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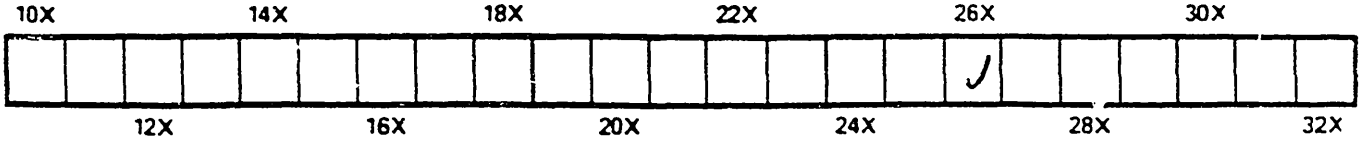

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Editorial

IMPORTERS AND THE CUSTOMS.

A most influentially signed petition is going up from the business community of Montreal to Parliament asking for the appointment of a Board of Customs Experts. The different sections of the Board of Trade are most fully represented; great care having been taken by Mr. Henry Miles, who had the affair in hand, to secure the signature of every interested man. This Board of Customs Experts is needed to secure ueiformity in the valuation of imported goods, so that the duty levied may at all times and places be the same for thh same article. They have such a body in the United States where it does admirable work. The need for one here is well put by the first clause in the petition which reads as follows:

That your petitioners suffer from want of uniformity in the application of the Tariff and from the circumstance that there is no satisfactory recourse or remedy in matters of dispute as to classification for duty, value for duty, or in cases where customs officials inflict injustice upon importers by erroneous and arbitrary rulings.

A Board of five members is asked for here, who shall represent the principal branches of trade: (1) Dry goods; (2) hardware, oils, paints, etc.; (3) drugs, chemicals, fancy goods, stationery and jewellery; (4) groceries, provisions and fruits; (5) leather and shoefindings. Appeal is to be had by both the Government and the importers to the Exchequer Court. Similar petitions are being sent up by the various other Boards of Trade of the Dominion; and the Government can hardly fail to be impressed by so imposing a display of influential opinion. It is certainly desirable that the tariff should be uniformly applied; that the government shauld thus get the full amount of revenue to which it is entitled; and that friction should be avoided between Government officials and the business men of the country. The cost of such a Board is easily exaggerated; and, if properly manned, it would be certain to pay for itself in many ways.—*Star, May 18th.*

THE PROPOSED ALCOHOL TAX.

Mr. Henry Miles, of Lyman Sons & Co., has drawn attention in the Council of the Board of Trade of which he is one of the most active members, to the "fact that by a resolution before the House of Commons, the inland revenue tax upon spirits would be increased by 33c per imperial gallon, whereas the advance upon imported manufactured spirits or compounded spirits, was only 12½ cents. As alcohol was a crude material used by manufacturing druggists, perfumers and kindred trades, such a resolution was manifestly unjust, since

it discriminated to the extent of 20½ cents per gallon against the Canadian manufacturer." The council recommended that the drug and perfumery trades make representations to Ottawa, and said that the secretary of the board would, if requested, make arrangements for an interview with the Minister. It may interest the trade to know that the price of alcohol, 65 o.p., per imperial gallon in bond in Canada is $1.17 while it is only 34 cents per gallon in the United States. Here is a nut for legislators to crack —*Journal of Commerce.*

The need for a Dominion Board of Appraisers to act as a "Court of Appeal" in cases of dispute between importers and the customs authorities has time and again been manifested, and in the face of some most ridiculous rulings that have been made public, the Government can hardly fail to recognize that some such authority is urgently necessary. Some of these matters of dispute, such as whether or not canary seed is edible, have already been referred to in these columns, and have caused considerable trouble and annoyance to importers, however amusing they may be to the public. In fact, we believe that it has not yet been proved to the satisfaction of the Controller of Customs that the seed referred to is not generally eaten by human beings, and should be admitted free of duty.

It is a matter then for congratulation that the petition published in the *Herald* some days ago has met with such general approval. It points out the want of uniformity in the application of the tariff; and, as there is at present no satisfactory recourse or remedy in matters of dispute between importers and the several collectors of customs, it asks for the establishment by Parliament of a board of experts, with power to deal with all such questions and disputes, and also to act as a board of reference in matters of seizures. Such a board would undoubtedly be a benefit in more ways than one, and would certainly prevent such mistakes as seizing goods coming from the town of Sing Sing on the plea that they were prison made, as was the case a short time ago in this city.

That merchants and importers generally are tired of the present slip-shod method of doing business is evidenced by their unanimity. Already all the prominent members of the drugs, surgical instruments, oils and paints, hats and furs, leather, liquor, spices and grocer's specialties, retail drugs, hardware, wholesale grocers, green fruit, boots and shoes, stationery, fancy goods, dry goods, tobacco and cigars and jewellery trades have signed the petition. In addition, the president and members of the council of the Board of Trade, the Corn Exchange and other associatins have signed, and some thirty Boards of Trade in other parts of the country have already written endorsing the petition and promising their support. The probabilities are, then, that about the 20th May, the date so far fixed, a large number of copies of this petition, numerously signed, will be presented from both sides of the House, coming from all parts of the Dominion. The Montreal petition will be presented, it is expected, by Hon. J. A. Ouimet and Senator Desjardins on behalf of La Chambre de Commerce, and Sir Donald A. Smith with Senator Ogilvie for the Bornd of Trade. The movement was inaugurated by Mr. Henry Miles, of the firm of Lyman, Sons & Co, and it was through his efforts that the council of the Montreal Board of Trade took the matter uy.—*Herald, May 10th.*

THE CHEMISTRY OF PHOTOGRAPHY.

By J. R. Burn.

Read at a meeting of the Liverpool Pharmaceutical Students' Society, on April 4th, 1895.

Photo-Chemistry is really the study of all those chemical changes which are brought about by light when it is absorbed by various substances, and its energy is expended in producing chemical decomposition; but I intend only to speak of it in its relations to the art of photography, and would more correctly have styled this paper with the longer title of Photographic Chemistry.

The practical illustrations will be necessarily few, and limited to those who can be performed in gaslight, as some of the most interesting and instructive require a non-actinic light and considerable time to perform.

The chemistry of photography encroaches largely upon the domain of physics, perhaps more so than any other branch of chemistry, since nearly all the decompositions involved are at least initiated by the action of light.

The dictionary (Nuttall's) definition of photography is: "The art of fixing images of the camera obscura on plates of copper covered with a thin coating of silver." This definition

takes us back to the day when photography was in its infancy, in the early part of the present century, since which time the term has come to mean a great deal more; but one point still holds good, and it is this, that all the surfaces employed for obtaining the image in the camera, almost without exception, are still dependent for their efficiency upon the susceptibility of silver salts to the action of light.

I will give but a short sketch of the history of photographic chemistry. Colour photography was taken as a subject in a paper on "Recent advances in Photography," by Mr. E. W. Hill, before the London Chemists' Assistants' Association, in November last, but I will refer to the chemistry of colour photography, or rather orthochromatic photography, later on under orthochromatic plates.

HISTORY.—The action of silver nitrate in darkening the skin is reported as having been noticed as far back as the 13th century by Albertus Magnus. In the 16th century Fabricius mentioned the fact that horn silver, or native silver chloride, turned darker in colour when removed from the mines, and the discolouration of silver compounds was noted by Glauber and Robert Boyle in the 17th century, but they do not appear to have attributed this change to the action of light. Schülze, a German physician, appears to have been the first to definitely prove that light and not heat, or action of the air alone, was the cause of the darkening, and he showed it experimentally by pouring silver dissolved in nitric acid upon chalk, and observing that the precipitate darkened upon the side exposed to light. It was not till the middle of last century that it was noticed by Professor Beccerues, of Turin, that precipitated silver chloride turned violet, then brownish violet, on exposing to light, and it is on a similar change in the chloride, bromide and iodide of silver, that the principal photographic processes of the present time depend. Two or three simple experiments here will serve to indicate what occurs when the halogen silver salts are exposed to the action of light, and will make my subsequent remarks much clearer.

EXPERIMENTS.—The first experiment is intended to show the change of colour in silver chloride by exposure to light. I form a precipitate of silver chloride in two large test tubes by adding to a solution of silver nitrate some hydrochloric acid. Above each precipitate I suspend bibulous paper moistened with potassium iodide and starch paste, then expose one of the tubes to the light of an electric arc for a few minutes while the other is kept in the dark. It will be noticed that the precipitate has changed colour, from white to violet, in the tube exposed to light; also that the paper above it turns blue, indicating that chlorine, or some chlorine containing gas, has been liberated, while that retained in the dark remains apparently unchanged. This clearly shows that the AgCl has to some extent been reduced by the action of light.

Next I form another quantity of silver chloride, pour upon it strong nitric acid and expose to the electric light (gaslight is not sufficiently actinic or chemically active to serve the purpose) as before, and it will be seen that the change still takes place, although nitric acid is one of the strongest oxidising agents. I will refer to this later.

At this point I must explain what is meant by the terms "sensitizers" and "restrainers." Any substance which, by its presence and chemical or physical action, causes the reduction of the silver salt by light or a developer to take place more easily and rapidly, is called a "sensitizer," while any substance which by its presence retards or prevents the chemical decomposition of the silver or other salt acted upon, is known as a "restrainer."

In illustration of restrainers, I have some silver nitrate solution as before, and add to it some gelatine solution, then a few drops of hydrochloric acid. It will be observed that the precipitate is much slower in forming, and this is because the gelatine, by giving viscosity to the solution, acts as a "physical restrainer," yet at the same time gelatine is used as a "chemical sensitizer," because it has the power, even when "set," of absorbing the halogens chlorine, bromine, and iodine.

Collodion is also a "physical restrainer," but it differs from gelatine in that it is not a "chemical sensitizer," *i.e.*, it will not absorb or combine with the halogens.

Ferrous sulphate is used as a developer for collodion wet plates, and acts by reducing the silver nitrate to the metallic state, while the ferrous salt is raised to the ferric condition according to this equation :—

$$6FeSO_4 + 6AgNO_3 = 2Fe_2(SO_4)_3 + Fe_2(NO_3)_6 + 3Ag_2.$$

On performing this experiment in test tubes it is seen that the reaction takes place at once, and it is too rapid to be of service in development, but on doing this again in the presence of a little acetic acid it is evident that the reaction takes place much more slowly. It is thus that acetic acid acts as a "chemical restrainer" in development.

After this digression I will now refer briefly to the more important processes in the order of their discovery, which have led up to our present state of knowledge in the art of photography. The first process of copying pictures painted on glass, or profiles cast by a strong light, was devised by Thomas Wedgewood and Humphry Davy in the year 1802, and was performed by placing the transparent picture or

the opaque profile in front of paper or leather impregnated with solution of silver nitrate or coated with silver chloride, and exposing to light. A darkened image was produced, but they had no means of fixing this image, *i.e.*, preventing a further darkening of the silver salt by what we call a fixing agent, and consequently the result was not permanent. This is, of course, quite similar to our methods of printing in the printing frame. An imperfect fixing agent was supplied by Fox Talbot, in 1839, who employed a solution of common salt, which acted by removing the greater portion of the silver chloride which had not been acted upon by light, but not all, therefore the resulting picture was not permanent. In the same year Sir John Herschell showed how all the unaltered silver salt might be dissolved by sodium thiosulphate, or "hypo," which is the fixing agent still most generally employed. The prints were called Talbotypes, after Fox Talbot. Joseph Nièsse, in 1824, was the first to be successful in fixing a photographic image obtained by means of a lens, and he did this by coating a metallic plate with bitumen, a pitch-like substance, and exposing in a camera for *some hours*. His developer was a rather expensive one, viz., oil of lavender, which dissolved the portions of bitumen unaffected by light, and left on the plate a picture of insoluble bitumen. Nièsse discovered this method after working on various substances for a period of 15 years. Nièsse died in 1833, and in 1839 Daguerre, who worked along with Nièsse a few years before he died, made known what is called a Daguerreotype process. In this process a highly polished plate of silver, or silvered copper is exposed to the vapours of iodine and bromine alternately, forming a film of silver bromo-iodide, the sensitiveness being judged by the colour of the surface. The method of sensitizing was improved until a Daguerreotype plate was prepared, which is as rapid as a wet collodion plate, but the image can only be seen at a certain angle.

The Calotype process, which comes next, was patented by Fox Talbot, in 1841, and consists in having a mixture of bromide and iodide of silver on paper sensitized with silver nitrate and gallic acid, and developed with these latter, and fixed with sodium thiosulphate. Calotype papers subsequently received a better surface by being coated with albumen and gelatine, and after being waxed were used as negatives from which to obtain positives copies to any number by printing in the sunlight. There were many drawbacks to the Calotype process, such as lack of uniformity and transparency owing to the grain of the paper and its partial opacity to light. Experimenters sought to remove these, and in consequence glass plates were successfully introduced in place of paper as a support for the film in the year 1847, when the Niepceotype process was brought out by Niepce de St. Victor. This consisted in coating a glass surface with a mixture of albumen and potassium iodide, and when dry immersing it in a solution of silver nitrate. Sensitive silver iodide was thus formed on a substratum of albumen, and it was found that these plates could be used dry, the albumen acting like gelatine, as an absorbent of iodine, *i.e.*, as a sensitizer. Four years later, in 1851 (scarcely 45 years ago), the "collodion wet-plate process" was made known in a practicable form by Scott Archer, and this is the process which was practically used by photographers to the exclusion of all others until about 15 years ago, when the introduction of the "gelatine dry plate," in an improved form, rapidly superseded the collodion wet plate on glass in every day use, until the latter has now become almost obselete, the wet collodion film being now little used except by itinerant photographers, who use it for taking positive pictures direct on the enamelled surface of ferrotype tin.

