the first, is added, and this process of successive additions of the acid continued until nearly the whole of the amylic alcohol is exhausted, which may be known by the dense red fumes evolved from the retort. The distilled product exceeds in bulk the amylic alcohol used, and is the impure nitrite of amyl. This is washed with solution of $Na\,H\,O$ to remove the $H\,C\,N$ and other free acids present, and rectified over fused $K_2C\,O_3$ to get rid of moisture. The portion which distils between 95° and 100° C. is collected as nitrite of amyl, sufficiently pure for medicinal use.

It has several times been stated that nitrite of amyl produces violent headache, and also coughing and irritation of the larynx; this, I think, must be due to its insufficient purification. The presence of $H\,C\,N$ and undecomposed amylic alcohol would, I think, account for this; no such effect was produced on myself with the purified nitrite. Mr. Umney has shown, in an article in the *Pharmaceutical Journal* of November, 1870, that the samples then met with were very impure.

ASSAY OF PYRITES FOR GOLD.*

BY J. M. MERRICK, S. B.

The following described method may be novel to some readers of the *American Chemist*, but it has been employed by myself for more than a year, and found to work well enough to merit description.

One pound, or even eighteen ounces [avoirdupois] of fine marble dust is mixed with finely-pulverized and sifted pyrites, the whole then resifted and put into a Hessian crucible, which should be about one-third filled by the mixture. The crucible is set as usual on a fire brick, and a fire of hard coal is made around it, the coals being heaped up to within an inch of the top. The crucible is covered with a piece of brick or a piece of sheet iron. During the first half hour the contents should be stirred once or twice. As the fire grows brisker the carbonic acid evolved keeps the contents of the crucible in brisk evolution, and the mixture should be stirred well every five or ten minutes. On stirring, during this time, the iron rod used seems to meet with but little resistance from the light mass, but at the end of about one hour and one half, the evolution of gas suddenly ceases, the red hot mass becomes heavy, sinks, and requires considerable force to keep it stirred. It must be stirred well and vigorously, however, for about half an hour, not leaving it unstirred for more than a minute, otherwise the mass will fuse or cake, and the assay will be almost inevitably ruined.

When a sample taken out in an iron spoon gives off *no* smell of sulphur, the entire contents of the crucible must be turned into a stone ware pot or a wooden bucket half filled with water and well stirred. When the powder—which should be uniform and free from lumps or fused pieces—has settled, the water must be poured off, the wet mass allowed to drain, and then transferred to a large earthen bowl, or porcelain mortar. Here it is to be amalgamated with about two ounces of mercury, to which a little bit of sodium amalgam has been added. The amalgamation, as well as the stirring in the fire, is a tedious process, and one which I prefer to do by proxy. It does not consist in merely grinding with a pestle the mercury in among the particles of the roasted ore, but this ore itself must be ground in contact with the mercury, until the particles are so fine that they will float suspended in water for several seconds. At the end of—say—ten minutes thorough grinding the contents of the bowl are to be brought into one mass in the bottom of the vessel, the bowl then sunk in a tub of water and the contents 'washed down'—an operation not easily described, but familiar enough to every old Californian. It consists essentially, in shaking

*From the American Chemist.

the bowl half full of ore and water, in such a way that the mercury, gold particles, and unground ore sink to the bottom while the light and finely ground ore is floated off into the tub. The ore remaining is reground and rewashed, and these processes are repeated till nothing but the mercury remains in the bottom of the bowl or mortar. The mercury is then dried with filter paper and heated in a porcelain capsule over a Bunsen flame very gently until it is sublimed and the gold remains behind. The film of gold may then be scraped up and melted with a little sodic borate, and potassic nitrate in the very smallest sized Hessian crucible, either with the foot blowpipe, or in a charcoal furnace, by which means a round, clean button of gold suitable for weighing, will be obtained.

This method which I have subjected to a most thorough trial, my experiments having been made almost daily, for three and one half months, has its disadvantages, and its counterbalancing merits. On the one hand it must be admitted to be tedious, laborious and to a considerable degree, uncertain. Some analysts fail with it altogether, while none who have tried it, so far as I know, get closely agreeing results.

But on the other side it is certain that this method will indicate the presence of gold, and will bring out the gold in a weighable form from pyritic ores, where the assay by smelting will not show a remote trace of the precious metal; and that where the fire assay shows a certain percentage this will invariably bring out a larger amount. I have obtained large returns by this amalgamation method from iron pyritic ores, which have been repeatedly assayed in the ordinary way, by chemists of great eminence, with uniformly negative results.

It may be added, that while on this side of the water the existence of gold in any workable amount in iron pyrites is strenuously denied by the ablest assayers, the Wicklow pyrites are worked for gold and silver, as by-products to be sure, but in quantities sufficient to pay.

That no gold has been discovered by many assayers in pyritic ores, which have yielded me large results, I refer to the volatility of gold in the presence of sulphur. I imagine that the gold is roasted off in this very first step of the ordinary process. See Crookes and Rohrig on Gold, p.p. 629—630, and the authorities there quoted.

I have had no opportunity to put this method in practice on a large scale, and I hardly know what kind of stirring apparatus could be devised, but I have seen twenty pound lots of ore thus roasted and stirred by hand power, with satisfactory results.

A CHAPTER IN MICROSCOPY.

BY HENRY POCKLINGTON.

(*Concluded from Page 212.*)

Optical Errors.—Errors of interpretation frequently arise out of certain well-known optical phenomena, and are less easily guarded against, because less expected. "Seeing is believing," says the old saw; but in optics seeing must very frequently be *not* believing. One of these phenomena we have already glanced at in the case of the oil, air and water globules. A very similar case is that of the lacunæ in bone, so long mistaken for opaque radiating solids. Not unlike, also, are the cases of the concavity of the blood-corpuscle, the so-called tubular structure of the human hair, and the so-called hexagonal areolation of the valves of certain *Pleurosigmæ*. One rule may serve as guide here. Carefully alter the focus in the way we have just described. If the portion of the structure under view appears brightest when the distance between the objective and itself is *greatest*, and darkest when that distance is least, it may, with tolerable safety, be concluded that it is a superficial elevation. The rule is, of course, modified if the particular portion of the structure possess a different refractive power from its surroundings; but making allowances for this (any variation in this respect may be detected by altering the direction of the illuminating pencil), the rule may be relied upon with safety. The student may practise upon the eyes of insects, provided they be carefully mounted. We would recommend him to secure a really good specimen of the eye of a beetle (one in our possession, mounted by Mr. J. F. Barnett, of Tottenham, is exquisitely done), human hair mounted dry and in balsam, and a slide of *Pleurosigma formosum*, and to carefully study these under all possible conditions as regards the direction of the illuminating pencil. But, after all, the most perplexing phenomena are those due to diffraction. Perhaps, without plunging into mathematics, we may, in a few words, explain the cause of these phenomena before we attempt to discover a safeguard from their misleading tendencies.

These phenomena appear to have been first noted a little more than two centuries since by Grimaldi, of Bologna, but it is only within modern times that they have been thoroughly investigated. They are due to the fact that a ray of light is, under certain circumstances, inflexed in passing the margin of an object. The phenomena may be easily observed if a diverging pencil of light be permitted to enter a dark room through a narrow aperture, and a knife-edge be held in the path of the pencil just above its point of divergence. The shadow of the object will be split down the centre by a bright line bordered with fringes of colors in harmonic progression; or, a grating of fine wires may be arranged so that no light shall enter the

eye but has passed through the grating, when exceedingly beautiful effects, dependent upon the size and arrangement of the wires, will be produced. The phenomena are thus explained:* if the diverging rays, which are inflexed on one side of the pins or wires, meet those which are inflexed on the opposite side in the same phase of undulation (on crest or in trough of wave at same time), they coincide and produce a line of white light; whilst rays, which differ in their path, encounter each other under different phases, and interfere, producing either darkness or a colored fringe. (The student at the seaside, or near a lake or pond, may study these phenomena at his leisure in visible waves of water.) Very similar in character to diffraction interferences are those known as thin-plate interferences, and we may conveniently study them together.

In microscopy we meet with the one when we study fine striæ, as in diatoms, some of which give a lovely iridescent glow when viewed by an intense beam of white light; the others, in such structures as the ramenta of Ceterach and certain vegetable hairs. Both are met with in certain histological preparations, where fine fibres lie side by side, or are interlaced, or where two membranes are closely superimposed. Very commonly in the barred, or pitted, vessels of plants, it is exceedingly difficult to decide whether the apparent puncture is complete, or whether the primal cell wall is still present, but uncovered by the later deposit, as it is visible only as a narrow band of a faint reddish color, with, perhaps, a dark band round the centre. In a slide of the vessels of *Tropæolum majus* (nasturtium), now before us, there is a splendid illustration of this class of phenomena; and it was not without long and careful study that the true character of the structure could be made out. We did it at last by the use of homogeneous light, which, being obviously incapable of interference, enabled us to see, by aid of careful focusing, that there was really no complete aperture in the *cell under observation*, but that the later deposits of sclerogen had left the primal cell wall uncovered in those particular portions. This is, of course, a very common structure, the less frequent being the perforate one. The use of monochromatic light, in all cases where there is the least reason to suspect interference phenomena, is strongly to be advised. Careful use of the polarizer without analyser, but with and without selenite, is also, in many cases, of great service. The student may familiarize himself with these phenomena, and the way of dealing with them, by the careful study with low powers in a strong light of such things as these,—gratings of fine wires, meshes of one threads or wires, films of mica having their surfaces broken up by being bent to a right angle and then reflexed, and, lastly, of such fine powder as the sporidia of *Lycoperdon* (puff-ball), and of various species of *Ustilago*. He will, after a course of such study, be able almost intuitively to

*Brooks' 'Natural Philosophy,' 6th edition.

pronounce as to the true character of the structure producing the interference, and find these very phenomena a great help instead of a plague and a torment.