The necessity for preparing the wet collodion plate at the time of using was found especially inconvenient in out-door and away from-home photography, consequently efforts were made to prepare plates which could be kept for some time both before and after exposure The *gelatine* dry plate of to-day was not the first which could be so used, for the collodion wet plate was soon followed by the collodion dry plate, which was first prepared by Taupenot in 1853 but was not brought out in a really practical form until 1861, when Colonel Russell who experimented much in this direction, introduced a dry collodion plate which would keep and was fairly free from defects, but not so quick as the wet plate. This collodion dry plate was very similar in mode of preparation to the wet collodion, but I will explain the essential difference later on.

In 1964, the first dry plate coated with an "emulsion" was introduced by Bolton and Sayce, the film consisting of silver bromide emulsified in "collodion;" but it was not until 1871 that the practical details of the *gelatine emulsion* dry plate process were made known by Dr. R. L. Maddox, although the use of gelatine as a vehicle was suggested by Gaudin as far back as 1853.

This completes a short account of the progress of photographic processes up to the present time, and we will now consider, first of all, the

CHEMISTRY OF THE WET COLLODION PLATE.—This kind of plate was almost universally used 15 or 20 years ago. The preparation of the plate on which the image is to be obtained, of which I have here a specimen to show you,

may be described as follows: A sheet of glass cut to size is made chemically clean. A collodion is then prepared, of which I have here a sample, by dissolving pyroxylin in a mixture of alcohol and ether (it is very similar to that of the Pharmacopœia), and in this collodion some soluble iodide, or generally a mixture of bromide and iodide is dissolved. The iodides and bromides of Zn., K, NH_3 and Cd. have all been used; but the ammonium and cadmium salts are chiefly employed. When the soluble salts are added to the collodion, along with a little free iodine as a rule, it is said to be "salted." The "salted collodion" is to be dexterously poured over the glass plate, on which it very quickly sets, on evaporation of the ether and spirit, leaving a fine transparent film of salted pyroxylin. The plate is then sensitized by immersing it in a solution of silver nitrate containing a little iodide of potassium. The strength and purity of this silver bath, as it is called, is of great importance, also that it be neutral or only slightly acid. The foregoing operation of sensitizing with silver nitrate must of course be performed in the dark or in the ruby light. The plate is placed in the camera whilst wet, and exposed and developed before it dries. An acid developer must be used for a wet plate, since an alkaline developer would immediately cause the precipitation of the silver nitrate as silver oxide. Two typical examples of the developers used are: (1) Pyrogallic acid, gr. i; glacial acetic acid, m 20; alcohol, q.s, and water 1 ounce. (2) Ferrous sulphate, 20 grs.; glacial acetic acid, 10 minims; gelatine, gr. i; alcohol, q.s, and water 1 ounce. The chemical reactions are as follows: On immersion of the plate in the silver nitrate solution the soluble, iodides and bromides in the film form silver iodide and bromide thus:—

$$NH_4I + AgNO_3 = AgI + NH_4NO_3.$$
$$CdBr_2 + 2AgNO_3 = 2AgBr + Cd(NO_3)_2$$

The sensitive silver salts are thus deposited evenly over the surface of the film, and are superimposed by a layer of silver nitrate solution. On exposing the moist plate in the camera a very small proportion of the iodide and bromide of silver is reduced by the action of the light which is reflected to it from the object through the lens, and with proper exposure the amount of reduction is proportionate to the intensity and colour of the light. I might remark here what will be well known by most of you, that the silver salts are more easily reduced by the violet, blue, and green, or more refrangible rays than by the orange and red rays, but it will be seen, when speaking of orthochromatic plates, how objects of the latter colours may be photographed quite as faithfully by indirect methods. The change which takes place when the image is transmitted by the lens to the plate has long been represented by this equation:

$$2AgBr = AgBr, + Br \text{ or } 2AgI = Ag_2I + I.$$

It is true that Br and I are liberated just as chlorine was seen to be in the case of silver chloride, but there are many arguments which go to show that the reduction product is not simply a sub-bromide or subiodide, &c., as, for instance, the fact that the change takes place under strong nitric acid, as we saw a little while ago, which is a powerful oxidising agent, and is known to effectually prevent all similar reactions with other analogous metals, such as copper and mercury. The subject was investigated by Dr. W. R. Hodgkinson some few years ago (about 1889), and he states that the reduction product is an oxychloride, bromide, &c., of the probable formula.

$$\begin{matrix} AgAgCl. \\ / \\ O \\ \backslash \\ AgAgCl. \end{matrix} \quad \text{or } Ag_2O, 2AgCl.$$

This view is supported by Professor Meldola, and, as it allows for the liberation of halogen (which is replaced by oxygen) it seems to be a more logical view of the change which occurs. Now it is found that this change takes place much more rapidly in the presence of some substance which absorbs the bromine and iodine as soon as it is formed, and in this case the $AgNO_3$ is the sensitizer which thus forms fresh iodide and bromide of silver, and gives off nitric acid, possibly according to this equation.

$$6I + AgNO_3 + 3H_2O = 5AgI + AgIO_3 + 6HNO_3.$$

although the $AgIO_3$ may not be formed but the small amount of oxygen may be liberated. Hence the necessity of having the silver nitrate solution upon the surface during exposure, for the collodion, or rather pyroxylin film, has no absorbing power and takes no part in the chemical reaction.

To follow the changes on developing, we will take the iron developer previously given, and observe what occurs. If the ferrous sulphate solution alone were applied to the plate the reaction previously explained and shown would take place — $6FeSO_4 + 6AgNO_3 = 2Fe_2(SO_4)_3 + Fe_2(NO_3)_6 + 3Ag_2$, and the acetic acid (also the gelatine, which, by the way, is not altogether necessary) is here to prevent this. It re-acts with the silver nitrate, and forms acetate of silver, which is not so readily decomposed by the ferrous sulphate, although the eventual precipitate is of a more suitable kind for forming the image, and thus the precipitation of the silver is retarded according to the quantity of acetic acid present. Other

acids could be used in this way, but acetic is found to be most suitable in every way. The acetic acid thus acts as a "chemical restrainer"; gelatine acts as a physical restrainer by giving greater viscosity to the developer. The alcohol is added to overcome any repellent action offered to the water by the alcohol-ether prepared film, and thus enables the developer to flow evenly over the surface of the film. When the reduction of the silver nitrate is thus retarded it is found that the portions of haloid silver salt on the film have an attraction for the precipitated silver in proportion to the extent to which they have been previously reduced by the action of light, so that the particles of silver are gradually built up upon these portions. It is extremely interesting and important to note here that in this wet plate process the image is not formed from the film, or even one might say from a portion of the film, but that it is built up on the surface of the film from the silver which is contained in the solutions. After intensifying with additional developer if necessary, the plate must be fixed *i.e.* the unaltered silver haloid salt must be dissolved off the surface of the film, that it may be no longer sensitive to light. For this purpose a strong solution of sodium thiosulphate is used (3 or 4 oz. to the pint), or a much weaker solution of potassium cyanide (25 grs. to the ounce). The reactions in fixing, with equations, respectively are according to these equations:

$$AgI + 2KCN = AgK(CN)_2 + KI$$
$$AgI + Na_2S_2O_3 = AgNa(S_2O_3) + NaI$$

The potassium cyanide is preferred as a fixing agent for collodion plates, because it fixes rapidly and is more easily removed from the surface than hypo by subsequent washing. On looking up the chemistry of the fixing process by sodium thiosulphate, I find that Professor Meldola states the correct formula to be $Ag_2Na_4(S_2O_3)_3$, while Capt. Abney states just the reverse in his "Instruction in Photography," and other books on chemistry do not mention that two double salts can be formed, but I am inclined to think that the formula $AgNaS_2O_3$ is that of the highly soluble salt. The formation of the soluble double salt in a strong fixing solution, and of the insoluble in a weak solution, can easily be shown in test tubes. It is certain that the yellow stains which sometimes occur on prints during toning are formed by this insoluble thiosulphate, owing to a minute trace of hypo getting into the toning bath from the fingers or otherwise. This can also, I find, be easily demonstrated by a simple experiment on ordinary paper.

I will now hastily describe the dry collodion plate, which is never used now, but is the first plate which was prepared to be used when dry. A thin coating of albumen or rubber solution or gelatine, is painted on the plate to make the film grip, then a salted collodion is prepared in the same way as for the wet collodion plate, and is flowed over the glass plate, which is then immersed in the silver nitrate solution to sensitise, but the superfluous nitrate solution is afterwards washed away, because, if allowed to dry on, it would crystallise and spoil the film of silver haloid. An organic preservative is then coated over the dried surface, and allowed to set. This preservative prevents the haloid salts from becoming perfectly dry, and consequently less sensitive, and protects them from the action of the air. But its chief use is as a sensitizer (or absorbent of the bromide and iodine evolved) in place of the silver nitrate solution, and in this way it acts like gelatine. Many curious substances have been successfully employed as preservatives, among which may be mentioned tea, albumen, coffee, stale beer, and a solution of gallic acid with gum; the latter being perhaps the best or equal to any. The developer used is similar to that employed for wet plates, a little silver nitrate solution being added to give density by the further precipitation of silver, and fixing is carried out with cyanide or hypo as usual.

CHEMISTRY OF THE COLLODION EMULSION PLATE.—This plate has also been discarded of late years for the more rapid gelatine emulsion plates, but as its mode of preparation is very similar to that of the gelatine plate, it will be worth while enumerating the chief points in the process.

The silver bromide, or other sensitive haloid salt, is suspended in a very finely divided state in the collodion, but, of course, water cannot be used alone as a solvent of the re-acting salts, because it would precipitate the pyroxylin of the collodion from its solution. The general method of preparing the plate is to dissolve bromide of cadmium, or zinc, or ammonium in alcohol, add to this a few drops of nitric acid, and add the solution to collodion. This constitutes the "salted collodion." A solution of silver nitrate in alcohol is then prepared and very gradually added to the salted collodion, with constant stirring or shaking, the amount of silver nitrate added being sufficient to leave an excess after all the zinc or cadmium bromide has been acted upon. The collodion emulsion of silver bromide thus formed should have a deep orange or ruby tint by transmitted light. These operations need not be performed in the dark room The reasons why the emulsion is not appreciably sensitive up to this point, are because the soluble salts present act as "restrainers;" and secondly, because the particles of silver haloid formed are so minutely divided. The latter reason I will explain more fully when speaking of the gelatine emul-

sion. After allowing the emulsion to stand for some hours to "ripen," as it is called, the alcohol and ether are evaporated and the solid mass is washed in several changes of water to get rid of all soluble salts. The mass is then dried, re-dissolved and flowed over the glass plates. In this film the sensitizer is a very minute quantity of silver nitrate, which is retained by the particles of silver bromide. Note here the difference between the collodion wet plate and the collodion emulsion plate on development. In the wet plate you will remember that the image was formed by silver precipitated from the superincumbent solution of silver nitrate; but here the image is formed from the silver bromide in the film, and the same statement holds good for the gelatine emulsion plates which we now use. The minute quantity of silver-bromide, reduced on the surface by the action of light, is further reduced to metallic silver by the developer, which may be an alkaline pyrogallic solution, because in this case no silver-nitrate is present in solution. This "nascent" or active silver immediately reduces the bromide below it, and this partially reduced salt in turn is further reduced to the metallic state by the developer. Thus an image of metallic silver is embedded in the film.

CHEMISTRY OF THE GELATINE EMULSION PLATE.—The gelatine emulsion is made by methods very similar to the foregoing, gelatin taking the place of collodion, water that of alcohol and ether as the solvent, and potassium or ammonium bromide and iodides replacing the zinc or cadmium salts since water is the solvent.

METHOD OF PREPARING THE GELATINE EMULSION.—There are many formulas for gelatine emulsions, and perhaps as many different methods of preparing them; but the following rough description will give a fair idea of the general *modus operandi*. A small portion of the gelatine is dissolved in water and mixed with silver nitrate solution; into this a solution of bromide, bromide and iodide, or chlorate of potassium or ammonium in water is carefully poured, with constant stirring or shaking; the remainder of the gelatine solution is then added, and the emulsion is heated for some stated time, or "cooked," as it is called, or else a little ammonium solution is added. This cooking or addition of ammonia is intended to "riped" the emulsion, *i.e.*, to give it the maximum or the desired sensitiveness to light. The solution is then cooled after a certain time to the solid state, when it is then freed from soluble nitrates, bromides, etc., by repeatedly squeezing it through coarse cloth under water, after which it is re-melted and coated over glass plates or over films in the usual way. In this emulsion the state of physical aggregation of the silver bromide molecules is very fine, so that the particles come into intimate contact with the gelatine, which, as previously stated, is an absorbent of the halogens. For a good, sensitive emulsion it is found necessary to have an excess of soluble bromide present on mixing. Excess of silver nitrate would cause the formation of a compound of silver and gelatine, not much affected by light, but easily decomposed by the developer, producing "fog," *i.e.*, a film of silver over the plate. The excess of bromide with heat or the ammonia added in the "cold process" causes a small quantity of the silver bromide to dissolve, and this is reprecipitated on the undissolved particles, thus causing them to grow in size. Up to a certain point this increase in size gives a vast increase in sensitiveness, and "instantaneous plates" are prepared by prolonged cooking or by treatment of the emulsion with ammonia and slight heat.