A class of phenomena accompanying the use of "oblique illumination" should be considered here, but we must confine ourselves to pointing out the form the errors generally assume. The phenomena are strictly analogous to the second images seen when the image of an object is viewed in a thick looking-glass, and were, of course, due to successive reflections from the different surfaces of the mirror and its metallic coating. When such objects as diatoms are viewed by very oblique light from the mirror, these secondary images are very numerous, arising from successive reflections from the surfaces of the thin cover, glass slide, the object itself, and the medium in which it is mounted. These successive reflections produce the appearance known as false striæ, and may be detected by slightly changing the angle of incidence of the illuminating pencil, or by rotating the object in a horizontal plane.

Molecular Movements.—We must notice these very briefly, as our space has nearly run out. These, called often after their discoverer, *Brownian movements*, are hardly to be distinguished from those more properly called vital by any other than an experienced microscopist. Indigo, carmine or gamboge rubbed up in water is admirably adapted to show the movements, and a careful study of them will be the surest means of enabling the student to recognize them. Their want of power of choice (*i. e.*, their movements are purely mechanical) is, perhaps, their sole distinguishing feature. The differences between Brownian and vital movements in small particles are so slight, that it is doubtful whether they can be described, or that anything but experience will enable the student to distinguish between them.

Certain sources of error of interpretation arising out of the use of the micro-polariscope and micro-spectroscope, must be deferred, as must also the discussion of a few other points with reference to the use of the ordinary stand. Enough has, it is hoped, been said to be of use to the student in microscopy, who, like the author, in his younger days especially, is pretty often at his wits' ends.

SOLVENTS FOR INDIGO.*

DR. E. JACOBSEN.

Translated by C. Dengenhardt.

Some new solvents for indigo have lately been given by de Aguiar and Baeyer, and by Prof. Wartha. (See *American Chemist* Vol. I, p. 472). To these I will also add a few which I have discovered,

*From the American Chemist.

That aniline will dissolve indigo has been known several years, from my own experiments. But an equally good solvent for indigo is nitrobenzol, which when heated with indigo is colored a deep violet blue, and on cooling deposits flaky crystals and then appears dark red, probably from red indigo.

In greater or less quantities the following substances dissolve indigo at their boiling points:

Castor oil, acetone, hydrate of chloral, camphor, oil of turpentine, balsam of copaiba, cedar oil (oil of Juniper virgin), amylic-acohol, oil of lavender, white beeswax, Japanese vegetable wax, and Caranuba wax, (from this last small flaky crystals precipitate).

The higher the boiling point of the solvent, the redder is the appearance of the solution, so that bodies like acetone, amylic alcohol and hydrate of chloral give a clear blue. Castor oil, cedar oil, etc., a violet blue, and the different kinds of wax a purple red solution. If kept for a short time at the boiling point with white wax, the color changes from scarlet to orange, and at last to a brown. The indigo is reduced by the formation of acrolein, and the solution retains its brown color even on the addition of gasoline.

If powdered indigo is added to melting picric acid, the former will be decomposed with deflagration.

ON THE LOSS OF THE HERBACEOUS PARTS OF PLANTS IN DRYING.*

BY JOHN M. MAISCH.

Few pharmacists have a correct idea about the amount of moisture contained in the drugs which they are daily handling, and many would smile incredulously if informed that some of these drugs, which are regarded as "dry," still lose from one-seventh to one-sixth of their weight if dried in a water-bath, and that even many of the powders as met with in the shops contain from six to ten per cent. and sometimes more moisture. Carefully performed experiments with a large number of drugs and dry preparations are very much needed; for it is obvious that galenical preparations, and particularly tinctures, syrups, fluid extracts and the like, must vary in strength as prepared from anhydrous or merely air-dry material, though both may be of equal quality when anhydrous.

The loss in weight of living plants or parts of plants, when brought to an air-dry condition, is likewise a subject about which little is known, since pharmacists usually depend on wholesale dealers for their supply of indigenous drugs, though the plants may

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grow abundantly within convenient reach. The superior quality, however, of drugs collected and cured by the pharmacists, as compared with their usual condition in the general market, is often so striking, that few who value good and reliable drugs, would be willing to discontinue such collection and curing, after they have once commenced it.

In collecting the annual supply, it is necessary to take into consideration the loss of these medicinal herbs, sustained by drying. The following table is compiled by observations by me, with plants or their parts of my own collection, and I regret that other notes of the more important medicinal herbs, growing in this locality, are now not at hand. Sufficient care was invariably taken to collect and weigh the plants free from external moisture by dew or rain; the drying was effected under an airy shed or in a room, protected from rain; and the final weight was taken when the plant ceased to lose weight in an ordinarily dry atmosphere:

	Loss, per cent.	yield, air-dry, per cent.
Chimaphila umbellata, leaves and stem	48·98	51·02
Mentha canadensis, the flowering herb	89·21	10·79
Scutellaria lateriflora	77·68	22·32
Lobelia inflata	76·56	23·44
Brunella vulgaris	76·39	23·61
Nepeta cataria	76·39	23·69
Eupatorium perfoliatum, the flowering tops	76·52	23·48
Gnaphalium polycephalum	63·34	36·66
Hypericum perforatum	61·03	38·97
Datura stramonium, the leaves	88·70	11·30
Hepatica triloba	71·65	28.35
Cassia marilandica	70·92	29·08
Leontodon taraxacum, the root collected in Oct	72·40	27·60

The above data are too few in number to allow of any general deductions; it seems, however, as if low plants from wet localities (mentha canad.) and juicy leaves (stramonium) may yield air-dry residues, equal to about one-ninth, plants from dry sandy soil (gnaphalium and hypericum) about one-third, other plants about one-fourth or one-fifth of their original weight; the large yield of chimaphila is doubtless in the main due to the woody stems, and in part also to the leathery leaves.

OIL OF WINTERGREEN.

BY DR. J. E. DE VRY.

In reading the note on "Oil of *Andromeda Leschenaultii*" on page 285 of this Journal, I supposed it would be of some interest to publish some experiments on a similar subject which I made in 1859, when I was in Java. The presence of large numbers of *Gaultheria punctata* and *Gaultheria leucocarpa* on the tops of many volcanoes of that island having attracted my attention, I collected the leaves of both of them on the extinct volcano Patoea, with the view of ascertaining the amount of essential oil to be extracted from them by distillation.

65 pounds of fresh leaves from *G. leucocarpa* yielded 40 grams of oil, amounting to about 0·012 per cent.

59 pounds of fresh leaves from *G. punctata* yielded 340 grams of oil, amounting to about 1·15 per cent.

Both of these oils are almost identical with the American wintergreen oil, as I found them to consist chiefly of methyl-salicylic acid. I brought them home, and presented them to the chemical collection of the Polytechnic School at Delft.

If wintergreen oil is really in great request by certain manufacturers, I suppose it would be made with profit in Java from *G. punctata*.

As Zwenger found quinic acid in the leaves of *Vaccinium Myrtillus*, I supposed that both the species of *Gaultheria* mentioned as belonging to the same natural family, might contain the same acid. Therefore, after distilling the oils, I examined the residue in the still, and found the expected quinic acid, as was proved by its deviation of the plane of polarization to the left, and by the production of hydrochinon, if treated with manganese and sulphuric acid.

PREPARATION OF SULPHURETTED HYDROGEN.

BY JOHN GALLETLY.

In making some experiments on the action of sulphur on paraffin, I have found that a mixture of these substances, either in equal parts or with a larger proportion of sulphur, when heated in a flask not greatly above the melting point of the sulphur, begins to evolve sulphuretted hydrogen, and continues to give off this gas steadily, while kept moderately heated, for a considerable time.

I have used this process repeatedly, and consider it the most convenient for laboratory use. With a round flask holding about a

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From the Chemical News.

pound of the materials fitted with a tube bent at right angles about ½-inch bore, and 12 to 18 inches long, containing a little loose cotton wool, and having a smaller tube fitted to the end of this for dipping into the liquid, through which it is desired to pass the gas, a convenient stream can be obtained, lasting several days. The production of the gas can be stopped and renewed at pleasure by withdrawing or applying the heat. An argand lamp should be employed, or if a Bunsen is used, the top piece should be on the tube for spreading the flame, so as to avoid heating the flask on one spot. Heavy paraffin oil used for lubricating machinery can be substituted for the solid paraffin, and good results are also obtained with commercial stearic acid, but with the latter the tube conveying the gas soon becomes covered with drops of a milky liquid, which is probably water and finely divided sulphur. With paraffin the tubes remain clear and bright, except for a little sulphur sublimate close to the neck of the flask.

I observe that Reinsch recommends a laboratory process for obtaining pure sulphuretted hydrogen by heating in a glass flask equal parts of sulphur and suet. The recommendation does not seem to have been generally followed, but the advantages resulting from the substitution of paraffin for suet may lead to the more usual adoption of this process.

THE SUBSTITUTION OF PROPORTIONAL OR RELATIONAL NUMBERS FOR SPECIFIED WEIGHTS AND MEASURES IN THE DESCRIPTION OF PROCESSES IN THE PHARMACOPŒIA.*

BY PROFESSOR REDWOOD.

One of the questions that will necessarily arise in connection with the preparation of a new edition of our Pharmacopœia, is that of the weights and measures to be authorized or recommended for use in prescribing, dispensing and compounding medicines. The committee by whom the present edition of the British Pharmacopœia was prepared have alluded, in the preface to that work, to two "grave defects" in the system of weights principally employed in the description of pharmacopœia processes, namely, "the absence of any denomination of weight between the grain and the avoirdupois ounce of 437·5 grains, and the fact that the ounce is not a simple multiple of the grain;" and they have given, and to some extent used, a second or alternative system,—the metrical system,

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, Dec, 6, 1871, and published in the Pharmaceutical Journal, London, Dec. 1871.

in which those, or similar, defects do not exist. This more perfect system having been thus approved, and having been adopted in most Continental countries, and in this country for the purposes of science; moreover, the substitution of this system for British weights and measures being now sanctioned by law, and a knowledge of it being included among the qualifications which pharmaceutical chemists are expected to possess,—it becomes important to consider whether we cannot adopt an arrangement in the Pharmacopœia by which the employment of metrical weights and measures would be facilitated and promoted. Instructions for the use of these weights and measures in volumetric testing are given in the present edition of the Pharmacopœia, but with this exception, the British system is used, and the processes are so constructed that the application of the other system, in many instances, involves a good deal of calculation.

Yet, notwithstanding the fact, as thus shown, that there are defects in our system of weights, especially as applied to pharmacy, and some strong grounds for exchanging this system for another, I do not think the time has arrived at which it would be judicious or safe, in the administration of medicine, entirely to replace British weights and measures by those of the metrical system. Such a change, if it were now suddenly made, would be distasteful and embarrassing to a large proportion of those for whose use the Pharmacopœia is intended; and this, I believe, applies quite as much to medical as to pharmaceutical practitioners. There are, however, many physicians and pharmacists who are favourable to, and prepared for, the change, and by whom an arrangement of the Pharmacopœia that should afford easy means for effecting the transition from one system to the other, would be looked upon as a step in the right direction.

Assuming, therefore, that this change is desirable, and indeed inevitable, but that it ought to be brought about gradually, we may profitably consider what are the means best suited for accomplishing such an object.

There are two ways in which a gradual change might be introduced. One is to attach to each of the formulæ of the Pharmacopœia, as now constructed, a separate column of figures, representing the equivalent weights and measures according to the metrical system, leaving it to the operator to adopt whichever system he may prefer; and the other is to substitute proportional or relational numbers for specified weights and measures, such numbers being equally applicable to either system.

There are some difficulties in the way of carrying out either of these methods. If we adopt the first, it would be found that in representing the equivalents of our system in terms of the other, it would be necessary to use such a multiplicity of figures as would prove cumbrous and inconvenient in their practical application. Moreover, to be consistent, the same method of giving the equival-

ents in terms of the alternative system ought to be extended to every part of a process in which weights or measures are expressed, including the application of tests; and this, if fully carried out, would greatly add to the length and intricacy of the descriptions of our processes, and tend to render them obscure. These objections appear to present insuperable obstacles to the adoption of this as a general method of describing the processes, although there are a few instances in which it might be used with advantage.

With reference to the second method, the principal difficulty in the way of its being applied arises from the defect, already alluded to, in our system of weights, namely, that the ounce is not a simple multiple of the grain; for as the quantities represented in several of our processes, as they now stand, are expressed partly in grains and partly in ounces, it is sometimes impossible to give the proportions of the ingredients in whole numbers. There is also another difficulty, if liquids are to be measured volumetrically, and solid and liquid ingredients are used in the same process, arising from the necessity of referring to two different standards, one for the solids and the other for the liquids; for not only would this entail the use of different words to indicate the signification of the numbers when so applied, but in many cases the numbers would not represent the proportional relation of the parts. These difficulties, however, might be met, and in a great measure obviated, by altering the proportions of the ingredients used in some of the processes, attaching to the numbers short affixes which should define their meaning, modifying the mode of arranging or constructing some of the formulæ, and omitting the application of the method in a few instances.

I have been for some time endeavoring to apply this as a general method to be used in describing processes in the Pharmacopœia; and my object on the present occasion is to explain the way in which I think it might be made to accomplish the desired object; I wish also to elicit the opinions of practical pharmacists and others with reference to it.

The first thing required is a definition of terms to be employed in connection with the number representing relative quantities, for as these numbers would sometimes represent weight and sometimes volume, it would be necessary to distinguish one from the other. The term *part* might be used to represent *weight*, and the term *measure* to represent *volume*. These terms are commonly employed with such significations, and if it was clearly defined that *parts*, when when used in connection with the proportional or relational numbers, always meant parts by weight, and that *measures*, when similarly used, always meant parts by volume, no mistake would be likely to occur. If, however, it should be thought desirable in some instances to be more explicit, the term *part* might be extended to *part by weight;* but it would be very undesirable to use more words than are absolutely necessary, as these terms would have to be fre-

quently employed, not only in setting out the formulæ for the ingredients, but in the instructions for conducting the processes, and also in describing the application of tests. In cases in which the terms *part* and *measure* would both occur in the same process, the *measure* would be the water-measure of the unit of weight, whatever that might be.

With a clear understanding of the meaning of the terms *part* and *measure*, as thus defined, their application in the construction of formulæ would, in most cases, be sufficiently simple and easy, and the interpretation of the descriptions given by means of them would admit of no doubt.

The following examples will serve to illustrate the application of the proposed method to some of the processes of the Pharmacopœia:—

Antimonial Powder.

Take of

Oxide of Antimony ..... 1 part.
Phosphate of Lime ..... 2 parts.

Mix them thoroughly.

Diluted Acetic Acid.

Take of

Acetic Acid..... 1 measure.
Distilled Water..... 7 measures.

Mix.

These are two of the most simple cases that would occur; the numbers used representing the proportions of the ingredients, in one case by weight, and in the other by volume.

As another example, we may refer to the process for *spirit of camphor*, in which an ounce of camphor is dissolved in nine fluid ounces of rectified spirit. The formula would be written:—

Take of

Camphor..... 1 part.
Rectified Spirit ..... 9 measures.

Dissolve.

In this case, whatever weight might be used to represent 1 part, the 9 measures would be nine water-measures of that weight. It is obvious, however, that the numbers here are not strictly proportional numbers, for the spirit and camphor do not bear the relation of 9 to 1 either by weight or volume. The numbers might be more correctly represented as relational numbers. They indicate the relation of the weighed quantity to a measured quantity. Even the terms part and measure, as used in this case, might be taken exception to, if considered apart from the definition already given. Viewed in that

way, without reference to the definition, the terms would be more explicit, if for measures was written unit-measures, the measure being a measure of the unit of weight; but even this, without further explanation or definition, would not convey a correct impression, for the spirit, if estimated as spirit, is not 9 measures of the unit of weight, but 9 water-measures or nine times the measure of the unit-weight of water.

It thus appears, therefore, that the terms *part* and *measure*, or, I believe, any other equally and sufficiently concise terms, must be used conventionally, for the specific purpose required, and subject to a definition. When so used, the terms are convenient, and appear to answer the required purpose. They are applicable to either of the alternative systems of weight and measure, for while we have the grain and grain-measure, the ounce and fluid ounce or ounce measure, and the pound and sixteen-ounce measure, all of which are recognized and have long been used in this country,—the metrical system includes the cubic centimetre and the litre, which are water-measures of the gram and the kilogram.

In some of the processes that are more complicated than those I have referred to, difficulties in the way of applying the proposed method appear to exist, which, however, are easily removed by slightly modifying the arrangement of the formulæ. The process for chloroform, as given in the Pharmacopœia, is one of this description. The formula, as it now stands, includes not only the ingredients employed for the production of the crude chloroform, but also those used in the subsequent purification of the product. The description would be rendered more simple and effective, and, at the same time, better suited for the use of proportional and relational numbers, if the formula representing the ingredients contained only those used in the first operation, and the substances used in the purification were merely named when referred to in the instructions for conducting the subsequent part of the process; it would then run as follows:—

Take of

Rectified Spirit	2 measures.
Water	30 measures.
Chlorinated Lime	10 parts.
Slaked Lime	5 parts.

Put the water and the spirit into a still capable of holding three or four times as much as the bulk of the ingredients introduced, and having raised the temperature of the mixed liquid to 100°, add the chlorinated lime and slaked lime, and mix the whole thoroughly. Connect the still with an efficient condenser, terminating in a narrow necked reciver, and apply heat so as to cause distillation to commence, taking care to withdraw the fire as soon as the process has been well established. When the distilled product amounts to 3 or 4 measures the receiver is to be withdrawn, and its contents mixed

with about 5 measures of water in a bottle of ample size in which they may be well shaken together. The mixture is now to be left at rest for a few minutes, when the liquids will separate into two strata of different densities. Let the lower stratum, which constitutes crude chloroform, be washed by agitating it in a bottle with a tenth of its volume of distilled water. Allow the chloroform to subside, withdraw the water, and repeat the washing twice in the same way with similar portions of distilled water. Add to the washed chloroform an equal volume of sulphuric acid, care being taken that the acid thus used is entirely free from nitric or nitrous acid; shake them together in a stoppered bottle for five minutes, then allow the mixture to settle, and transfer the upper stratum, consisting of purified chloroform, to a flask or retort, with about one-twentieth of its weight of dry chloride of calcium and a fourth of that quantity of perfectly dry slaked lime. Let them stand together for about on hour, then, an efficient condenser being attached, distil over the pure chloroform by means of a water-bath. Preserve the product in a cool place in a bottle furnished with a accurately-ground stopper.

The process for ether would be treated similarly, and would be described as follows:—

Take of

Rectified Spirit.....	12 measures.
Sulphuric Acid.....	10 measures.