In the case of a collodion emulsion, the light transmitted is of an orange or ruby tint, the violet, blue, and some of the green rays being absorbed, and it is just these absorbed rays which most readily reduce the silver salt, the orange and red rays being comparatively inert, and having even a retarding action on chemical change in some instances. According to what is known as Draper's Law a chemical change in a substance by the action of light involves the absorption of the chemically active portion by the light of the substance. This leads me on to orthochromatic photography, that is, the production of photographic images in their correct colour value. So far this has not yet been quite achieved, but much has been done to that end. The silver salts in the film are not acted upon by the various colours in the same ratio as the eye is impressed by them, that is to say, the "photographic" and visual intensities of light are very different. Thus a blue object looks much less intense for light value to the eye than a red object, yet the light reflected from the blue is much more intense in its chemical action upon a film of silver salt than the light from red. In showing how to correct this difference, Prof. Vogel, in 1873, found that the silver haloid salts were rendered more sensitive to yellow and greenish-yellow rays, by tinting them in a collodion film with coal-tar dyes, such as eosin, cyanin, etc., that is, these dyes acted as sensitizers of the silver salt for yellow and greenish yellow rays. Since then other dyes have been used for these and other coloured rays, but the greatest photographic intensity is still, as a rule, possessed by the violet and blue rays, although that is almost surmounted by placing a screen of tinted yel-

low glass before the lens, which absorbs some of the blue rays and modifies the action of that coloured light upon the plate. I have here specimen photographs of flowers in vases taken with an ordinary film and an orthochromatic film with the yellow screen. The difference in gradation of tone will be evident. To prepare the plates they are either dipped for a time in a solution of the dye, then dried, or the dye is added to the emulsion before coating the plate.

The chemistry of orthochromatic photography is still based to a large extent upon theories which have not been corroborated by facts, although much experimental work has been done. The following explanation is based upon a number of interesting experiments by Captain Abbey, which I have not time to give in detail.

It has been observed that amongst the most sensitive dyes are those which most readily fade. If a dyed plate be exposed for a long time in the spectrum it is found to be bleached in the region of the yellow and red rays, or that part which is sensitized. If a short exposure be given and the plate be developed, the silver salt is found to be reduced most in the part which would be bleached by a long exposure, although sometimes the region of greatest intensity is somewhat intermediate between the maximum of the silver salt alone and that produced by the dye. Under the action of light of a certain colour or wave length, the dye seems to decompose, forming products which have the power of reducing the silver salts below it, so that on development it is further reduced to the metallic state. Eosin, erythrosin, cyanin, and rose Bengal seem most suitable for obtaining a wide range of photographic intensity. Lippmann, by exposing a film of albumen treated with bichromate of potash solution and backed with a mirror of mercury, has obtained a plate which, when wet, shows an image by reflected light, which very nearly approximates to the natural colours. So far as I am aware no nearer approach to direct colour photography has yet been made.

I now pass on to the "Chemistry of Intensification of the Image," and what follows must be very brief. One of the best and simplest methods of intensifying or increasing the density of the image is one which was introduced not long ago by Selle, and I mention it first because I wish to intensify half of a plate by this method in order to show the change which is effected. The intensifiier consists of uranium nitrate and potassium ferricyanide, and the reactions are probably as follows: Uranium ferricyanide is formed in solution, and this is poured over the plate. The metallic silver on the plate has a reducing action on the ferricyanide causing insoluble ferricyanide of uranium ann ferrocyanide of silver to be formed, the former salt having a brown colour. The colour of the intensified image is very pleasing. Lead ferricyanide is used in the same way, and the reaction may be represented thus:

$$2Ag_2 + 2Pb_3Fe_2(CN)_{12} = Ag_4Fe(CN)_6 + 3Pb_2Fe(CN)_6$$

The favourite method of intensifying consists in bleaching the image with a solution of mercury bichloride, and afterwards changing the colour to brown or black with ammonia or the double cyanide of silver and potassium. On treating with the first solution, the silver reduces the perchloride to insoluble white subchloride or calomel, and silver chloride is formed at the same time.

On adding ammonia solution, the subchloride of mercury is converted into insoluble black di-mercuros-ammonium chloride, and the silver chloride is dissolved out.

$$Hg_2Cl_2 + 2NH_3 = NH_2Hg_2Cl + NH_4Cl.$$

If the perchloride treatment be followed by the application of the double cyanide of silver and potassium, the black deposit is found to consist largely of silver with some mercury, cyanogen and a trace of chlorine. The chief reaction might be represented thus:

$$Hg_2Cl_2 + 2AgK(CN)_2 = Ag_2 + 2Hg(CN)_2 + 2KCl.$$

CHEMISTRY OF THE TONING OF SILVER PRINTS.—In albumenised sensitised paper, the salted albumen surface consists of albumen and ammonium chloride. The 'salted paper" is floated on a bath of silver nitrate, then dried; a surface of silver chloride and silver albumenate being formed. On toning the silver image with gold or platinic chloride, the reduced silver salts, which constitute the image, in turn reduce the gold or platinum salt in solution, and a fine film of gold or platinum metal is deposited over the surface of the image, changing its colour. The silver salts unaffected by light are dissolved out on fixing with sodium thiosulphate as previously explained. Such salts as ammonium sulphocyanide are added to the gold solution in order to form salts of gold, which are more easily reduced than the chloride, and alkaline additions, such as borax, bicarbonate of soda, chalk, etc., are intended to prevent the formation of free acid, which would act as a restrainer and stop the toning process.

Historical Notes on Bacterio and Sero Therapy.

J. S. LOCKHART, BOSTON.

Read before the Cambridge (Mass.) Medical Improvement Society, Dec. 31, '94.

It has often been charged against bacteriology that whatever great advances it has made in etiology, pathology and diagnosis of disease, especially of the communicable diseases, the unfortunate victims of these effections have received no material benefit, though it must be acknowledged that prophylaxis in infectious diseases has received a great impetus and effectiveness from the researches of the bacteriologist.

Bacteriology has demonstrated that pulmonary phthisis, acute miliary tuberculosis, the various localized tubercular processes in the osseous and glandular system, as well as lupus in the cutaneous, are all one and the same etiological entity. It has settled the question of the identity of croup and diphtheria. In short, it has given us a bacillus or a coccus for an ever increasing number of diseases, and established their causal relation to them beyond question. It has enabled us to diagnose with certainty many obscure diseases, and placed in the ranks of the profession sentinels which observe the enemy from afar, and enable us to take prophylactic measures against epidemics before they have insinuated their deadly poisons into the hearts of communities, and if, as many prominent investigators assure use, by inoculation of animals with cultures of bacteria, they can be rendered immune to certain diseases and that immunity conveyed by means of the serum to other animals and man, acting not only in producing immunity, but as a curative agent as well, then the crowning victory of bacteriology is won, and we have not only its positive influence in etiology and pathology, but we have a logical scientific bacterio therapy which is so promising in its incipiency that the ultimate abolition of all infectious diseases would not be an extravagant claim for it.

In Berlin last summer I spent some time in the infectious wards and laboratories under the control of Prof. Koch, and the wonderful results of the serum treatment, especially in diphtheria induced me to look up the subject and I thought the presentation of a few historical notes to this society would stimulate discussion on this subject, which seems to present a rational, specific treatment for specific communicable diseases, especially those which may be communicated to the lower animals.

There are two distinct methods of bacterio therapy. The direct and the indirect methods. The latter may be regarded as the union of the former with the practical development of vaccination and immunity and is the result of the discoveries of Jenner, Pasteur, Koch and their followers and contemporaries in this field, colaborated and developed into the practical serum therapy by Behring, and adopted and extended by numerous investigators in Italy, France and Germany. In England and America it is just beginning to be regarded as a reality, and some effort is being made to introduce it in hospitals.

It has long been recognized that one attack of an infectuous disease conveys a certain immunity to the animal from future attacks. This immunity does not appear to be governed by any regular law, in some cases lasting the remainder of the life and others of variable duration.

Variolization, or the artificial infection with smallpox virus, was an early effort to immunize against smallpox. Then came the great discovery of Jenner, that immunity to smallpox could be conveyed to man by the lymph of cows suffering from a modification of that disease. Thus we have the counter parts of direct and indirect bacterio therapy, or sero therapy in these two now ancient methods of rendering individuals immune to smallpox.

Pasteur succeeded by inoculating animals with attenuated bacterial cultures in rendering them immune to authrax and hen cholera.

Toussaints and Chauveau demonstrated that not only the inoculation with attenuated living virus, but also of their products free from all organisms produced immunity. Thus we have the direct method of bacte.io therapy, which consists of the introduction into the organism of attenuated bacterial poison virus, either from a culture or from an effected organism. This method includes the Pasteur inoculations for rabies and the Koch tuberculin treatment of tuberculosis. The former is a striking example of acute immunization during the incubation of the disease. The latter, though it fell far short of a realization of the great hopes it aroused in the profession, is not barren of results. It is still practised in the infectious wards in the Charite at Berlin. Every patient who does not object receives a diagnostic dose of tuberculin, and if tubercular processes are manifest by reaction, they are then put upon therapeutic doses of the same. I saw several cases of lupus that had been treated with apparently brilliant results. They claim it will cure all cases of tuberculosis, taken before mixed infection occurs.

It has been proved by the above and by numerous experiments upon animals, that this method has a beneficial action upon infectious diseases, not only as prophylactic in rendering them immune, but also as curative when introduced subsequent to the infection.

The great objection to its general use is that it is not entirely free from danger, the reaction

of the organism to the virus not always being maintained within the bounds of safety, and one can never accurately estimate the amount of reaction that may result in a given case.

The second or indirect method of bacterio therapy is the result of the great discovery of Behring. It differs from the first in that the immunizing principle elaborated in the animal is transferred to the individual, who thus avoids the dangers incident to its development, and receives a finished product suitable for immediate effect.

In its historical development it is intimately associated with the bacteriocidal effect of blood serum. The early experiments of Traube showed that liquids containing bacteria of infectious diseases could be injected into the blood of animals with impunity, but later Fœdor, Flugge and other investigators found that while the serum of certain animals was fatal to some bacteria, that of others afforded a good culture medium for them; also, the Klebs Lœffler bacillus was found to flourish in the serum of rats, while these animals are naturally immune to diphtheria These and similar experiments with the cell free serum of animals, demonstrated that the organism possessed some other means of defense against infection beside the phagocytes of Metchnikoff or the bacteriocidal effect of the serum. This also tended to show that the bacteria were not alone the cause of the pathological process in blood organism, but that their products the toxines, here played an important role. Behring and others found by experiments on animals that while some animals were naturally fortified against certain infectious diseases and that others became so after having recovered from them, they could be artificially immunized by administering gradually increasing doses of virus, until they did not react to the attenuated bacterio virus. Also that other animals of the same species and other species were rendered immune by injecting the serum of those artificially immunized animals. The serum of rabbits artificially immune to tetanus acts efficaciously in affected that this serum not only acted as preventive before the infection but as curative after, but in much larger doses. Its efficiency was in inverse ratio to the length of time after infection. Thus a small dose a short time after infection had much greater effect on the disease than a larger one at a later period. Similar results were obtained by Ehrlich with the plant tox albumins ricin and albrin.

He was able to render animals immune to lethal doses of these poisons and transfer that immunity to other animals with the serum. This process of immunizing animals is termed the Behring-Ehrlich method. Further experiments demonstrated that during the period of reaction the bacterial poison of the disease was in the accendancy, and only after the reaction had subsided was the presence of the protective material manifest by the effect of the serum on other animals, and that the protective efficiency of the serum was in proportion to the amount of reaction resulting from the virus. Thus before administering more virulent virus one must wait until all reaction from the last dose has subsided and the protective substance developed. These experiments also tended to confirm the theory that the rationale of cure in acute self limiting diseases, is the production of antitoxines which neutralize or destroy the toxines produced by the bacteria, and that each specific disease develops a specific antitoxine.

After the perfection of these methods by experiment upon animals and the perfect safety of the method being established, it was extended to man. The experiments of Behring, Kitisato, Aronson, Vernicke and others in diphtheria, of Cattini and Tizzoni in tetanus, of Klemperer in pneumonia, of Bruchetini in influenza and of Bernheim in tuberculosis, have demonstrated at least to their entire satisfaction that this is a feasible and reliable specific method of treatment for specific infectious diseases.

The mode of action of this immunizing principle has given rise to numerous hypothesis. Klebs and Pasteur held that immunity was the result of the exhaustion of the material necessary for the nutrition of the micro-organisms.

Chauveau advanced the so-called retention theory, that immunity was the result of certain products of the bacteria which remained in the system and neutralized the effect of subsequent infection.

Metchnikoff, in his lectures at the Pasteur institute which I attended last summer, referred it to his pet theory of phagocytosis, that the immunizing substance stimulated the action of the phagocytes or developed their powers of resisting bacterial toxines.

Hans Aronson, who has done much work in this line, says that experimental investigation has demonstrated that the serum therapy of infectious diseases, at least of tetanus and diphtheria, has a specific curative effect which is without parallel in modern therapeutics. He, with Buchner, explains its action as an acute immunization—that it is limited to the prevention of further damage to the cells of the body by the infection, and is powerless to repair that already sustained. So that if the organs have already been sufficiently injured to cause death, the antitoxin is of no avail.

Behring concludes that it acts in one of the following ways:

1. By destroying the living micro-organisms.
2. By inhibiting their growth.

3. By depriving them of their power to generate toxic products.

4. By destroying the poison produced by the bacteria.

5. By increasing the resistance of the central organs or cells against the bacterial toxines.

The exact nature of these substances has not been definitely determined. The antitoxin of diphtheria, which is soluble in alcohol, is regarded by Loefler, Yersin and others as a diastase or ferment. Brieger defines it as a tox-albumin. It has a much greater power of resistance to physical and chemical influences than the bacterial toxines. A mixture of this latter with immunized serum heated to 60° was found to be innoxious when injected into animals, but the animals so treated were immune to subsequent infection with this virus. It passes by dialysis through animal membrane and its presence has been demonstrated in all the tissues and secretions of the body of immunized animals and in some cases it is transferred from parent to offspring.

The practical application of this subject includes:

1. Immunizing the animal.
2. Obtaining the serum, determining its properties and preserving it for use.
3. The administration as prophylactic or curative agent.

It requires skilled bacteriologists to immunize the animals, which is a most difficult procedure on account of the danger of killing them with too virulent virus. They begin with an attenuated virus, and wait until all reaction has subsided and a certain amount of immunity produced, when the strength of the virus is increased and so on until the animal gives no reaction to the full virulent virus. It was found that to obtain a strong antitoxic effect from the serum, one must introduce as large and virulent doses in as short intervals as the animal can stand. The efficieny of the serum depends on the amount of reaction produced by the virus, hence the choice of animals is a matter of great importance. Behring found that the horse gave the best serum for tetanus aud sheep for diphtheria, while Aronson and Vernike found dogs to be serviceable in the latter disease. Bernheim in Paris uses goats to prepare serum for tuberculosis. It requires from two or three weeks to six months to immunize these animals.

The blood is then drawn at intervals so as not to injure the animal. How long an immunized animal can serve as a producer I have not been able to ascertain.

The serum separated and either used as such or concentrated to a colorless viscid fluid, which is preserved by addition of 0.2 p. c. trikresol. This is the Behring-Ehrlich heilserum, which is prepared in two different strengths, No. 1 and No. 2, the latter 2½ times the strength of the former.

Aronson succeeded in obtaining from the serum a white powder, soluble in water and dilute alcoholic solution. It contained all the antitoxic principles of the serum.

Bernheim's method of preparing the serum of goats is as follows: The cell free from serum is passed through unglazed porcelain filters under a pressure of 60 atmospheres. The serum is then collected, in glass ampullæ and the air replaced by carbon dioxide.

Cattani and Tizzoni claimed to have obtained an effective antitoxin without the intervention of the animal.

The efficiency of the serum or antitoxine is tested upon animals before using on man.

Bernheim, at the Clinique General in Paris, is treating tuberculosis with his serum, and he claims excellent results from the method. I saw a number of his cases and they seemed to confirm his statement. He will soon publish the results of his experiments.

Behring states that the mortality of diphtheria under treatment by antitoxin does not exceed 5 p. c.

The results of the observations of Drs. Roux, Yersin, Martin and Chaillou in the diphtheritic wards of the Paris hospitals give an improvement in the death rate of diphtheria by this treatment of over 27 p. c.—*New England Druggist.*

IRON IN COMMERCIAL GLYCERIN.

BY J. W. HAUSSMANN.

The practice of keeping glycerin in tinned iron cans, often for a prolonged time, will have the effect of contaminating the same with traces of the metal.

As special inducements are usually offered by the wholesale dealers to buy this liquid in lots of fifty pound cans, of this capacity are generally found in retail pharmacies, and often form the only stock container, entailing the above mentioned contamination.

In many operations, both in the laboratory and on the prescription counter, the delicate iron reactions produced with certain compounds are productive of color changes, which are at times difficult of explanation.

These may be produced by impure articles, in this instance the iron contaminated glycerin.

In a number of instances where glycerin was kept in the containers mentioned, such reactions were produced and found at times to be the source of considerable trouble.

It is hardly necessary to mention the various iron reactions, as they are found in every chemical text-book. But to the phar-

macist a few are of importance, as they are liable to occur at the dispensing counter, when the presence of a trace of iron in commercial glycerin is not suspected.

In the popular glycerite of tannin we find the preparation not unfrequently to turn a blackish-brown color, no matter how careful we may be in the handling of our working utensils. Examination of the glycerin, which appears to contain the metal in the ferric form, will reveal the cause of the coloration.

Extemporaneously prepared nipple washes containing tannin, or similar preparations, are apt to show the same effect, as will also preparations containing tannin-like principles.

In connection with this, attention may be called to the presence of tannin in commercial alcohol.

The average pharmacist accepts this most important solvent from his dealer without even attempting a superficial examination as to its purity, and does not recognize the importance of the same until he finds color changes in delicate preparations.

Elixirs containing scaled iron salts often show this result, and the question: Why does elixir of iron, quinine and strychnine turn dark after standing a short time? may find partly an explanation in the tannin-containing alcohol of commerce.

Such alcohol, or preparations made therefrom, when mixed with glycerin kept in tinned iron cans, will show the same effect.

The delicacy of the iron reaction with the phenol compounds is well known.

Carbolic acid is frequeutly prescribed in admixture with glycerin; and if the latter is not free from iron, a red coloration is sure to take place. This was observed with a perfectly colorless sample of the acid.

Salicylic acid, in particular its sodium salt is a compound which is readily afiected in this manner. The fact that a perfectly colorless aqueous solution of this salt, when mixed with glycerin, turned to a reddish-violet color, first drew the writer's attention to the presence of the metal in the latter.

Similar effects can also be observed with other aromatic compounds, especially with a number of the new remedies, such as antipyrin, salipyrin, etc.

The following prescription was the subject of a controversy between a physician and a pharmacist:

R Tinct. guaiaci.....ʒ j
Glycerini .....ʒ j
Aqua rosae.....ʒ ij

When this mixture was dispensed, it was found to acquire a blue color on standing. This took place either with or without the presence of gum arabic, thereby proving the same not to be a factor in the change. An examination of the rose-water failed to find any oxidizing agents, but an examination of the glycerin revealed the presence of iron.

The same prescription was sent to several reputable pharmacists to be compounded for the sake of comparison, almost invariably showing the same result—with only one exception—indicating the presence of iron in glycerin to be quite general.

Other color reactions, produced by this impurity, may also take place, but a consideration of analytical principles will enable the well-informed pharmacist to satisfactorily explain the cause of any of such changes.—*Amer. Jour. Phar.*

BUSINESS CHANGES.

Norman R. MacKenzie, of Chatham, N. B., has purchased the business formerly owned by H. H. Johnston, Newcastle, N. B.

F. A. Sharpe, formerly with S. McDiarmid, St. John, N. B., and lately with H. H. Johnston, N. B., is opening out in Port Elgin, N. B.

Geo. T. MacDonald, of the firm of F. S. Kinsman & Co., Digby, N. S., has opened out in Shelburne, N. S.

L. R. MacLaren, formerly with A. E. Holstead, Moncton, N. B., and later with H. Paxton Baird, Woodstock, N. B., has purchased the business of F. S. Kinsman & Co., Digby, N. S.

The result of the elections for the Council of the Pharmaceutical Association of the North West Territory, held in Regina, March 27th, was as follows: W. G. Pettingell, Regina; Robert Martin, Regina; W. W. Bole, Moose Jaw; J. G. Templeton, Calgary; A. D. Ferguson, Wolseley.

The bacteriologist of the Brooklyn health department made a thorough investigation of the case of the young woman in that city whose death was alleged to have been caused by an injection of anti-toxin. He administered some of the same serum as was used in this case to guinea pigs and rabbits, which suffered no inconvenience therefrom. The bacteriological examination showed, moreover that the dead patient's blood was free from micro-organisms. His experiments, he says, demonstrated that the cause of death was not inherent in the antitoxin, and the conclusion reached by the health authorities was that the physical condition of the patient was such as to render her liable to fatal convulsions after any hypodermic injections whatever.

INJUSTICE TO IMPORTERS.

VEXATIONS CAUSED BY A VACANT COLLECTORSHIP. —COMPLAINTS PIGEON-HOLED AT OTTAWA ANE FORGOTTEN. — A REPUTABLE FIRM FINED FOR A CRIME OF WHICH IT WAS INNOCENT.

The neglect of the Government to fill the vacant place of the collector of customs is becoming a most serious matter to importers Complaints are more frequent and bitter every day the injustice continues. It is charged that the deputy collector has not the necessary authority to act in matters in dispute between the appraiser and the importer, and that when these cases are referred to Ottawa they are pigeon-holed and never heard of again.

An instance occurred recently which gives a fair illustration of the condition of affairs at the Montreal custom house. The firm of Kerry, Watson & Co., wholesale druggists of St. Paul Street, received a small consignment of goods valued at $46, less a discount of 25 per cent., or $34.50. The law states that goods imported are not to be sold at a greater discount than in their home market. The firm were not aware that the discount was specially for export, and gave the value of the goods as $34.50, which was the amount they had paid for them. The goods were sold, and then the appraiser was heard from. He claimed that the value of the goods was $46, and that duty should have been paid on that amount. The firm protested, but the deputy collector sustained the appraiser, and the firm were charged a duty of 50 per cent. on $46, with $5.50 added duty as a fine. Mr. John Kerry stated that if the deputy collector was right in his decision, it would be necessary for them to go to the customs people with every invoice in order to avoid trouble. In this particular case one of the articles was peroxide of hydrogen, which is a pure drug, and can be made by anyone, and upon which the duty is 20 per cent., yet 50 per cent. duty was levied upon it because the maker's name was on it. Mr. Kerry states that in the case of English goods imported in bond a 20 per cent. discount is granted by the exporters, yet the importer must pay 50 per cent. on that 20 per cent. in other words, he is taxed on 20 per cent. more than the goods cost him.

"When we write to Ottawa we get no satisfaction," continued Mr. Kerry. "We have invariably to dispute the appraiser's decision, and the deputy collector won't interfere. We have frequently received more goods than appeared on the invoice, and have promptly reported them and paid the duty. When matters are the other way, however, we get no consideration or justice.

"What is wanted here is a Court of Appeal, instead of the appraiser's decision being final. The deputy collector would be competent if he had the necessary authority. We will appeal to Ottawa, as we object to having it on record that we have been fined for something we knew nothing about. We object to the odium attached to such a thing.

"Mr. Wallace seems, as a matter of plain fact, to look upon the importer of goods as the natural enemy of the Goverument, and the appraiser has been instructed, according to his own admission, to get all the money possible out of the importer. We want a collector appointed at once."

From the foregoing it will be seen that there is more truth than poetry in the complaints of the importers regarding the neglect to appoint a Collector of Customs to the port of Montreal. —*Montreal Herald.*

THE TESTING OF EUCALYPTUS OIL.

By H. B. HELBING and DR. F. W. PASSMORE.

When, in 1892, we first advocated strongly the necessity of judging the quality of a eucalpytus oil by its freedom from irritating aldehydic substances, by the absence of phellandrene, and by the yield of crystallisable eucalyptol, we were convinced that in time such requirements would be everywhere adopted. For three years our method of fractionating the eucalyptus oil and separating the eucalyptol from these fractions by a freezing mixture was widely adopted, and many buyers require eucalyptus oils to contain at least 40 per cent. crystallisable eucalyptol obtained according to our method.

At the end of last year a new test was devised for the determination of eucalyptol in eucalyptus oil by means of phosphoric acid. In February, 1895, we pointed out that we did not think that this apparently promising method would yield accurate results in the quantitative estimation of eucalyptol in all commercial samples of eucalyptus oil, although it certainly answers for manufacturing eucalyptol on a large scale from suitable eucalyptus oils. Since then we have continued to examine in detail the merits of this method, and as it is still put forward as a means of determining quantitatively the true value of eucalyptus oils of commerce, we think it important that a clear understanding should be come to as to how far the method is reliable.

Everyone is aware that the difficulty of obtaining crystallisable eucalyptol by the freezing process consists in the tendency of the terpenes to retain the eucalyptol in solution. Results obtained by this method would therefore be, if anything, too low, and a buyer of eucalyptus oil giving 40 per cent. crystallisable eucalyptol by the freezing process was sure to have an oil with at least this percentage, but often higher.

The phosphoric-acid test yields in some instances no precipitation whatever, particularly where the percentage of crystallisable eucalyptol is low. In cases of eucalyptus oils with a high percentage of eucalyptol the yield is, however, marked. We have found that in oils yielding by our freezing process above 30 per cent. eucalyptol, in single instances even up to 15 to 20 per cent. more eucalyptol is obtained by the phosphoric-acid test.

In judging and buying eucalyptus oil the following points must, therefore be taken into consideration :—

1. A proportion of 40 per cent. crystallisable eucalyptol is required by the freezing-process.
2. A proportion of 50 per cent. eucalyptol is required by the phosphoric-acid rest.
3. A proportion of 40 per cent. crystallisable eucalyptol obtained by the freezing-process (our standard) is equivalent to between 50 and 60 per cent. crystallisable eucalyptol obtained by the phosphoric-acid test.

In carrying out the phosphoric-acid test the following points are specially important:—

1. Cooling and stirring the oil whilst adding a highly concentrated phosphoric acid, drop by drop, till a dark reddish coloration appears.
2. Pressing the eucalyptol phosphate between filter-paper till the crystals are quite white.
3. Decomposing the eucalyptol phosphate with warm water, separating the eucalyptol, and determining that it solidifies easily by—3°C.
4. Testing as usual for irritant aldehydic compounds and phellandrene.

We trust that this note may result in securing that uniformity of interpretation which is desirable.—*Chem. and Drug.*

Restriction of Public Misuse of Carbolic Acid.

The Cleveland Pharmaceutical Association, recognizing both the value and danger of carbolic acid as a drug for popular use, is endeavoring to minimize this danger. A committee of the Association, consisting of Nathan Roswater, P. I. Spenzer, M.D., E. A. Schellentrager, Eugene R. Selzer and T. L. Sords, has issued a circular, from which we quote the following :

"The Carbolic Acid U.S.P. is in crystals; and not being convenient in this form for the household or medical use, this acid is made liquid by addition of from 5 to 8 per cent. of water, although, when thus prepared, not strictly conforming to the legal (U.S.P.) standard, has by common usage become recognized by the public and by many physicians, erroneously, as true carbolic acid, and has been so labeled.

"This conveniently liquefied acid apparently mixes easily with other liquids, such as water, oils, etc., so that many of the best physicians have been know to direct their patients to buy this liquified acid and mix it at home, never dreaming of its resulting in dangerous possibilities.

"First: It does not readily dissolve, although it diffuses and seems to mix with water in all proportions.

"Second: Unless completely dissolved, the strong, oily, milky or cloudy acid that remains undissolved acts as a powerful caustic instead of a healing agent.

"Third: If directed to be mixed at home with oil, vaseline, lard or other fats, the liquefied acid will not dissolve on account of the 5 to 8 per cent. of water it contains, thereby resulting in caustic instead of healing actions.

"Fourth: If swallowed by accident it is almost universally fatal before assistance could arrive; yet is not desired or needed in so dangerous a liquid form."

To obviate these difficulties and dangers as far as possible it is recommended to prepare a 33 per cent fluid carbolic acid according to the appended formula and introduce it in place of other forms as far as practicable :

Carbolic acid crystals.....15 troy ozs.
Glycerin.....40 troy ozs.
Melt the acid and stir in the glycerin.
Or for practical purposes :
Carbolic acid.....1 measure.
Glycerin.....2 measures.
Mix, as above.