Mix the acid and spirit together in a glass matrass capable of containing at least twice as much as the bulk of the ingredients introduced, and, not allowing the mixture to cool, connect the matress by means of a bent glass tube with a Liebig's condenser, and distil with a heat sufficient to maintain the liquid in brisk ebullition. As soon as the ethereal fluid begins to pass over, supply fresh spirit through a tube into the matrass in a continuous stream, and in such quantity as to equal the volume of the fluid that distils over. For this purpose use a tube furnished with a stopcock to regulate the supply, connecting one end of the tube with a vessel containing the spirit raised above the level of the matrass, and passing the other end through a cork fitted into the matrass. When about 42 measures of liquid have distilled over, the process may be stopped. For the purification of this crude ether, mix it with a third of its volume of saturated solution of chloride of calcium and a little slaked lime (about a fourth part of the weight of chloride of calcium solution), and, having shaken them together in a bottle, leave them at rest for ten minutes, then pour off the light supernatant fluid, and distil it with a gentle heat until a glass bead of specific gravity of 0·735 placed in the receiver begins to float. The ether and spirit retained by the chloride of calcium and by the residue of each rectification may be recovered by distillation, and used in a subsequent operation.

Among processes the description of which would require to be modified much in the same way as the two last noticed are those

for the preparation of the alkaloids. These are the most complicated processes we have, and if the use of proportional and relational numbers can be made available in describing them, we may conclude that the method would not fail on account of the complicated nature of the instructions to be given. The process for *digitalin* may be taken as test of the applicability of the method in such cases. It would be given as follows :—

Take of

Digitalis Leaf, in coarse powder Rectified Spirit Distilled Water Diluted Acetic Acid Purified Animal Charcoal Solution of Ammonia Tannic Acid Oxide of Lead, in fine powder Pure Ether	Of each a sufficiency.

Digest 100 parts of the digitalis with 400 measures of the spirit for 24 hours at a temperature of 120°, then put them into a percolator, and when the tincture has ceased to drop pour 400 measures of the spirit over the contents of the percolator, and allow it to slowly percolate through, Distil off the greater part of the spirit from the tincture, and evaporate the remainder over a water-bath to the consistence of a soft extract. Mix this extract with 12 measures of diluted acetic acid, and digest the solution thus formed with 1 part of purified animal charcoal; then filter, and dilute the filtrate with distilled water until it amounts to 50 measures. Add solution of ammonia nearly to neutralization, and afterwards add 1 part of tannic acid dissolved in distilled water. Wash the precipitate that will be formed with a little distilled water; mix it with a small quantity of the spirit and 1 part of the oxide of lead, rubbing them together in a mortar. Put the mixture a flask, and add to it 10 measures of the spirit. Raise the temperature to 180°, and keep it at this heat for about an hour. Then add 1 part of purified animal charcoal. Put it on a filter, and from the filtrate carefully drive off the spirit by the heat of a water-bath. Lastly, wash the residue repeatedly with pure ether, and dry it.

If, with reference to cases such as this, it should be said that the instructions would be more easily followed in carrying out the processes if the quantities referred to were represented by specified weights and measures, the objection might be admitted without material detriment to the value of the proposed method; for these processes, the only ones in which such complicated instructions occur, are not given with a view to their being carried out by pharmacists in general, nor should they be undertaken by any but those ac-

customed to such operations, and to whom the modified instructions would supply all the information required.

Thus far, and in cases similar to those I have noticed, which constitute a great majority of the Pharmacopœia processes, the application of the proposed method would not be attended with any difficulties that could not be overcome by such slight modifications as I have indicated; and in some of these and other cases it would, I think, facilitate improvement of the processes by causing a more uniform relation and more simple proportions to be established than now exist among the ingredients of compound medicines.

But I must now refer to cases in which more serious difficulties are presented. There are a considerable number of processes in the Pharmacopœia in which the ingredients do not bear a simple numerical relation to each other, and several of these, containing powerful medicines, are very important remedies. Thus, we have *liquor arsenicalis*, *liquor arsenici hydrochloricus*, *liquor atropiæ*, *liquor atropiæ sulphatis*, *liquor morphiæ acetatis*, *liquor morphiæ hydrochloratis*, *liquor sodæ arseniatis*, and *liquor strychniæ*, all containing 4 grains of the active ingredient in a fluid ounce of the solution, or 1 part in 109·375 measures. Now, in these cases and others of a similar description, as the proposed method is not applicable to the existing processes, it would be necessary to make the processes applicable to the method by altering the proportions of the ingredients. In the event of such an alteration being made in the medicines named, it would probably be considered desirable to make them all contain 1 per cent. of the active ingredient. But a proposition to that effect, although much might be said in its favor,—and I might be disposed to advocate it,—would nevertheless raise some questions which ought not to be overlooked. The existing proportions have evidently been adopted to suit our system of weights and measures. Four grains in the fluid ounce, or half a grain in the fluid drachm, are convenient proportions suited to the particular circumstances under which we have been accustomed to prepare, dispense and administer the medicines. The proportions have been made to suit our compounding and dispensing appliances. If the proportions were altered to 1 in 100, we should simplify the numerical relation of the ingredients, but not the proportion of the active ingredients to the measures commonly used for dispensing and administering medicines, for a 1 per cent. solution would contain 4·375 grains in a fluid ounce, or 0·5468 grain in a fluid drachm.

If this method were adopted in preparing the solutions referred to, and other preparations that would come into the same category with them, it would be necessary to provide measures of ample size graduated to grain-measures instead of fluid ounces. Such measures are now supplied by dealers in chemical apparatus, but they are not in common use. Sets of grain-weights up to 10,000 grains would also be desirable. The ease and rapidity with which processes would

be performed in which proportional and relational numbers are used would greatly depend upon using the same denomination of weight or measure throughout a process, and where measure as well as weight is indicated in the same process, using a denomination of measure that corresponds to the unit of weight, as for instance, using the grain measure in connection with the grain, and the cubic centimetre in connection with the gram.

One of the objects contemplated in the proposed change being the establishment of a more simple quantative relation of the ingredients in compound medicines, it would, I think, be desirable in some cases to depart from the usual practice of measuring liquids. I would suggest, therefore, that in medicines containing solid and liquid ingredients, if the products be of such consistence that they would be prescribed and dispensed by weight, the liquid ingredients contained in them should be apportioned by weight, with the view of simplifying the proportions. Thus, for instance, in confection of opium, as now prepared, neither the opium nor the compound powder of opium is a simple proportion of the whole, because the syrup is used by measure; whereas if the syrup as well as the powder were ordered by weight, the proportions could easily be made simple and definite. The formula now is,

Compound powder of opium..... 192 grains.
Syrup..... 1 fluid ounce.

Proportion 1 in 4, nearly.

I would make it,

Compound powder of opium..... 1 part.
Syrup..... 3 parts by weight.

Proportion of compound powder of opium 1 in 4, and of opium 1 in 40, exactly.

This is a case in which it would be desirable to extend the term "parts" to "parts by weight," as applied to the syrup, with a view to greater explicitness.

Confection of scammony would be treated similarly, and so also would the pill-masses which contain liquid excipents or essential oils, By adopting this and other proposed changes, we might obviate the necessity there now is of using the term "nearly" in representing the proportions of the ingredients in compound medicines.

I have already alluded, among the modifications required to make the proposed method practically applicable to all the processes of the Pharmacopœia, to the omission in a few instances of the use of proportional or relational numbers. It will be obvious that in cases in which the formulæ are intended to represent the quantities of the medicines ordered which are to be administered at one time, as occurs in the formulæ for *enemata*, reference must be made to specified weights and measures. In such cases, of which there are only a few in the Pharmacopœia, one of the two methods must be adopted. We must either express the quantities of the ingredients by

weight and measure, putting the two sorts of weight and measure in separate columns,—a method I have already alluded to,—or we may first describe the process by using proportional or relational numbers, and then to represent the doses by weight or measure, according to the alternative systems.

In the formulæ for *enemas* I think the former of these methods the best, because each of the formulæ is in fact a prescription, which is inserted in the Pharmacopœia to save the physician trouble. The only change I would propose to make in these formulæ would be the introduction of a second column of figures representing the quantities according to the metrical system; thus,

Enema of Aloes.

Aloes	40 grains.	or	2.59 gram.
Carbonate of potash	15 grains.		0.97 gram.
Mucilage of starch	10 fl. ounces.		283.49 cubic centimetres.

The occasional placing in apposition of the equivalents of the two sorts of weight and measure, in this way, would have the good effect of showing the relation existing between them.

There are two other classes of preparations in the Pharmacopœa, in which the processes include the apportionment of the doses, namely, the *suppositories*, and the *lozenges*. I would treat these cases differently from that of the *enemas*.

With reference to the suppositories, the formulæ for all of which are very simple, it would only be necessary to substitute parts for grains in connection with the ingredients, and in representing the weight of each suppository to give it in grams as well as in grains:

Tannic Acid Suppositories.

Take of

Tannic Acid	36 parts.
Benzoated Lard	44 parts.
White Wax	10 parts.
Oil of Theobroma	90 parts.

Melt the wax and oil of theobroma with a gentle heat, then add the tannic acid and benzoated lard, previously rubbed together in a mortar, and mix all the ingredients thoroughly. Pour the mixture while it is fluid into suitable moulds to form suppositories, each of which shall weigh about 15·4 grains, or 1 gram.

In the formulæ for lozenges more considerable alteration would be necessary, but in making such alteration the processes might be simplified as far as the descriptions are concerned, and the proportions among the ingredients made definite. One instance will illustrate the whole:—

Reduced Iron Lozenges.

Take of

Reduced Iron	10 parts.
Refined Sugar, in powder...	250 parts.
Gum Acacia, in powder.....	15 parts.
Mucilage of Gum Acacia....	30 parts.
Distilled Water.....	a sufficiency.

Mix the iron, sugar and gum, and add the mucilage and water to form a proper mass. Divide into lozenges, each of which shall contain 1 grain, or 6·4 centigrams, of reduced iron. Dry them in a hot-air chamber with a moderate heat.

The only remaining part of the processes and descriptions in the Pharmacopœia that I have to refer to is that which relates to the applications of tests. There is no difficulty here in the employment of proportional and relational numbers, provided the rule be adhered to of always using the same denomination of weight or measure throughout a process; and when measure as well as weight is indicated in the same process, of using a measure that corresponds with the unit of weight. The quantities used in testing are always such as easily admit of the application of this rule, and, in other respects, only a few slight alterations are generally required. The following examples will serve to illustrate the mode of treating cases of this sort.

Vinegar.

Characters and Tests.—A liquid of a brown colour and peculiar odour, specific gravity 1·017 to 1·019. 500 measures of it require at least 451 measures of the volumetric solution of soda, corresponding to 5·4 per cent. of acetic acid ($H\ C_2H_3O_2$). If mixed with $\frac{1}{20}$ by measure of solution of chloride of barium, and the precipitate, if any, separated by filtration, a further addition of the test will give no precipitate. Sulphuretted hydrogen causes no change of colour. One fluid ounce or 28·349 cubic centimetres, contain 24 grains, or 1·55 grams, of acetic acid ($H\ C_2H_3O_2$).

Hydrochloric Solution of Arsenic.

Characters and Tests.—A colorless liquid, having an acid reaction. Specific gravity 1·009. Sulphuretted hydrogen gives at once a bright yellow precipitate. 400 measures of it boiled for five minutes with 20 parts of bicarbonate of soda, and then diluted with 2000 measures of distilled water, to which a little mucilage of starch has been added, does not give with the volumetric solution of iodine a permanent blue color until 808 measures have been added, corresponding to 1 part of arsenious acid in 100 measures of the solution.

One fluid ounce, or 28·349 cubic centimetres, corresponds to 4·375 grains, or 0·283 gram, of arsenious acid.

In this case I have assumed that the process has been so altered as to yield as 1 per cent. solution.

Editorial.

REVISION OF THE PHARMACOPŒIAL SYSTEMS OF WEIGHTS AND MEASURES.

At a recent meeting of the Pharmaceutical Society of Great Britain, a paper on the weights and measures of the Pharmacopœia was read by Professor Redwood, which, is re-produced, *in extenso*, in another part of the JOURNAL. Considering the position occupied by Prof. Redwood, as an authority in matters pharmaceutical, and, more especially, as the chief compiler of the Pharmacopœia, we are assured that the paper will receive the best attention of our readers. It is quite possible that our English friends forget that in this hyperborean corner of the earth there are a thousand pharmacists who claim allegiance to the B. P., and who are as much interested in any changes, or improvements, as are their brothers of the fatherland.

Some profane person has said that the Pharmacopœia is the druggist's Bible. However irreverent the comparison, there is an aptness about it that we cannot but acknowledge. That book, which is to be an unerring guide to the pharmacist in the pursuit of his professional career, must give forth no uncertain sound; nor must it be subject to frequent or unnecessary changes. The conservative element, rather than one of reform, should predominate. Not that we hold with that high Tory party who regard the pharmacopœia as unapproachably sacred, and to whom the awe-inspiring words, "*By Authority*," are an insurmountable barrier, forbidding the very idea of inquiry or dissent. A too implicit belief in the infalliability of the national standard is almost as bad as having no belief in it at all. Both are alike detrimental to true progress. One acts the part of a stumbling block, and tends to keep everything down, while the other is a sort of pharmaceutical communism, which turns everything the wrong side up. The true course lies between these extremes. If the pharmacopœia has faults, or shortcomings, and we are thoroughly convinced that they are such, it becomes our duty to correct them.

We are glad to see that Professor Redwood has taken the initiative in regard to a revision of our systems of weight and mea-

surement. We need not point out the defects and inconveniences of the present system—we are all too well acquainted with them; especially in this country, where one of the legalized standards is different from that authorized by the pharmacopœia. In reducing the imperial to the wine system, we have to employ the most unwieldy figures, which not only require a considerable amount of time for calculation, but occasion a great many mistakes, which would be avoided in dealing with simpler numbers.

The plan proposed consists in the substitution of proportional or relational numbers for the specified weights and measures. As the details of the change are fully entered into in the paper to which we have referred, we do not think it necessary to repeat them in this place. We would merely express the opinion that the adoption of a system similar to that proposed would be a step in the right direction. We think, however, that it might be still further simplified by estimating the quantity of liquids by weight. Professor Redwood proposes to employ this method in some instances, but these might be largely extended without occasioning inconvenience.

One of the arguments employed in favor of this proposed change is that its adoption would pave the way for the introduction of a decimal system. There is no doubt but the transition would be less marked; but after all we cannot see the need for all this paving and preparation. If the metrical system is a good one—and this has been fully demonstrated by its rapid and almost universal extension—who not adopt it at once? We really cannot see any formidable obstacle in the way. It is true that a trifling outlay of brains would be necessary in order to familiarize the mind with the new system; and a little expense might be incurred in making the necessary changes in our weights and measures, and it is possible our prejudices might have to suffer a slight sacrifice. But what are these when compared with the immense advantage gained in the possession of a system whose simplicity and perfection are so apparent, and would confer such lasting benefit. Canadians can appreciate changes of this kind, as they have already had some experience in the matter. Ten years ago we were puzzling our brains and wasting our time over barbarous calculations of pounds, shilling, and pence. Although every unprejudiced person was convinced of the superiority of the decimal system in use in the United States, there was a strong feeling on the part of some against its

introduction in Canada. Men of the old school preferred to plod along amongst the labyrinths with whose mazy paths they had learned to be familar, rather than to take a straight open course which they had never trod. Our Legislature saw, however, the desirability of the change, and the decimal system was adopted in all the governmental departments. A new coinage was issued, the old denominations were abolished, and in less than three months were almost forgotten. People soon became familar with the new system, and only wondered they had been so foolish as not to make the change sooner.

We believe that a change in our weights and measures would prove as satisfactory as has that of our coinage, and we can only hope that the compilers of the pharmacopœia will give us an opportunity of making the trial. There must be a change sometime or other, and we believe the pharmacist of to-day is as well able to bear the terrible shock, as he will be by twenty-five years schooling under proportional numbers. If our authorities think otherwise, we would commend the scheme of Prof. Redwood as a great improvement on the present state of things.

Retirement of Dr. Sterry Hunt.—We learn with unfeigned regret of the retirement of this eminent chemist from the position he has so long occupied on the staff of the Geological Survey. In the discharge of the duties of his position he has rendered the most important services to Canada; and his contributions to science are such that this country may well feel proud of him. Our neighbors across the line have in some way managed to induce Dr. Hunt to accept the chair of Geology in the Massachusetts Institute of Technology. We understand that he leaves Canada in October next. Dr. Girdwood is named as his successor on the Geological Survey.

We have to apologize for the late appearance of the present number of the Journal, as it has been unavoidably delayed in the hands of the printer.

Books and Pamphlets.

The Chemists' & Druggists' Diary and Pharmaceutical Text Book, 1872. Office of the Chemist and Druggist, 44 Cannon Street, London, England.

A number of our readers will remember the first appearance of this useful little book, and may also have seen the three issues which have been published, annually, since that time. In every number there has been a marked improvement in design and extent. The edition for 1872 is still further in advance of its precedessors, being double the size of that of last year. The "Diary," properly so called, occupies some 60 pages, allowing ample space for the entries for each day. It is interleaved with blotting paper. The literary part of the book is well arranged, and contains much information which will prove useful for reference, besides several interesting papers on subjects of interest. The most noticeable feature is a collection of Pharmaceutical Formulæ, embracing recipes for those preparations of foreign origin with which the pharmacist should be familar. Austria, Denmark, Norway, Sweden, France, Prussia, Russia, Saxony, and the United States, are each represented in this compilation. Besides a large amount of information, which is chiefly interesting to residents of Great Britain, we have much of general interest, as the tables of weights, solubilities, expansion of metals, maximum doses, melting points, monies, &c.

We cordially recommend the Chemists' and Druggists' Diary to our friends.

The Physician's Annual for 1872. A complete Calendar for the City and Country Practitioner. Philadelphia: S. W. Butler, M. D., 1872.

To the physician this will prove a handy little book. It comprises over seventy pages, and besides containing a monthly calendar, and also a hospital calender for the principal cities in the U.S., has a complete list of medical colleges, institutions, and societies, with an enumeration of the principal officers. There is also a considerable amount of general information, of interest to the physician. The Annual is edited by Drs. Butler and Geo. H. Napheys, and is published at the price of fifty cents.

Proceedings of the Vermont Pharmaceutical Association, at the second annual meeting, held at Rutland, Vermont, Oct. 11, 1871; also Constitution, By-Laws, and Roll of Members, etc.

This pamphlet, besides containing the information set forth in

the title, has reports of the papers read at the meeting; these include papers on Valeriana Officinalis; the recovery of Sulphate of Soda from Soda Water residues; a Course of Reading for the Apothecary; on preparing Powders for Percolation; and Herbs, Barks, and Roots indigenous to Vermont.

The Phrenological Journal. Edited and published by Samuel R. Wells, 389 Broadway, New York

Although we must confess to some amount of scepticism in regard to the doctrines of which this journal is the able expositor, we have no doubt whatever of the character of the journal itself, and as many of our readers are interested in the subject of phrenology, we commend, with pleasure, this excellent periodical to their notice. It has just entered upon its 54th volume, and shows no sign of the decline incident to old age; on the contrary, its vigor and life increase with its wisdom. We cordially wish it a continuance of prosperity.