This solution is to be known as No. 33 carbolic acid, the number expressing approximately the percentage.

The Association recommends:

To all druggists, and especially to its members, not to dispense a stronger carbolic acid than No. 33, except on physician's prescriptions.

To all physicians.—When desiring to mix carbolic acid with fatty bodies, instead of intrusting such dangerous work to the laity (since such work requires professional skill to suit each case), it will be best intrusted to the proper professional expert—the pharmacist.

To all physicians requiring the liquefied carbolic acid as hitherto to dispensed, to specify this article in their prescriptions to avoid error and relieve the druggist of the responsibility for dispensing it, or of embarrassment for refusing to sell without prescription.

The Association has also devised a label printed in red, the name with skull and crossbones and the warning word "poison" showing in white on a deep red ground. This label mentions uses and antidotes. Among the latter we fail to find mention of epsom salt which has of late years been recommended. —*Druggist Circular.*

Hattie & Mylius.

OPEN THEIR MAGNIFICENT STORE ON HOLLIS STREET.

Halifax people are said by some to be "behind the times," but there are many among them who have great enterprise, and included in this number are two young men, Hattie & Mylius, who during the several years they have been in business have shown great ability and energy in having a first class establishment in the Acadia Drug Store on Hollis Street and a branch of similar qualifications on Pleasant street, but not satisfied with this have made further improvements by transferring their main store to the building at the corner of Hollis and Sackville streets, where they opened a magnificent store to-day, having had the lower part of the premises completely changed, and now have a store which is not only a credit to themselves but have conferred a boon on the city in having what has been at night time one of the darkest corners of Hollis street transformed into a perfect blaze of light, the premises being illuminated with 18 electric lights.

Their new stand was years ago a drug store, but for the last 20 years has been occupied as an insurance office. The corner is so changed that it can scarcely be recognized as the old place. The large stone column which formerly occupied the corner and supported the front of the building has been replaced by an iron column 14 inches wide. and a plate glass window 6 ft. wide has been put in on the Sackville St, slide The entrance is on Hollis St., the front having two sheets of plate glass 5 ft. 4 in. wide with a very pretty door in centre, glazed with bevel edged plate glass.

The effect inside the door is most striking. All the fittings to all cases, etc., are finished in mahogany, and many new and original ideas have been used. The soda fountain is placed on an end counter immediately inside of the north window and the design of the wood work and the effect of the mirror top is very pleasing indeed.

The dispensing front is of new design, and contains a bevel mirror 2 ft. wide x 6 feet high, on each side of which is a perfume case with mirror backs. The south side contains a new idea, having roller front show cases, set in under the patent medicine cases and deep lockers for surplus stock under the show cases. The shop floor is marble, the tiles being supplied by the Bras d'Or Marble Co. This is the first sample of their output, and reflects credit on them.

The counter show cases are of pretty design, and are on the north side.

There is a novelty in show cases, designed by show cases, designed by Philips, of Detroit, and for the diaplaying of cigars. It is filled with moistening boxes.

The chandeliers are a combination—electric light and gas; triple lights in each window, and four in the centre of the show.

The dispensing department, which is in the back part of the shop, and which is separated from the store by dark green curtaining,for convenience would be difficult to excel.

In rear of the shop, and over Horton's,is a large room connected with the main shop, and protected by an iron door. This is the firm's laboratory, and all their pharmaceutical and proprietary preparations are to be manufactured there.

The store is not as large as that lately occupied by the firm, but is more compact, being on the style of those in American cities, and with the additional room in the rear is more adapted to the business, especially as this do not intend to continue fancy goods.

Enlarged Faculty of the School of Pharmacy of Northwestern University—Chicago.

Illinois College of Pharmacy, Chicago, has added to its Faculty two strong men of national reputation—Mr. Henry Kraemer, well-known to the pharmacists of this country as the Reporter on Progress of Pharmacy of the American Pharmaceutical Association, and Mr. Jan B. Nagelvoort whose name is familiar to the readers of current pharmaceutical and chemical literature. These gentlemen are both apothecaries,and distinguished for their ability and their active participation in the scientific work of their profession.

Mr. Kraemer, after graduation from Girard College, Philadelphia, entered the drugstore of Dr. C. B. Lowe of that city, who was Prof. Maisch's assistant in the Phildelphia College of Pharmacy. He served an apprenticeship in Pharmacy extending over five years, and when he graduated at the college just named, he was awarded the Lee Prize and the Maisch Microscope Prize. For two year he was assistant to Prof. Sadtler, University of Pennsylvania. Then he was called to the New York College of Pharmacy to teach Botany, Materia Medica and Pharmacognosy, but he resigned his position after one year to devote himself to an extended course of study at the Columbia College, giving special attention to Botany and Chemistry with the fixed purpose of thoroughly preparing himself to make Pharmacognosy his life work. In 1892 he was elected Reporter on Progress of Pharmacy of the American Pharmaceutical Association, which position he still occupies with distinguished ability and unselfish zeal. Desiring to pursue further studies in German universities before he enters upon his duties in the School of Pharmacy of Northwestern University, he has been granted leave of absence for one year for that purpose.

Mr. Nagelvoort was born at Amsterdam, Holland. He enjoyed the great advantages of re-

ceiving his early education at the hands of private tutors. Then he became apprenticed to an apothecary who was his father's neighbor and friend, and has continued, since that time, faithful to his love of the sciences upon which true pharmacy rests. At seventeen he entered the University of Amsterdam as a student of pharmacy, and graduated upon the completion of the three year's course there prescribed. The compensation received by dispensing pharmacists in Holland being rather meager, Mr. Nagelvoot accepted an appointment to the position of Military Apothecary and in that capacity served for many years in Europe and in India! While in the service of his government he enjoyed unusual facilities for scientific work and study. Then he came to this country and for some years was a pioneer farmer in Nebraska. In the meantime he continued sedulously to cultivate his scientific studies. In 1887 he offered his services to Messrs. Parke, Davis & Co. as an analytical chemist and has been busily engaged since that time in the qualitative and quantative examination of drugs, chemicals and pharmaceutical preparations. In an analytical laboratory where every convenience and the most approved apparatus was to be had for the asking, and with a reference library such as few pharmaceutical schools in this country possess, Mr. Nagelvoot was daily accumulating a practical experience in pharmaceutical analysis, assaying and testing such as could hardly be acquired elsewhere, until he must now be recognized as one of the foremost experts in this special field of work. His contributions to current chemical and pharmaceutical literature are numerous and valuable. Of his translation of Fluckiger's well-known work on the "Reactions" of organic compounds Prof. Fluckiger himself said, "I fully acknowledge how zealously and intelligently you not only translated but in many respects improved the "Reactions."

Prof. Nagelvoot enters upon his duties at the School of Pharmacy of Northwestern University about the first day of next August to complete the details of the equipment of the special laboratory assigned to his charge, so as to be thoroughly ready to begin the courses of instruction on the first of October. His entire time will be devoted to the special chemical and pharmaceutical laboratory courses included in the Second Year's curriculum for the degree of Pharmaceutical Chemist, the most important part of which is pharmaceutical assaying and related analytical work such as the pharmacists and the sanitary public analysts of the future must be prepared to perform. The School of Pharmacy of Northwestern University, has heretofore required practical experience in drug-stores for the degree of Graduate in Pharmacy. It has now abolished this requirement on the ground that it can not assume the responsibility for any training its students may have received outside of the school. Nearly all the university schools of pharmacy now stand together on this question.

St Louis College of Pharmacy.

FORTY-SIX CANDIDATES RECEIVED THEIR DIPLOMAS.

The annual graduating exercises of the St. Louis College of Pharmacy took place before a large and appreciative audience. Much disappointment was caused by the unavoidable absence of Mayor Walbridge, President of the College, who was to have delivered the opening address and conferred the degrees. In his absence the degrees were conferred by Prof. E. P. Walsh, Vice President of the college. The class this year was exceptionally large, numbering no less than forty-six members. The programme was interspersed with musical selections by Saengers's Orchestra.

The conferring of degrees was followed by a valedictory on behalf of the faculty, delivered by Prof. H. M. Whelpley. He congratulated the class in well chosen terms on the intellectual victory which they had achieved. He dwelt at length on the responsibilities of their chosen calling. The commercial side of pharmacy, he said, was fast being superseded by its professional aspects. He closed by exhorting the members of the class of '95 to emulate the greatness of the graduates who had gone before them, and never by word or deed to cast odium upon the fair name of their alma mater. The valedictory on behalf of the class was delivered by Oramel M. Curtis, and was a masterly effort.

A pleasing feature of the exercises was the presentation to the faculty of a beautifully engraved class plate by the class of '75, in commemoration of the twentieth anniversary of their graduation. The presentation speech was to have been made by Charles Gietner, Ph. G. He was able to reach the city in time, however, and his place was taken by Mr. Francis Hemm, Ph. G. His remarks were appropriate and feeling. Vice President Walsh accepted the plate in the name of the faculty, and assured the class of '75 that it would ever be cherished as a precious remembrance. The plate is a beautiful piece of work. It is of burnished copper, the engraved portions being inlaid with silver

William C. Belm then awarded the prizes of the Alumni Association, and Francis Hemm those of the faculty. The prizes were awarded as follows:

Senior class—The Alumni prize, a gold medal, for passing the best examination in all branches, Frederick A. Houck, of Boonville, Mo.; second prize, a silver medal, Kurt P. Giesecke, of Brenham, Tex.; the prize offered by the Oldberg-Wall Laboratory for the best examination in pharmacognosy, Otto Augustus Wall, Jr., of St. Louis, and Albert Eugene Suppiger, of Edwardsville, Ill.; the prize offered by the professor of pharmacy for the best examination in theoretical pharmacy, Oramel M. Curtis of Warrensburg, Mo.; prize given by the professor of practical pharmaceutical

laboratory. William E. Blackwell and Washington K. Penn; the professor of chemistry prize, practical chemistry, Julius John Jeude, of St. Louis.

Junior class—The college prize for the best examinatien in all branches. Anthony B. Walker, of Hermann, Mo.; for best examination fn microscopical technology, Felix Paquin, of St. Louis; the Alumni prize, a standard work on pharmacy, for excellence in examination, Joseph L. Boehm, of St. Louis.

The following students received honorable mention, having made 90 per cent or over out of a possible 100: Theodore F. Becker, Edwin W Eberlein, Edward H. Eyerman, Harry Holland Hokey, Theodore J. Riedel, John T. Sanders, Albert E. Suppiger, Ernest H. Thurman and Otto A. Wall, Jr.

A General Invitation to the Members of the American Pharmaceutical Association.

Members interested in commercial and allied subjects are respectfully invited to write papers for our next meeting, to be held on August 14, at Denver, Colorado.

As income and revenue derived from the practice of pharmacy is beyond dispute the most important factor involved in the pursuit of our material affairs, I hope that hundreds who will be unable to attend the above convention will favor the commercial section with their views on an impending crisis.

I particularly request the Chairman of Committee on Trade Interests, in every organized State Association, to favor me with their existing grievances, and problems to be solved in the interests of the common welfare of our brethern. Many able members whom I approached at Asheville, and suggested that they enlist themselves among writers on commercial subjects, surprisingly responded: "What shall I write on?" In order to promote the desideratum, I take great pleasure in suggesting the following queries:

1. Whither is the practice of pharmacy drifting?
2. To what cause is failure due, in attempting to protect our mutual trade interests?
3. Why do a large number of wholesale druggists supply department stores with drugs and medicine, and violate contract agreements on rebate goods with manufacturers or proprietary medicines?
4. Under what circumstances is substitution admissible?
5. Is the protection of the trade interests of the druggists and chemists by the manufacturer of proprietary goods a possibility?
6. Is general substitution justifiable?
7. Is it justifiable to purchase unreliat materials for the purpose of increasing profits, thereby injuring the reputation of the physician and endangering the patient's chance of recovery?
8. Are non-secret preparation in imitation of well-known domestic medicines a legitimate product and is it honest for a dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such preparation?
9. Does not the pharmacist jeopardize his reputation and standing by dealing in non-secrets, when he possesses the knowledge of compounding as good or better formulæ?
10. Does it pay pharmacists to substitute?
11. Is the claim true, that physicians dispense their own medicines on the ground that pharmacists use inferior materials in their prescriptions?
12. Where reputable pharmacists discover goods falsely labeled, and below pharmacopœial standards, is it not their duty to expose such dishonesty.
13. Has excessive competition introduced a "cheap era" into the drug trade?
14. Why are physicians' supply establishments making inroads on the business of the pharmacists?
15. What are the chief arguments employed to induce physicians to supply ready-made medicines to their patients?
16. Where is the practice of medicine drifting?
17. If the future facilitates the art of dispensing by physicians, what is our remedy?
18. Is it not our duty to demand protection from the physician, and make an effort to fuse our natural relationship by a just compromise?
19. What argument have we against those who advocate that the day has arrived when any person, with open store for the sale of merchandise, will have the right to sell his goods to any other person who comes with money in hand and demands same, irrespective of his calling or profession.

There is no hypothetical sensationalism in my queries, and I might add a few more sure to present themselves in the future, but we will await developments. There are questions that confront us daily. A revolution in our ranks is imminent. What shall we do about it? Shall we submit to the situation like slaves? Never! Let us get together at Denver, and act, not like flustered and unsympathetic brethern, but like men willing to battle for justice and our rights. It is high time to cry halt!

Address all papers and communications to

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THE WORD OF COMMAND.

When Napoleon was massing the war-ships of France at Boulogne, with the intention of making a descent on the English coast, the military and patriotic ardor of the Islanders was greatly roused. Volunteer militia corps were organized at all the centres of population. The lawyers of Temple Bar, London, caught the enthusiam of the hour and organized a Company. The Master in Chancery was made Captain. At the first drill there was a fine muster of lawyers, who fell into line somewhat irregularly and were put through the elementary stages of drill by the master in Chancery coached by a Sergeant. It is related as a curious instance of the force of habit that when the Captain gave the word of command, "Charge!" Every man instantly took out his note-book and marked down £2 4. 6d.