Wells' Illustrated Annual of Phrenology and Physiognomy for 1872 is published at the office of the above journal, and is, this year, replete with interesting matter, which is illustrated by over eighty engravings. Price: twenty-five cents.

Vick's Floral Guide for 1872.

We must congratulate Mr. Vick on the handsome appearance of his illustrated catalogue, of which an edition of two hundred thousand has just been issued. It numbers some 112 pages and is elegantly printed on fine tinted paper, and illustrated with over three hundred engravings. The colored plates are really very fine, and, indeed the whole book is unexceptionably good. Druggists will find it very useful in aiding them in the selection of flower seeds. It may be procured by enclosing ten cents to James Vick, Rochester, N. Y.

The Manufacturer and Builder.

We are glad to notice the continued success of this valuable magazine, and recommend all of our readers interested in scientific or industrial matter to subscribe to it, as its pages always contain practical information regarding the newest and most useful discoveries and inventions in science and art. Among the articles in the present issue we notice those on "Ready-Made Houses," "International Societies," New Rotary Drilling Machine," "The Selden Double-Action Plunger Pump," "Floral Fountains," "Manufacture of Russia Iron," "New Source of Supply for Paper." "Fallacious Theories of Boiler Explosions," besides many others, all admirably illustrated. Published by the Engineers' and Manufacturers' Publishing Company, 37 Park Row, New York, $2 a year.

The Monetary Times and Trade Review, Toronto, J. M. TROUT, Publisher.

Our city contemporary continues to increase steadily in value, and in one of its January issues gives evidence of a good state of internal prosperity by presenting its subscribers with several handsome lithographs of prominent buildings which have been recently added to our city. Druggists, as a class of the mercantile community, will find this paper well deserving of patronage.

The Public Ledger Almanac, 1872, George W. Childs, Philadelphia. More interesting, amusing, and useful than ever.

Editorial Summary.

REMEDY FOR DANDRUFF.—J. L. Davis (*Am. Jour. Pharm.*) having tried without success the ordinary remedies for this troublesome and inconvenient affection, made a mixture of one ounce of sulphur in one quart of water, and after repeated agitations, decanted off the clear liquor. This was applied to the head every morning, and in a few weeks every trace of dandruff had disappeared. After a discontinuance of the treatment for eighteen months, there has been no return of the disease. The liquid was destitute of taste, color, and odor. The preparation has been used in other cases with satisfactory results.

SENSITIVENESS OF LITMUS PAPER.—Charles Bullock (*Am. Jour. Pharm.*) finds that blue litmus paper, made according to the directions given by Fresenius in his Qualitative Analysis, affords re-actions with one drop of acetic acid, No. 8, (30 per cent. acid, in the following amounts of water:—In four ounces of water it turns red immediately; in six ounces, completely red in one half minute; in ten ounces, changes on the edges in one-fourth minute) and is completely reddened in one minute; in 13 ounces it is completely red in a minute and a-half, and remains red when dry. In 16 ounces of water the limit of distinct re-action is found.

With one grain anhydrous carbonate of soda in 32 ounces of water, reddened litmus paper turns blue in one minute; in 56 ounces of water, in three minutes; in 64 ounces of water, in four minutes; in 80 ounces of water, in seven minutes; in 160 ounces of water is found the limit of distinct re-action—the blue shade can be seen before the color is dissolved from the paper. In making the above experiments the paper was submerged in the liquid.

DEXTRINE AS AN ADULTERANT OF SUGAR.—The results of a series of experiments made by Dr. Scheibler, and detailed in the *Journal des Fabricants du Zollverein*, are thus summed up in the *Sugar Cane*:

1st.—That the adulteration of raw sugar by dextrine has the effect of considerably raising its degree of rotation.

2d.—That sugar so adulterated may be recognized by the action of alcohol, which causes a gelatinous precipitate or a marked turbidity; by the coloration caused by the addition of iodine; by the impossibility of completely clarifying the liquid by acetate of lead; by the differences between polarization before and after inversion; and lastly, by the absorbent action exercised on dextrine by animal charcoal.

PREPARATION OF NITRATE OF SILVER.—M. R. Palm (*Le Technologist* in *Am. Chemist*) recommends a method for the preparation of this salt from cupreous silver. The process is based on the insolubility of the nitrate in nitric acid. It has often been tried by other experimentors, and can be successfully carried out. The metal must be dissolved in nitric acid, and evaporated to the consistence of oil. To this is added ¾ths part of nitric acid free from chlorine. The silver salt precipitates in the form of crystals and the copper remains in the solution. Wash the precipitate two or three times with concentrated nitric acid, and evaporate to dryness. The more concentrated the nitric acid, the more completely is the silver salt precipitated; an acid of 1·250 specific gravity is sufficient, however, to separate completely the two metals.

METHODS FOR DETERMINING THE QUALITY OF CASTOREUM.—M. Hager (*Jour de Pharm. et de Chem.*, in *Pharm. Jour.*) gives the following methods for ascertaining the quality and source of castoreum:

(1.) The taste of Siberian castoreum is much more pronounced than Canadian, in consequence of its greater richness in castorine, of which it contains 4·6 per cent., whilst Canadian contains but 1·98 per cent. The castorine may be easily obtained by exhausting the castoreum with pure benzine, and evaporating the product upon a watch-glass, when the castorine will be left mixed with a certain quantity of volatile oil.

(2.) Treated with chloroform, castoreum yields a sepia-brown resin, which has a stronger odour, and is more viscous in the Siberian than in the Canadian.

(3.) If powdered castoreum be treated first with alcohol and afterwards with dilute hydrochloric acid, a liquid is obtained, in from ten to twenty hours, which from Canadian castoreum is yellow or light brown, and from Siberian castoreum is dark brown.

(4.) The Siberian castoreum powder when macerated for some

hours in an ammoniacal solution gives a darker liquid than the Canadian.

(5.) The alcoholic tincture forms with water a milky liquid, which, upon the addition of a little ammonia, becomes clear if the tincture is made with Siberian castoreum, but remains cloudy if made with Canadian.

NOVEL RESULT OF AN EXPERIMENT.—Under the caption, "How is this for High," an American exchange details an account of some recent experiments on a new burning fluid. However questionable the story, the moral is good enough:

"Mr. Gray, of Boston, recently discovered a non-explosive illuminating fluid. To show how safe the new compound was, he invited a number of his friends to meet him in his rooms, whither he had brought a barrel of the fluid, which he at once proceeded to stir with a red-hot poker. As he went through the roof, accompanied by his friends, he endeavored to explain to his nearest companion that the particular fluid in the barrel had too much benzine in it, but the gentleman said he had engagements higher up, and could not wait for the explanation. Mr. Gray continued his ascent until he met Mr. Jones, who informed him that there was no necessity for him to go up higher, as everybody was coming down, so Mr. Gray started back to be with the party. Mr. Gray's widow offers for sale the secret for the manufacture of the non-explosive fluid at a reduced rate, as she wishes to raise money enough to buy a silver-handled coffin with a gilt plate for Mr. Gray.

COLORED FIRES.—A German chemist gives the following formulæ for colored fires, which, during combustion, do not emit disagreeable fumes like those commonly used:—

Red fire, 9 parts nitrate of strontia; 3 parts shellac; 1½ parts chlorate of potash.

Green fire, 9 parts nitrate of baryta; 3 parts shellac; 1½ parts chlorate of potash.

Blue fire, 8 parts ammonio sulphate of copper; 6 parts chlorate of potash; 1 part shellac.

It is only necessary to reduce the shellac to a coarse powder. The nitrate of strontia, baryta, and the ammonia salt ought to be intimately incorporated with the shellac before adding the chlorate of potash; and, as any hard rubbing or percussion of the latter salt in a mortar might occasion an explosion, it is better to mix by transferring from one sheet of paper to another, and not attempt to rub the mixture at all. By the above mixture, the suffocating odor of sulphurous acid is avoided, and the fireworks can be let off without inconvenience in any large room. To obviate the danger of spontaneous combustion, the chlorate of potash could be stored in a separate bottle and mixed when wanted, in the way described.

Correspondence.

To the Editor of the Canadian Pharmaceutical Journal.

DEAR SIR.—It does not seem to me that your correspondents "Druggist" and "Pharmacist" have succeeded in overthrowing my position. I put forth two propositions: First—That it is *not* morally wrong to give a percentage. Second—That it is often good policy to do so. It is easy to see that if they succeed in establishing the adverse proposition. That it *is* wrong to give a percentage, my whole argument must fall to the ground. I do not think, however, they have done this. I will endeavor, to the best of my ability, to review their communications. "Druggist" refers me to the Montreal *Star*. Unfortunately I have not seen that paper, and cannot tell where to get it, consequently I cannot now answer its article. He then says I have "not proved that it is right for a physician to demand a percentage." I do not know that I am called upon to do so. We are not discussing what it is right for a physican to ask, but what it is right for a druggist to give. However, lest it may be claimed that I am asking the druggist to encourage the physician in wrong doing, I will say that I think I see sufficient ground upon which he may ask for his percentage. (I may here say that I use the term physician in the loose way in which way it is generally used in Canada—meaning by it any member of the medical profession, conceiving that what is right or wrong for a member of the Royal College of Physicians is also right or wrong for the youngest Apothecary.) It will be conceded at once, I presume, that a physician has a right, if he pleases, to compound his own prescriptions; and that, if he does so, they will be a source of profit to him, since he will have the profit on his medicine as well as the fee for his advice. Now, if he gives up this privilege in favor of the druggist, is he not fairly entitled to some compensation for it? Let us put a case: A physician prescribes; for this he charges fifty cents. He also furnishes a bottle of medicine; for this he charges fifty cents more. His fee is net gain; his medicine yields him a profit of —say—twenty-five cents. He makes seventy-five cents out of the transaction, and the patient pays one dollar. If, now, this patient is sent to the druggist with a prescription, the druggist can well afford to halve the profit with the physician. In this case, the physician will make sixty-two cents, and save his trouble in compounding; the the druggist will make thirteen cents, while he made nothing in the other case; and the patient will have a little extra walking, will not pay one cent more, and will most likely get his medicine better compounded. Who is wronged in this? I cannot see; but I can see

who is benefited, and I think it must be patent to "Druggist." I cannot agree to the assumption that because a percentage is allowed the customer is therefore mulcted. That will depend upon the character of the druggist with whom he deals. If a man is inclined to be dishonest he will show it in all his transactions; but if he is upright he will not take from his customers pockets that which should came out of his own. I do not think it is any sufficient argument to say that those who will not give percentages cannot get prescriptions to compound, for the answer is ready—if they value that class of business, let them offer the inducement, and they will then be on equal terms with their competitors. My letter is already, I fear, somewhat long for your columns, I must therefore leave a review of the letter of "Pharmacist" for a more convenient season, hoping, however, that the matter will not be permitted to drop, but be thoroughly ventilated.

I remain, yours truly,

SOOTHING SYRUP.

Selections.

REMOVAL OF ANILINE COLORS.—(*Musterzeitung fur Farberei* 1879, No. 17.)—Goods dyed with aniline colors may easily be rendered white by the use of zinc gray; the metallic zinc contained in this powder reduces the colors, forming soluble colorless products. To apply the principle—Triturate 100 grms. zinc gray with 50 grms. mucilage, marking 20° B., until the mixture is homogeneous; incorporate with this 20 grms. of a solution of hyposulphite of soda, marking 20° B., apply this mixture directly to the goods, let it dry and vaporize. After this operation it is best to wash the goods with water slightly acidulated with hydrochloric acid.—*American Chemist.*

INFLUENCE OF LIGHT ON PETROLEUM.—According to recent researches, petroleum, when exposed to solar light, absorbs oxygen and changes it into ozone, although this does not combine with the oil, the ozone remaining free, and oxidising every thing with which it comes in contact. Petroleum oils impregnated with ozone have a totally altered smell, burn with more difficulty, and attack the cork stoppers of the vessels very strongly. If the vessels are of glass, their color exercises much influence upon the absorbtion of oxygen by the petroleum. Thus, petroleum oils, when exposed in white glass to solar and daylight, become yellow and impregnated with ozone, assuming a greater specific gravity, and losing their ready combustibility. This is said to be especially the case with American petroleums. The practical inference may therefore be deduced that petroleum intended for burning should be kept in stone or metal vessels; or, if in glass, protected as much as possible against the influence of daylight.—*Ironmonger.*

CREASOTE PILLS.—The following formulæ for the preparation of creasote pills are taken from the *Journal de Pharmacie et de Chimie* :—

Creasote	1 drop.
Soap Powder	0·25 gram.
Crumb of Bread	0·20 "
Lycopodium	0·05 "

For six pills. The soap powder forms with the creasote a homogeneous mass, to which the crumb of bread gives plasticity.

Or, better still—

Creasote	3 drops
Crumb of Bread	0·60 gram.
Lycopodium	0·06 "
Mucilage of Gum Tragacanth	q. s.

For six pills, each of which will contain half a drop of the active constituent. In these proportions the manipulation is easy, and the appearance leaves nothing to desire.—*Pharm. Jour., London.*

TESTING SILVERY COATING OF METALS.—It is sometimes a matter of interest to be able to determine, by means of a simple test, the nature of a silvery coating to a metal, whether it be pure silver or some other substance. This is said to be readily accomplished by the use of a cold saturated solution of bichromate of potash in pure nitric acid, of one and two-tenths specific gravity. The surface of the article to be tested is to be first washed with strong alcohol, so as to remove any lacquering, and then a drop of the solution applied by means of a glass rod, the place affected being immediately rinsed off with water. If the substance in question be silver a distinct blood-red spot of chromate of silver will be perceived. The spot is brown on German silver, and after rinsing shows no trace of red. With Brittania (composed of tin, antimony and a little copper), a black spot will be developed, but no effect will be seen with platinum. Upon a surface amalgamated with mercury a reddish-brown deposit will be perceived, which is completely washed away on rinsing. With lead and bismuth a yellow deposit remains. Zinc becomes strongly etched, the liquid, however, disappearing completely on washing. Tin is attacked also very decidedly, but the test liquid imparts a brownish color, and an addition of water produces a yellow deposit which readily attaches itself to the metal.

A NEW AND CHEAP METHOD OF PREPARING PURE DEXTRINE.—For this purpose, 500 parts of potato-starch are mixed with 1,500 parts of cold distilled water and 8 parts of pure oxalic acid, and this mixture placed in suitable vessel on a water-bath, and heated until a small sample tested with iodine solution does not produce the reaction of starch. When this is found to be the case, the vessel is immediately removed from the water-bath, and the liquid neutralized with pure carbonate of lime. After having been left standing for a couple of days, the liquor is filtered, and the clear filtrate evaporated upon a water-bath until the mass has become quite a paste, which is removed by a spatula, and, having been made into a thin cake, is placed upon paper and further dried in a warm place. Two hundred and twenty parts of pure dextrine are thus attained.—*Boston Journal of Chemistry.*

118. CHINESE VARNISH.—Dr. V. Scherzer.—Under the name of schio-liao, the Chinese apply as varnish freshly defibrinated blood, mixed with powdered slaked lime, and a small quantity of alum, in the proportion of 3 parts of previously defibrinated fresh blood, 4 parts of lime, and a small quantity of powdered alum. The result is the formation of a glutinous yet fluid mass, which is ready for use at once, and especially used for rendering wood perfectly water-tight, and hardening its surface. The author states that he has seen, in China, bags made of straw rendered so impervious to liquids by the application of this varnish as to serve for the transport of oil, while thin millboard painted with this varnish becomes as hard as wood.—*Chemical News.*

BUSINESS MEMORANDA.

Mr. W. A. White has commenced business at Amherstburg.

Mr. James Massie, of Kingston, has purchased the business conducted by Mr. T. Morton, of Smith's Falls.

A new drug store has been opened at Orillia by Mr. F. Cooke.

The business in Strathroy, recently carried on under the name and style of Chamberlain & Gibbard, has been purchased by Mr. Edmonds Chandler, Jr., late of Belleville.

MARKET REPORT.

Trade opened out dull, and continued so for the first week, but afterwards improved, and has been throughout the month rather better than usual at this season.

The fluctuations are not very numerous, but nearly all tend upwards. Chemicals are all very firm, and are reported as not having reached their highest point on account of the trouble of workmen's wages not being yet adjusted.

Iodine and the iodides are still most prominent from the excessive advance they have made, and which is not yet checked.

Ammonias are scarce, and command high rates. Chloroform, on account of the advance in chloride lime, is very much higher. Shellac is also very much advanced. Bromide potassium, in sympathy with iodide, is also quoted higher.

Articles quoted easier are Peruvian Bark, Bismuth preparations, oil wintergreen, pink root, and santonine.

In spices, white pepper shows a very heavy advance.

Naval stores continue very firm, and we may look for an advance in spirits of turpentine at any time.

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 30	0 36
" good	0 12½	0 20
Pill, Blue, Mass	0 80	0 85
Potash, Bi.chrom	0 25	0 27
" Bi-tart	0 27	0 28
" Carbonate	0 14	0 20
" Chlorate	0 55	0 55
" Nitrate	10 50	11 00
Potassium, Bromide	1 40	1 50
" Cyanide	0 75	0 80
" Iodide	11 75	0 00
" Sulphuret	0 25	0 35
Pepsin, Boudault's oz	1 50	—
" Houghton's doz.	8 00	9 00
" Morson's oz.	0 85	1 10
Phosphorus	0 75	0 85
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 25
" Howard's	2 35	—
" " 100 oz. case	2 30	—
" " 25 oz. tin	2 30	—
Root, Colombo	0 13	0 20
" Curcuma, grd	0 12½	0 17
" Dandelion	0 25	0 35
" Elecampane	0 14	0 17
" Gentian	0 10	0 12½
" pulv	0 15	0 20
" Hellebore, pulv	0 17	0 20
" Ipecac, "	2 20	2 30
" Jalap, Vera Cruz	1 35	1 60
" " Tampico	0 90	1 00
" Liquorice, select	0 11	0 13
" " powdered	0 15	0 20
" Mandrake "	0 20	0 25
" Orris, "	0 20	0 25
" Rhubarb, Turkey	3 50	—
" E. I	1 10	2 00
" " pulv	1 40	2 50
" " 2nd	1 30	1 50
" French	0 75	—
Sarsap., Hond	0 40	0 45
" Jam	0 08	0 90
Squills	0 10	0 15½
" Sen	1 70	1 80
" [illegible]	0 40	0 45
Epsom	2 25	3 00
Rochelle	0 26	0 35
" Soda	0 01¾	0 03
Seled, Anise	0 13	0 16
" Canary	0 05	0 06
Cardamon	3 50	3 75
" Fenugreek, g'd	0 09	0 10
" Hemp	0 06½	—
" Mustard, white	0 14	0 16
Saffron, American	2 00	2 50
" Spanish	17 00	18 00
Santonine	9 00	10 00
Sago	0 07½	0 09
Silver, Nitrate Cash	14 85	16 50
Soap, Castile, mottled	0 10	0 14
Soda Ash	0 03	0 04
" Bicarb. Newcastle	5 00	5 25
" " Howard's	0 14	0 16
" Caustic	0 04½	0 05
Spirits Ammon., arom	0 25	0 30
Strychnine, Crystals	2 20	2 50
Sulphur, Precip	0 10	0 12½
" Sublimed	0 03½	0 05
" Roll	0 03	0 04½
Vinegar, Wine, pure	0 55	0 60
Verdigris	0 35	0 40
Wax, White, pure	0 75	0 80
Zinc, Chloride oz	0 10	0 15
" Sulphate, pure	0 10	0 15
" " common	0 06	0 10
DYESTUFFS.		
Annatto	0 35 @	0 60
Aqaline, Magenta, cryst	3 25	4 00
" " liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 08	0 10
Camwood	0 06	0 09
Copperas, Green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 02	0 04
Indigo, Bengal	2 40	2 50
" Madras	0 95	1 10
Extract	0 28	0 35