ENGLISH PHARMACEUTICAL NOTES

(By our London Correspondent.)

Spirit Duty.--The pleasant feature of the Budget this year is a substantial surplus of some 2½ millions sterling. A considerable part of this is required for extra expenditure on the Navy; but the interest to pharmacists centres on the fact that as the balance is on the right side a reduction in the spirit duty may take place. When the additional 12 cents per proof gallon was imposed last year it was on the distinct understanding that it should be enforced for one year only. Indeed special re-enactment would be necessary if the Chancellor of the Exchequer desired to continue it., as the Treasury Bill was only for a year. Under the present political exigences it is highly improbable that it will be renewed. An unpleasant feature of the increased duty last year was the absolute impotence of pharmacists to impress the Treasury with the unfair incidence of such an increase on pharmacy. The indifferentism displayed on the subject by the Pharmaceutical Society at that time, when energetic representations by a united trade would have probably been effective, will long be remembered against it. These frequent alterations in the cost of one of the principal articles in general use in pharmacy are very detrimental to the interests of the trade.

Cinnamon as a Panacea —Some short time ago a medical man suggested that cinnanmon was a powerful remedy, if not a specific cure for cancer· His method of exhibiting the drug was certainly not elegant, as he administered it in the form of infusion and compelled the patients to swallow both the liquid and solid portion. During the recent influenza recrudesence there have been frequent complimentary references to the value of Cinnamon, as a remedy for this complaint. In these instances the tincture has been found equally efficacious, whilst one medical man has spoken highly of the oil administered in the form of pills. It would be interesting to learn if the oil from the leaves is as good as the much more expensive oil from the bark. Probably, in any case, the value of cinnamon depends to a great extent upon its well-know stomachic and stimulating properties and the rediscovery of these properties hardly deserves the prominence that has been given to it.

Syrup of the Glycerino-Phosphates.—The importance of the salts of glycerino-phosphoric acid is daily being recognised by our leading specialists for the treatment of those ill-defined nervous affections, which are classed under neurasthenia. Sufficient evidence has been produced that these salts have distinct tonic action upon the nerves, whether given by the mouth or by subcutaneous injection. As objections to the latter method are frequently raised, pharmacists should be prepared to advise a pleasant form of administration, such as a syrup or elixir. It is highly probable that a compound syrup, containing the glycerino-phosphates of iron, lime and soda with some flavoring agent would form a palatable and popular preparation. The keeping properties of solutions of glycerino-phosphates will possibly cause some trouble, as they seem specially prone to fungoid growth. When prepared for subcutaneous injection, the solutions should always be sterilised by boiling, which does not decompose the salts.

The Aconite Research Squabble.—Prof. Dunstan has emerged from the investigation conducted by the Research Laboratory committee with a verdict in his favor on all counts. Not satisfied with asserting the Professor's innocence of anything so wicked as priority prigging, the committee go on to state that his researches have been conducted in a thoroughly efficient and satisfactory manner. Is not this going a little too far as the principal results obtained in the researches under investigation conclusively proved that former results were incorrect? Unkind critics might suggest that this carried, therefore, a retrospective aspect and plainly intimated that previous researches were *not* conducted in an efficient or satisfactory manner.

Stores' Dispensing.—It has been rather fashonable of recent years in certain quarters to cast aspersions upon the cheap dispensing and low-priced drugs of the stores. By 'stores" in England I mean the huge co-operative affairs that sell nearly everything and which have only added a drug department, just as they would add a frozen meat department—if it paid. Although it may be true in some instances that inferior drugs are used, that is certainly not the case in all. It does no necessitate an inferior article to sell epsom salts at 3 cents per pound. There is no doubt that managers of the drug departments in these institutions are keen buyers, but they are also responsible for the quality of what they buy to the directors and must give satisfaction to their customers. At one or two establiishments all the dispensing of prescriptions is done in a separate room, away from the drug counter, and from which customers are precluded. This is a distinct advantage in allowing the dispensers to work without interference and distraction. The public do not always appreciate this sort of retirement, however, an instance of which occurs to me. A young doctor had just purchased a practice in the country, rendered vacant by the death of an old-fashioned practitioner who had been in the habit of dispensing in full view of his

patients. When the new doctor appeared he immediately arranged a curtain right across the dispensary so that he might not be overlooked. The club patients did no hesitate to express their disapproval and plainly intimated their distrust of such proceedings. In the end he had to give way to their demands for the old order of things in order to pacify them. The only system open to condemnation at nearly all the stores is one that applies especially to large establishments and which is stated to frequently occur, viz., the bribery of assistants and others to push the goods of certain manufacturers instead of recognized brands. This is, of course carried on *sub rosâ* and would probably insure the instant dismissal of an assistant if discovered. But I am informed that it takes place to a very large extent, almost under the nose of the managers. Of course, it is only another phase of the "substitution fiend. The tariff for dispensing is certainly low and yet not remarkably ruinous. An ordinary 8 oz. mixture for which a chemist would charge 30 to 36 cents, is charged about 24 cents. Pills are charged at about 16 cents per dozen instead of 24 cents. It is also a mistake to suppose that unqualified dispensers are employed. As the stores offer shorter hours, Saturday half holiday and no Sunday duty they are able to get qualified assistants without difficulty at salaries that vary from $10 to $12 per week. It is a curious fact, which I have myself verified, that the ranks of assistants at the stores are very largely recruited from those who have failed, when in business for themselves. The introduction of a parcels post and other means of forwarding articles quickly have done much to extend the stores dispensing, but it is satisfactory to record that the trade of the drug departments generally does not indicate any alarming increase. But this gradual extension of company pharmacy is sufficiently serious to demand the careful examination of all who have the true interests of their calling at heart.

The Drug Market—The movements in the drug market have been for the most part unimportant, the intervention of Easter having reduced the auctions and interfered somewhat with business. Home trade is reported generally quiet; export fairly busy. Quicksilver has advanced, but mercurials are unchanged. Lithium is again dearer, and scarcity of caffeine has occasioned an advance. Opium is down and has the appearance of a still further reduction.

TRADE MARKS RELATING TO THE DRUG TRADE.

The following synopsis of Trade-marks relating to the Drug trade recently registered in the United States Patent Office is compiled for this journal by James Sangster, Patent Attorney, Buffalo, N.Y.:—

Granted March 5th, 1895.

25, 152. Liquid Medicinal Remedy for Erysipelas and Eczema.—"Nyassen."

26, 153. Hair Restoratives.— "Crystal Discovery."

26, 188. Cologne-Waters —"Farina's"

Granted March 12th, 1895.

26, 198. Diphtheritic Solvent.— "Trypsalin."

26, 199. Cough Remedy.—"Anti-Hack"

26, 000. Remedies for certain named diseases —"Anti-Hack."

26, 201. Medicine to render the use of Tobacco Innocuous.—"Corrocco."

26, 202. Hair Dye.—"American Hair Coloring."

26, 203. Healing Salves.— Essential feature, the representation of a sign-board standing in the midst of a landscape, with the figures of three sheep or lambs in the foreground.

26, 204. Insect Destroyers.—"Anti-Skeet."

26, 206. Soap Powder.—Essential feature, A pictorial representation of the god Neptune.

26, 207 Perfumery.—"Brownie."

26, 208. Perfumes. "Brownie."

26, 223. Food and Medicine for Poultry.—Essential feature, the representation of two hens sitting on nests in a crate or box, with eggs protruding, another hen standing near, and a brood of small chickens in the foreground.

26, 224. Preparation to be used as food or medicine for Live Stock.—Essential feature, the representation of a platform scale, having a broken balance beam, a group of live stock on the platform of the scale, a number of weights on one end of the beam, and a fowl perched on the top of the scale looking down at the beam.

26, 225. Cramp and Diarrhœa Compound. —"Before using" and "After using."

Granted March 19th, 1895.

26, 238. Medical Preparations in the form of liquids Pills, Powders or Tablets.—"Phenatrocacti."

26, 239. Sarsaparilla Compound in Dry Form.—"Robust"

26, 240.—Local and Aesthetic for Painless extraction of Teeth.—"Alvatunder."

26, 241. Preparation for use in Dental and Surgical Operations —"Balsamo Del Deserto."

26, 242. Hair Restorer.—"Creole."

26, 243. Liniment—"Black Hawk."

26, 244. Poisons for animals.—"Rat salts"

26, 245. Rye Whisky.—"Hanover."

26, 246. Whishy.— "Palmam Qui Meruit Ferat."

Granted March 26th, 1895.

26, 285. Toilet Soap.—"Riviera Castile."

26, 2°6. Perfumery, Toilet - waters and Sachet-Powders.—"Rob Roy."

26, 287. Pomade for the Skin —"Ristori."

26, 288. Tooth-wash. "Rosemist."

26, 289. Wash for the Mouth. — "Oral Liquid."

26, 290. Toilet Preparations of an Antiseptic and Disinfectant Nature.—"Izal."

26, 292. Liquefied Carbonic-Acid Gas.—"Diamond Brand Liquid, Gas."

26. 293. Medicinal Tablets.—Essential feature, the representation of a double-headed eagle having a scroll extending across it, and arranged between two scrolls, the lower one of which is supported upon another scroll.

26, 294. Tonic Medicinal Compound. —"Barley Elixir." and the world "Macdonald's."

26, 295, Cough Drops and other Remedies for Coughs, Colds and Sore throats.—"Uncle Sam."

26, 296. Pills.— "Eagle's Little Giant."

Granted April 2nd, 1895.

26, 230. Whisky.— Essential feature, the representation of an escutcheon bearing an oblong panel at the center and surmounted by an imperial crown, and having below a shield bearing a monogram, the whole surrounded by a foliated border of roses, shamrocks and thistles.

26, 330. Perfumery and Perfumed Soap.—Essentiyl feature, a device of a butterfly with outstretched wings.

26, 329. Perfumery and Perfumed Soap.—"The Bethrothal."

26, 331. Soap.—"Arrowene."

26, 332. Anti-pyretics.—"Apolysin."

26, 333. Pharmaceutical Products for the treatment of Cholera, Diarrhœa, and other diseases of the Intestines —"Xeroform."

26, 333. Herb Medicine.— Esssential feature, the representation of an outstretched human arm the hand of which holds a bunch of herbs.

26, 335. Pills.—"Oxien."

26, 336. Pills.—Essential feature, a symbolical figure representing a giant having the head of an ox and wielding a club.

26, 337 Creosote Capsules —Essential feature, fac similes of the signatures of Prof. Dr. Sommerbrodt and Dr. I Lewinsohn.

26, 338. Liniment.—"Rainbow."

26, 339. Hair Dye.—"Dyeine."

26, 340. Germicide Disiufectants.—"Amylkijo"

Granted April 9th, 1895.

26, 347. Rye Whisky. "Tom Kelley Rye Whisky."

26, 348. Remedy for Throat and Lung Affections. "Tonsiline."

26, 349. Headache Powders.— "Dr. Porzer's Kephaldora."

26, 350. Pills.—"Dr. Hooper's Green Seal."

26, 369. Toilet and shaving Soaps.— "C. M. Williams."

26, 286. Whisky and Wine.—Essential feature, a representation of a sheaf of grain surmounted by a spread eagle and supported by the figure of a womas on either side and partially inclosed by two crossed stalks of wheat.

26, 387. Remedy for Consumption.—"S" and "I."

26, 388. Certain named Remedy.—"Antiphlogistine."

26, 403. Soap.—Essential feature, the representation of a hat having an accentuated crown.

26, 405. Powder for use in Healing and Curing wounds,—"Arioi."

26, 406. Cough drops.—"La Grippe."

29, 407. Catarrh Cure.—Essential feature, a picture of a man's head and shoulders with handkerchief held before the nose from which discharge is flying, the head thrown backward mouth open, and the face distorted with pain.

26, 408. Remedy for excessive perspiration. —"Anti-Fut-Swet."

26, 409. Specific for Seasickness.— "Yanatas."

26, 410. Whisky and Wine.— "Pennsylvania Club."

26, 420. Veterinary Remedy.—"Anti-Abor Sio."

26, 421. Whisky—"Ashmont."

26, 422. Semi-Liquid Preparation for a bath Tonic.—"Pompeian."

26, 423. Regenerative Tonic and Digestive Preparation.—"Dr. Chavard's Tonic."

Granted April 3rd, 1895.

26, 445. Remedy for Cholera in Chickens, Hogs and other animals.—"Great Western."

26, 446 Liquid for the cure of Rheumatism, Gout and Analogous Diseases.—"Hygeia" and "Omnis Orbis."

26, 447. Remedy for Catarrh.—"Dr. J. L. Free."

26, 448. Tonics, Pills, Powders, Plasters and Tablets.—"Hockamock Reef or the Indian Watch ground."

26, 449. Medicinal Tablets.—"Ideal."

26, 450. Corn Cure.—"Relief."

26, 451. Hair Tonic.—"T T B B H H."

26, 452. Cosmetics, Lotions, Pefumery, Cream and Soap.—"Nirvana."

26, 453. Perfumery, Toilet Waters, and Hair Washes or Dressings.—"Ambroline."

26, 454. Toilet and Laundry Soap.—"Aunt Mary's."

26, 455. Melted Dry Food Extracts. "Milkine."

26, 464. Natural Mineral Water.—"Loser Janos."

Granted April 30th, 1895.

26, 493. Whisky.—"Coon Hollow."
26, 506. Ointments.—"Byrolin."
26, 500. Toilet Soap, Perfumery, and other Toilet preparations.—"Hispania."
Buffalo, N. Y. May 3rd, 1895.

The Commercial Synthesis of Illuminating Hydrocarbons.