DYESTUFFS—*Continued.*		
Japonica	0 05½	0 06½
Lacdye, powdered	0 33	0 38
Logwood	0 02	0 03
Logwood, Camp	0 02	0 3½
" Extract	0 10	0 14
" " 1 lb. bxs	0 14	—
" " ½ lb. "	0 15	—
Madder, best Dutch	0 16	0 17
" 2nd quality	0 15	0 16
Quercitron	0 03	0 05
Sumac	0 06	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
SPICES.		
Allspice	0 8½ @	0 10
Cassia	0 38	0 40
Cloves	0 12½	0 15
Cayenne	0 18	0 25
Ginger, E. I	0 12	0 14
" Jam	0 20	0 30
Mace	1 45	1 50
Mustard, com	0 20	0 25
Nutmegs	1 05	1 10
Pepper, Black	0 19	0 20
White	0 35	0 36
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
Green, Brunswick	0 07	0 10
" Chrome	0 16	0 25
" Paris	0 25	0 35
" Magnesia	0 20	0 25
Litharge	0 06½	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	1 15	1 25
" American	0 25	0 35
Whiting	0 85	0 90
White Lead, dry, gen	0 08	0 09
" " " No. 1	0 07	0 08
" " " No. 2	0 05	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 30	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1 lb tins	0 11	0 12
Putty	0 03½	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25 lb. tins	2 30	—
" " 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	5 50 @	5 60
Rosin, Strained	5 25	5 25
" Clear, pale	9 00	10 00
Spirits Turpentine	0 88	0 90
Tar Wood	5 00	5
OILS.		
Cod	0 58 @	0 60
Lard, extra	1 00	—
" No. 1	0 95	1 00
" No. 2	0 85	0 90
Linseed, Raw	0 77½	0 80
" Boiled	0 87½	0 85
Olive, Common	1 15	1 35
" Salad	1 80	2 30
" " Pints, cases	4 20	4 40
" " Quarts	3 60	3 00
Seal Oil, Pale	0 70	0 75
" " Straw	0 65	0 65
Sesame Salad	1 30	1 35
Sperm, genuine	2 35	2 40
Whale, refined	0 90	0 95

DRUGS, MEDICINES, &c.	$ c.	$ c.
Acid, Acetic, fort	0 12 @	0 14
" Benzoic, pure	0 25	0 35
" Citric	0 90	0 90
" Muriatic	0 04	0 06
" Nitric	0 11½	0 15
" Oxalic	0 30	0 35
" Sulphuric	0 03¾	0 07
" Tartaric, pulv	0 45	0 50
Ammon, carb. casks	0 21	0 22
" " jars	0 21	0 22
" Liquor, 880	0 20	0 25
" Muriate	0 12½	0 15
" Nitrate	0 45	0 60
Æther, Acetic	0 45	0 50
" Nitrous	0 27	0 30
" Sulphuric	0 45	0 50
Antim. Crude, pulv	0 13	0 17
" Tart "	0 50	0 55
Alcohol, 95 per ct.....Cash	1 65	1 72
Arrowroot, Jamaica	0 18	0 22
" Bermuda	0 45	0 65
Alum	0 02½	0 03½
Balsam, Canada	0 24	0 35
" Copaiba	0 77	0 80
" Peru	4 00	4 20
" Tolu	0 90	1 00
Bark, Bayberry, pulv	0 18	0 20
" Canella	0 17	0 20
" Peruvian, yel. pulv	0 42	0 50
" " red "	2 10	2 20
" Slippery Elm, g. b	0 15	0 20
" " flour, packets	0 28	0 32
" Sassafras	0 12	0 15
Berries, Cubebs, ground	0 20	0 25
" Juniper	0 06	0 10
Beans, Tonquin	0 62	1 10
" Vanilla	16 00	17 00
Bismuth, Alb	4 00	5 00
" Carb.	4 00	5 00
Camphor, Crude	0 38	0 40
" Refined	0 50	0 55
Cantharides	2 20	2 30
" Powdered	2 30	2 40
Charcoal, Animal	0 04	0 06
" Wood, powdered	0 10	0 15
Chiretta	0 20	0 30
Chloroform	1 25	1 65
Cochineal, S. G	0 80	0 95
" Black	1 10	1 20
Colocynth, pulv.	0 50	0 60
Collodion	0 67	0 70
Elaterium.....oz	4 50	5 00
Ergot	0 65	0 75
Extract Belladonna	2 20	2 50
" Colocynth, Co	1 25	1 75
" Gentian	0 50	0 60
" Hemlock, Ang	1 12	1 25
" Henbane, "	1 70	2 00
" Jalap	5 00	5 50
" Mandrake	1 75	2 00
" Nux Vomic	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 25	0 35
" Chamomile	0 50	0 40
Gum, Aloes, Barb. extra	0 70	0 80
" " " good	0 42	0 50
" " Cape	0 12	0 20
" " " powdered	0 20	0 30
" " Socot	0 76	80
" " " pulv	0 90	00
" Arabic, White	0 60	0 65
" " " powdered	0 50	0 55
" " sorts	0 8	0 30
" " " powdered	0 12	0 50
" " com. Gedda	0 13	0 16
" Assafœtida	0 31	0 35
British or Dextrine	0 13	0 15
Benzoin	0 48	0 55
Catechu	0 12	0 15
" powdered	0 25	0 30
Euphorb, pulv	0 32	0 40
Gamboge	1 05	1 20
Guaiacum	0 38	0 87
Myrrh	0 42	0 60

DRUGS, MEDICINES, &c.—*Contd.*	$ c.	$ c.
" Sang Dracon	0 60	0 70
" Scammony, powdered	6 50	6 75
" " Virg. "	14 50	—
" Shellac, Orange	0 50	0 52
Gum, Shellac, liver	0 43	0 45
" Storax	0 65	• 75
" Tragacanth, flake	1 10	1 40
" " common	0 35	0 40
Galls	0 27	0 32
Gelatine, Cox's 6d	1 10	1 20
Glycerine, common	0 28	0 30
" Vienna	0 30	0 40
" *Prices*	*0 60*	*0 75*
" Honey, Canada, best	0 15	0 17
" Lower Canada	0 14	0 16
Iron, Carb. Precip	0 20	0 25
" " Sacchar	0 40	0 55
" Citrate Ammon	1 10	1 20
" " & Quinine, oz	0 50	0 60
" " & Strychine "	0 17	0 25
" Sulphate, pure	0 08	0 10
Iodine, good	12 00	—
" Resublimed	12 50	—
Jalapin	1 40	1 60
Kreosote	1 60	1 70
Leaves, Buchu	0 25	0 30
" 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 15
Lime, Carbolate.....brl	5 50	—
" Chloride	0 05	• 06
" Sulphate	0 08	• 12½
Lead, Acetate	0 1	0 15
Leptandrin.....oz.	0 60	—
Liq. Bismuth	0 50	0 75
Lye, Concentrated	1 50	2 00
Liquorice, Solazzi	0 50	0 55
" Cassano	0 23	0 40
" Other brands	0 14	0 25
Liquorice, Refined	0 35	0 45
Magnesia, Carb. 1 oz.	0 20	0 25
" " 4 oz.	0 17	0 20
" Calcined	0 65	0 75
" Citrate.....gran.	0 40	0 50
Mercury	1 00	1 15
" Bichlor	1 00	—
" Chloride	1 15	—
" C. Chalk	0 60	—
" Nit. Oxyd	1 20	—
Morphia Acet	3 65	4 00
" Mur.	3 65	4 00
" Sulph	3 80	4 20
Musk, pure grain.....oz	21 00	—
" Canton	0 90	1 20
Oil, Amonds, sweet	0 50	0 52
" " bitter	14 00	15 00
" Aniseed	4 00	4 00
" Bergamot, super	5 00	5 25
" Carraway	4 00	4 20
" Cassia	2 00	2 20
" Castor, E. I	0 15	0 15
" Crystal	0 22	0 25
" Italian	0 26	0 28
" Citronella	1 10	1 50
" Cloves, Ang	1 00	1 00
" Cod Liver	1 20	1 50
" Croton	2 00	2 10
" Juniper Wood	0 80	1 00
" " Berries	6 00	7 00
" Lavand, Ang	16 00	17 60
" " Exotic	1 40	1 60
" Lemon, super	5 00	5 20
" " ord	2 20	3 40
" Orange	3 20	3 50
" Origanum	0 65	0 75
" Peppermint Ang	13 00	14 40
" " Amer	3 00	3 25
" Rose, Virgin	7 75	8 00
" " good	5 50	00
" Sassafras	1 25	1 50
" Wintergreen	6 00	7 00
" Wormwood, pure	6 00	6 50
Ointment, blue	5 80	0 80
Opium, Turkey	0 70	6 25
" pulv	8 00	10 00

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