Cantor Lecture delivered Jan. 16th, reprinted from the *Journal of the Society of Arts.*

By Professor Vivian B. Lewes, Royal Naval College, Greenwich.

The two methods most used in chemical science for tracing the changes taking place in matter, and determining the composition of bodies, are firstly, breaking up compounds into their ultimate constituents, a process which is called "analysis;" and secondly by building up the compound from the elementary matter which forms it, a proeess to which the name of "synthesis" has been given.

If we take chalk and heat it in the limekiln, or in the chemist's crucible, a heavy colourless gas, called carbon dioxide, escapes from it and leaves behind a substance which we know as quicklime. If, now, this quicklime be further acted upon by chemical methods, the metal calcium and the elementary gas oxygen can be obtained from it,whilst the carbon dioxide, when collected,can be decomposed into the elements carbon and oxygen, and by such a series of operations as this we might perform the analysis of chalk.

If now we start with the metal calcium, with carbon, and with oxygen, it is perfectly simple to reverse the operation, and rebuild the chalk molecules from these elementary forms of matter; by burning the carbon and calcium respectively in oxygen, we obtain the quicklime and the carbon dioxide, and by bringing these substances together in the presence of moisture, chalk or calcic carbonate is once more formed, and we have synthetically built up the chalk from its constituents.

By such simple methods as these most inorganic compounds can be synthetically produced from elementary matter, but in the so-called organic chemistry it is not so easy to employ such constructive methods for the formation of compounds, and up to the end of the first quarter of this century it was supposed that organic bodies were only produced as the result of animal and vegetable life, and that their formation was due to the so-called "vital force," which was credited with governing all changes taking place in living organisms.

In 1828, Wohler showed that urea could be formed from cyanate of ammonium, whilst, later on, Fownes made cyanogen by the direct combination of carbon and nitrogen, these two discoveries taken together proving the possibility of forming an organic product from inorganic materials, and after this point had been reached, and the possibility of applying synthetic methods to the production of organic bodies had been demonstrated,compound after compound was built up without the aid of either vegetable or animal life, and the barrier between inorganic and organic chemistry finally broken down. Cases, however, in which such methods could he commercially successful were few and far between, as in most cases the processes which had to be adopted were costly and laborious.

In all the phenomena of ordinary combustion which we employ to provide us with heat and light, there are no compounds of greater interest than the class of organic bodies which, being formed of carbon and hydrogen in various proportions, have been termed hydrocarbons, and it is to this class of bodies that all the gases which can be used as ordinary illuminants owe their luminousity. Amongst the hydrocarbons, the simplest compound is acetylene, in which two atoms of carbon are united with two atoms of hydrogen; and it has long been known that if a stream of hydrogen is passed through a globe in which the voltaic arc is produced between carbon points from a sufficiently powerful current this gas is produced in minute quantities. It can also he formed in small quantities by the decomposition of carbon tetrachloride in the presence of hydrogen by the induction spark, whilst it is produced during processes of checked combustion in hydrocarbon flames.

The direct combination of carbon and hydrogen in the electric arc is a true case of synthesis, and if we could form acetylene in this way in sufficiently large quantities,it would be perfectly easy to build up from the acetylene the whole of the other hydrocarbons which can be used for illuminating purposes. For instance, if acetylene be passed through a tube heated to just visible redness, it is rapidly and readily converted into benzol; at a higher temperature naphthalene is produced,whilst by the action of nascent hydrogen on acetylene, ethylene and ethane can be built up. From the benzol we readily derive aniline, and the whole of that magnificent series of colouring matters which have gladdened the heart of the fair portion of the community during the past five-and-twenty years, whilst the ethylene produced from acetylene can be readily converted into ethyl alcohol by consecutively treating it with sulphuric acid and water; and from the alcohol, again, an enormous number of other organic substances can l.e produced, so that acetylene can, without exaggeration, be looked upon as one of the great keystones of the organic edifice, and, given a cheap and easy method of preparing it, it is hardly possible to foresee the results which will be ultimately produced.

From acetylene we can produce all those bodies which we are accustomed to look upon as the most important ones in our coal gas, and which, up to the present time, have never been produced from anything but coal, hydrocarbon oils, or other organic matter undergoing destructive distillation; but it has often occurred to those of us who are interested in the manufacture of illuminating gas, that as the supply of coal gets smaller, and as oil in time begins to share the same fate, from what sources are our illuminants and our fuels to be obtained? and in my mind, and at any rate, the synthetic production of hydrocarbons has long been a day dream, which I, however, never expected to see possible on a commercial scale.

Not only was the synthetic production of acetylene in the electric arc well known, but ever since water gas has been introduced, small traces of acetylene and methane have been found in it under conditions which render it impossible that they should have been produced from any compound present in the incandescent fuel, and which must have been due to the direct combination of carbon and hydrogen, but these traces only occurred in quantities so small as rarely to amount to 1 per cent, and it was manifest that the production of the compounds could not take place in large quantities under influence which would immediately tend to decompose them.

In 1836 it was found that when making potassium by distillation from potassium carbonate and carbon, small quantities of a by-product, consisting of a compound of potassium and carbon, was produced, and that this was decomposed by water with liberation of acetylene; whilst Wohler, by fusing an alloy of zinc and calcium with carbon, made caleic carbide, and used it as a source from which to obtain acetylene by the action of water.

Nothing more was done until 1892, when Maquenne prepared barium carbide by heating at a high temperature a mixture of barium carbonate, powdered magnesium, and charcoal, the resulting mass evolving acetylene when treated with water; whilst, still later, Travers made calcic carbide by heating together calcic chloride, carbon, and sodium. None of these processes, however, gave any commercial promise, as the costly nature of the potassium, sodium, or magnesium which had to be used made the acetylene produced from the carbide too expensive.

It is now some twenty-five years ago since I listened to one of the Friday evening lectures at the London Institution, given by Mr. Greville Williams, and in the same way that the thread of some melody lingers in one's mind, so has the concluding sentence of that lecture constantly recurred with ever-increasing force—"The impossible is a horizon which recedes as we advance; and the *terra incognita* of to-day will to-morrow be boldly mapped upon every schoolboy's chart;" and the haunting dream of the possibility of synthesising hydrocarbons commercially has, with the onward march of science, to day become an accomplished fact.

As is so usual in the history of discovery, the factor which has endowed us with the power of doing this was not the outcome of an elaborate research, having this discovery for its ultimate goal, but was found by chance during the search for another object.

Whilst working with an electric furnace, and endeavouring by its aid to form an alloy of calcium from some of its compounds, Mr. T. L. Wilson noticed that a mixture containing lime and powdered anthracite, under the influence of the temperature of the arc, fused down to a heavy semi-metallic mass, which having been examined and found not to be the substance sought, was thrown into a bucket containing water, with the result that violent effervescence of the water marked the rapid evolution of a gas, the overwhelming odour of which enforced attention to its presence, and which, on the application of a light, burnt with a smoky but luminous flame.

Investigation into the cause of this phenomenon soon showed that in a properly constructed electric furnace, finely ground up chalk or lime, mixed with powdered carbon in any form, whether it were charcoal, anthracite, coke, coal, or graphite, can be fused with the formation of a compound known as calcic carbide, containing forty parts by weight of the element calcium, the basis of lime, and twenty-four parts by weight of carbon, and that, on the addition to this of water, a double decomposition takes place, the oxygen of the water combining with the calcium, of the calcic carbide to form calcic oxide or lime, whilst the hydrogen unites with the carbon of the calcic carbide to form acetylene, the cost of the gas so produced bringing it not only within the range of commercial possibilities for use *per se*, but also the building up from it of a host of other compounds, whilst the production of the calcic carbide from chalk and from any form of carbon renders us practically independent of coal and oil, and places in our hands the prime factor by which Nature in all probability produces those great underground store-houses of liquid fuel upon which the world is so largely drawing to-day.

Wonderfully and intensely interesting as is the train of thought opened up by the discovery of this substance and its commercial production, the object I have in view this evening is not to discuss theoretic possibilities, but to show you the important effect which it will have in the direction of our great gas industry, and the phase of this which I wish to deal with specially is the value of acetylene, either for producing *per se* an enormously high illuminating effect, or for the enrichment of low grade coal gas.

When the calcic carbide is placed in a glass flask, and water allowed to slowly drip upon it from a dropping tube, the decomposition at once com-

mences with considerable rapidity, and the acetylene pours off in a continuous stream. As the decomposition continues, the solid mass in the flask swells up, and is eventually converted in a mass of slaked lime.

Calcic carbide is a dark grey substance, having a specific gravity of 2 262, and, when pure, a pound of it will yield on decomposition 5-3 cubic feet of acetylene. Unless, however, it is quite fresh, or means have been taken to carefully protect it from air, the outer surface gets slightly acted upon by atmospheric moisture, so that in practice the yield would not exceed five cubic feet. The density and hardness of the mass, however, protects it to a great extent from atmospheric action, so that in lumps it does not deteriorate as fast as would be expected,but in the powdered condition it is rapidly acted upon.

For commercial purposes the carbide will be cast direct from the electric furnace into rods or cylindrical cartridges, which, when 12 inches long and 1½ inches in diameter, will weigh one pound and will give five cubic feet of gas.

The acetylene so made, when analysed by absorption with bromine, the analysis being also checked by determining the amount present by precipitation of silver acetylide, gives 98 per cent. of acetyline and two per cent. of air and traces of sulphuretted hydrogen, the presence of this impurity being due to traces of sulphate of lime—gypsum—in the chalk used for making it, and to pyrites in the coal employed.

Acetylene is a clear colourless gas with an intensely penetrating odour which somewhat resembles garlic, its strong smell being a very great safeguard in its use, as the smallest leakage would be at once detected; indeed, so pungent in this odour that it would be practically impossible to go into a room which contained any dangerous quantity of the gas.

This is an important point to remember, as the researches of Bistrow and Liebreich show that the gas is poisonous, combining with the hæmoglobin of the blood to form a compouud similar to that produced by carbon monoxide, whilst the great danger of the latter gas is that having no smell its presence is not detected until symptoms of poisoning begin to show themselves, so that no fear need be apprehended of danger from this source with acetylene.

Acetylene is soluble in water and most other liquids, and at ordinary temperature and pressure —60° F. and 30 inches of mercury—ten volumes of water will absorb eleven volumes of the gas, but as soon as the gas is dissolved. the water being saturated takes up no more. Water already saturated with coal gas does not take up acetylene quite so readily, whilst the gas is practically insoluble in saturated brine—100 volumes of a saturated salt solution only dissolving five volumes of the gas. The gas is far more soluble in alcohol, which at normal temperature and pressure takes up six times its own volume of the acetylene, whilst 10 vloumes of paraffin under the same conditions will absorb 26 volumes of the gas. It is a heavy gas, having a specific gravity of 0-91.

When a light is applied to acetylene it burns with a luminous and intensely smoky flame, and when a mixture of 1 volume of acetylene with 1 volume of air is ignited in a cylinder a dull red flame runs down the cylinder, leaving behind a mass of soot, and throwing out a dense black smoke. When acetylene is mixed wish 1-25 times its own volume of air, the mixture begins to be slightly explosive, the explosive violence increasing until it reaches a maximum with about twelve times its volume of air, and gradually decreases in volume until, with a mixture of 1 volume of acetylene to 20 of air, it ceases to be explosive.

The gas can be condensed to a liquid by pressure, Ansell finding that it liquefied at a pressure of 21·5 atmospheres, at a temperature of 0° C., whilst Cailletet found that at 1° C., it required a pressure of 48 atmospheres, the first-named pressure being probably the correct one. The liquid so produced is mobile and highly refractive, and when sprayed into air, the conversion of the liquid into the gaseous condition, absorbs so much heat that some of the escaping liquid is converted into a snowlike solid, which catches fire on applying a light to it, and burns until the solid is all canverted into gas and is consumed.

In my researches upon the luminosity of flame, I have shown that all the hydrocarbons present in coal-gas and other luminous flames are converted by the baking action taking place in the inner non-luminous zone of the flame into acetylene before any luminosity is produced, and that it is the acetylene which by its rapid decomposition at 1,-200° C. provides the luminous flame with those carbon particles, which, being heated to incandescence by various causes, endow the flame with the power of emitting light. The acetylene, being in this way proved to be the cause of luminosity, one would expect that in this gas we have the most powerful of the gaseous hydrocarbon illuminants; and experiment at once shows that this is the case.

Owing to its intense richness, it can only be consumed in small flat-flame burners, but under these conditions emits a light greater than that given by any other known gas, its illuminating value calculated to a consumption ef 5 cubic feet an hour being no less than 240 candles.

Illuminating Power of Hydrocarbons for a Consumption of 5 cubic feet of Gas.

	Candles.
Methane	5·2
Ethane	35·7
Propane	56·7
Eythelene	70·0
Butylene	123·0
Acetylene	240·0

Having arrived at this startling result, it will be as well to at once turn to the commercial aspect of the problem, as it is upon this that the utilisation of this magnificent illuminant is entirely dependent. At the present time, private information from America shows that calcic carbide can be produced at a little under £4 a ton, and the beautifully pure lime obtained by the decomposition would be worth to the gas manager at least 1 os. a ton; and as a ton of the carbide will give rather more than 1¼ tons of slaked lime, £3 10s. may be taken as the cost of the acetylene produced from a ton of the material, and will leave a margin for handling. A ton of the carbide will yield in practical working 11,000 cubic feet of acetylene, which will bring the cost of the gas out at 6s. 4½d. per 1,000.

The cheapest and best enrichment process known at the present time is that introduced by Mr. Young, and which has been adopted at a number of gas works in Scotland and the north of England. In this process, by special methons of retorting, oils, are decomposed to yield a rich gas, which, in the photometer, and burnt in suitable burners *per se*, gives an illuminating value of about 60 candles, but for which an enrichment value of 96 candles is claimed.

I am desirous of understating rather than overstating the powers of the acetylene, so that, instead of taking enrichment values for it which might be questioned, I perfer to simply take the illuminating power of the gas when burnt, *per se*, and the light measured in the photometer, which, as before stated, is 240 candles, whilst, for the same reason, we will take the claimed enrichment value of the Young gas, instead of its photometric value.

An extended expericnce, gained with the Young process, as used at St. Helen's for the enrichment of coal-gas, shows that the cost may be taken at 3s. 4d. per 1,000 cubic feet, If now we compare this with the acetylene at 6s. 4½d. per 1,000, we find that the 240-candle gas at this price would be equal to Young gas at 2s. 6½d. Moreover, the Young plant, to work a ton of oil per diem, costs—according to the experience at Peebles—£1,500, and generates 22,000 cubic feet a day, the retorts for this purpose occupying a very considerable space; whilst, to make the same volume of acetylene, two tons of material would have to be handled, and the whole operation could easily be carried out in one small eggended boiler, fitted with an automatic water feed, and automatic gas delivery valve to outlet of the main of the holder, so that the enriching gas could be added *pro rata* to the gas as it left the works in order to bring it up to any required strength, in the same way as is done with the Maxim-Clarke enrichment, and all the troubles of stratification in the holder would be done away with. For the first few hours, the water in the consumers' meters would absorb small quantites of the acetylene, but quickly becoming saturated, no further absorption would take place.

It is well known that acetylene forms two compounds with ammoniacal solutions of the metals silver and copper, and both of these compounds, when dry, can be readily exploded by percussion, friction, or heat. In the early days of gas supply, copper pipes were used in New York, and Torrey, in 1839, found in them a brown scaly deposit, which exploded when struck or heated to 200° C., and which was, in all probability, acetylide of copper.

An extended series of experiments on this point show that when metals are kept in the gas, even if moisture be present, no action takes place unless water condenses on the metal, when tarnishing with silver and copper, and to a less degree with brass, commences, and under these conditions, as acetylide of mercury can also be formed, but the other metals remain unacted upon. If, therefore, iron, tin, lead, or compo pipes be used for the gas supply, no precautions are necessary. Copper and brass tubes must either be coated inside with some varnish not acted upon by the acetylene of tin lined.

In America, which was the birthplace of this method of making calcic carbide, the acetylene is mixed with an equal volume of air, and the mixture burnt at small slit burners; but I confess to a grave mistrust of this method of using the gas, as the margin of safety in the amount of air required to convert the mixture into an explosive is so small that the danger of exceeding it on any large scale must be very great, as any mistake or alteration in the mixing apparatus used for this purpose might easily bring the per-centage of air up to the explosive limit, whilst the diluting action of the nitrogen of the air reduces the illuminating value of the acetylene present from 240 candles to 130.

The possibility of liquefying acetylene by pressures about those at which liquid carbon dioxide is produced so largely, enables enormous volumes of this gas to be compressed into the liquid state in small wrought iron or steel cylinders, and in this condition, by means of suitable reducing valves and burners of the right construction, it may be stored and burnt. Used in this way, it will be of the greatest possible value for floating buoys, and the small cylinders can also be arranged in the form of portable lamps, whilst for use in the country where no gas is available a large cylinder of the liquid gas placed in an outhouse would supply a country house with light for a very long period; and there is no doubt that there is a very great field for it in this direction, as by utilising suitable burners a consumption of half a cubic foot an hour will give a light equal to from 20 to 25 candles.

Perhaps the most valuable suggestion which has been made with regard to the utilisation of this remarkable method of making acetylene is that advantage should be taken of the method of

preparation to utilise the body for making portable lamps for dining and drawing-rooms in places where no gas supply exists. To do this a strong steel cylinder, 4 inches in diameter and 16 inches in length, is fitted with an opening in the top of such size that a pound cartridge, or stick of the calcic carbide, can be passed through it. The cylinder has a second opening at the bottom, closed by a screw, for cleaning out the lime left by the decomposition. The right proportion of water is put into the cylinder, and the stick of carbide, coated with a slowly soluble glaze is inserted, and the head of the lamp screwed on. This head contains a double reducing pressure valve, which brings down the pressure existing in the cylinder, to that necessary for the proper consumption of the gas, it also being fitted with a valve. As the glaze dissolves from the surface of the stick of carbide, acetylene is generated, and the five cubic feet are compressed by their own pressure, the cylinder being stood in a vessel of cold water whilst the gas is generating, and the gas can then be burned from a suitable jet at the rate of half a cubic foot per hour, which will give a light of over 20 candles for something like ten hours. When the gas is all burnt out from the cylinder, the top of the lamp is screwed off, and the bottom plug also removed, and the lime washed out from the interior of the cylinder by a rapid stream of water, and re-charged as before. Used in this way also, this gas would rapidly replace oil gas for railway lighting, as the fittings at present in use for the Pope and Pintsch systems would answer perfectly well for the purpose of using acetylene, the only difference being that the cylinder placed below the carriage, which, under the present conditions, is filled with compressed oil gas, would be utilised, not only as a storing, but as a generating vessel for the acetylene, the highly expensive oil gas manufacturing and pumping plant being done away with, and a magnificent illumination ensured in the carriage.

Of late years an idea has been slowly permeating the minds of some gas managers in this country that it might be well to adopt a dual gas supply, one for fuel purposes, which would consist of a poor coal gas of about twelve candles, whilst the gas for illuminating purposes would be of about 29 candles; and in one town at least it has been proposed, and, I believe, carried out, that a supply of poor quality coal gas should be sent out during the day, when the maximum consumption is for heating purposes, and a richer gas at night for illuminating purposes, utilising the same mains for both. Although this is possible in a small town where the area to be supplied is not large, it would be impossible in a big town where many miles of huge mains have to be travelled before certain districts are reached, and the cost of a double set of mains would render a dual supply an impossibility.

The use of acetylene would render it possible for the gas company to send out a 12-candle gas for heating purposes, both by night and day, whilst a small enrichment cylinder might be attached to the gas outlet pipes from the consumer's meter, and which would be made to automatically enrich the gas supply to his house, so that by setting a valve he could have any quality he might desire.

The economic value of an illuminant such as acetylene, becomes apparent when we compare the cost of the gas for equal illumination with the light obtained from other illuminants. The London gas has an illuminating power of 16 candles, whilst the acetylene has an illuminating value of 240 candles, and this, at 6s. 9½d. per 1,000, would in light giving value, be equivalent to London coal gas at less than 6d. per 1,000.

In order to obtain a given illumination, moreover, the volume of gas to be consumed is excessively small, as compared with any other illuminating gas, and the products of combustion are reduced to an excessively low limit. One hundred cubic feet of London coal gas will yield 50 cubic feet of carbon dioxide and 140 cubic feet of water vapour as the products of its complete combustion, whilst 100 cubic feet of acetylene would yield 200 feet of carbon dioxide and 100 feet of water vapour. The acetylene, however, in its combustion gives a light of 240 candles, as against 16 yielded by the coal gas; and for equal illumination, therefore, the amount of carbon dioxide and water vapour produced is enormously smaller.

The following table contrasts the products of combustion, evolved from London coal gas when consumed in various forms of burners, and giving an illumination of 48 candles, which may be presumed to be the amount of light required in a fair sized London dining-room, and contrasted with this is the amount of the products of combustion, which acetylene would evolve in giving the same amount of light; whilst to make the meaning clearer, I have added the number of adults who would exhale the same amount of carbon dioxide in the same time.

Burner.	Gas consumed.	Carbon dioxide produced.	Adults.
Flat flame, No. 6....	19.2	10.1	16.8
Flat flame, No. 5....	22.9	12.1	20.1
Flat flame, No. 4....	25.3	13.4	22.3
London Argand.....	15.0	7 9	13.1
Acetylene.....	1.0	2.0	3.6

If we obtained the same amount of light from paraffin lamps the carbon dioxide evolved would be equivalent to 62.5 adults; whilst as far as carbon dioxide goes, you might as well invite 32.7 more guests to dinner as use 48 sperm candles to supply the needed illumination.

The flame of acetylene, in spite of its high illuminating value, is a distinctly cool flame, and in experiments which I have made by means of the Le Chatelier thermo-couple, the highest temperature in any part of the flame is a trace under 1000°

C., whilst with coal gas burning in the same way in a flat flame burner, the temperature rises as high as 1360° C., whilst if the heating effect of the flames be contrasted for equal illumination, it will be seen that the acetylene flame has so small a heating effect, considering its area, that it would not be much greater than the ordinary electric incandescent lamp.

The intensity of the light will make small acetylene lamps of enormous value for lantern projection, for railway signals, and, coming down to smaller things, bicycle lamps; whilst I should imagine the ease of production specially adapts it for such purposes as lighthouse illumination.

The scope and possibilities of such a discovery as that which I have brought before you this evening cannot be realised until many factors, at present unknown, are thoroughly worked out, and you must remember also that the time at my disposal has only enabled me to bring before you to-night some factors connected with the light-giving value of this hydrocarbon, and that, as a stepping-stone to the synthesis of other bodies, its value will be incalculable; and one cannot help feeling that, as science grows, and as our grasp and comprehension of the marvellous processes by which Nature builds up her matter become more and more extended, synthesis may have even greater conquests to make than the mere building up on a commercial scale of an illuminating hydrocarbon.

We are beginning to realise more and more fully the marvellous way in which Nature keeps matter in circulation, the way in which animal and vegetable structures are built up from the simplest and most plentiful substances, and the way in which, when the structure is done with, those processes of slow combustion which we call decay again convert the waste bodies into carbon dioxide and water vapour, from which once more Nature reconstructs the vegetable and animal kingdom; and it may be that as our perception of the methods of that marvellous natural architecture gets clearer and keener, we may discover how, by simple synthetic processes, the carbon dioxide and water vapour, which form Nature's building material, may be synthetically utilised by us in building up, not the perfected form of man, or animal, or plant, but the building on a commercial scale of the food which is required by Nature for carrying on the functions necessary for life.

The Micro-Chemic Reactions of Urinary Sediments.

While the diagnostic significance of the staining reactions of various organic substances has received recognition in both biologic and histologic research, the application of this method of differentiation is capable of extension and elaboration. The schizomycetes, for instance, present such a close resemblance one to another, that it is often quite impossible to recognize a given variety from its morphologic appearance. Some can be discriminated by their behaviour when exposed to certain stains and decolorizing reagents, while the identity of others is only to be established by their appearance in cultures, Histologically we know that the body and the nucleus of a cell each reacts differently, to stains; as do also healthy and deceased structures. Extending the application of the principle, we find that tube-casts in the urine when stained, behave diversely in accordance with their chemic constitution, amyloid casts, for instance, assuming a mahogony tint when treated with iodine, and a deep blue when treated with gentain-voilet. An interesting contribution to the subject of the color-reactions, of urinary sediments has recently been made from the Pathologico-Chemic Institute of the Rudolph-Stiftung in Vienna by Grosz (*Internationale klinische Rundschau*, 1894, No. 41, p. 1465), who has studied the formed elements contained in the urine stained with alizarin. To a drop of urine placed on a slide he adds a drop of 1 per cent. solution of sodium alizarin sulphonate, and then covers, the examination being made after the lapse of about a minute. The sediment present is stained differently according to the reaction of its constituent elements. Thus, those of acid reaction appear yellow, those of alkaline reaction violet, and those of neutral or feebly acid reaction red. In the urine from cases of acute gonorrhea were found cylindroidal bodies of mucin, staining red, and resembling tube-casts, the likeness being increased by the presence of leucocytes and epithelial cells. Further investigation rendered it probable that these bodies (which are not visible in unstained preparations) are derived from the glandular apparatus of the urethra, and more particularly from the glands of Littre. Other long, convoluted, and hyaline cylindrical bodies, upon which are seated isolated leucocytes and epithelial cells and which appear in unstained preparations as structures of faint contour, are derived from the prostate gland, of disease of which their presence is suggestive. They were also found in the urine passed after coitus. In contradistinction to these urethral and prostatic structures, renal tube-casts stain intensly yellow. The presence of casts is also associated with the absence of a mucoid ground-substance that stains red, and accompanies the other two. In some cases of disease of the posterior portion of the urethra leucocytes stained violet were observed, but the number of cases was not sufficiently large to establish the diagnostic significance of the observation. The opinion is expressed that the reaction of the epithelial cells progresses from acid to alkaline, from the surface to the deeper layers; so that the reaction of the sediment in the urine will indicate the nature and seat of the morbid process in the genito-urinary tract.—*Med. News, Jan. 5, 1895.*

The Production and Uses of Cotton-Seed Oil.

By P. L. Simmonds, F.L.S.

I think I may claim the merit of having first suggested the production of cotton-seed oil. Forty years ago, in a course of lectures I gave before the Society of Arts and Manufactures in London, on "The Utilization of Waste Products," I mentioned, among other waste products, cotton seed, which was then an incubus cotton cultivators did not know how to get rid of.

The Council of the Society of Arts awarded me their silver medal for my valuable suggestions. and subsequently elected me a life member under one of their rules, in consideration of being eminent in the application of abstract science to the Arts, Manufactures and Commerce.

These lectures I afterwards expanded into a volume, under the title of "Waste Products and Undeveloped Substances," which went through several editions and is now out of print. I have reason to believe that the adoption of many of my suggestions has resulted in fortunes to some, and has utilized profitably much of the former waste in manufactures.

The Science and Art Department employed me to form a collection of waste products and their utilization, with a descriptive catalogue, which is now placed in the Bethnal Green Museum.

I had also to make a similar collection for the Austrian Government at the Universal Exhibition, held in Vienna in 1873.

To return to cotton-seed oil. At the time my suggestion was made of utilizing cotton seed for oil in 1855, the United States production was less than 1,250,000,000 pounds; now the production has risen to about 3,500,000,000 pounds. The first shipment of cotton-seed oil in the year ending June, 1872, was but 547,165 gallons, and few would have anticipated it would reach, in 1892, the enormous export of nearly 14,000,000 gallons, worth nearly $14,000,000. The various forms of cotton seed all yield good oils capable of being refined for dietetic use.

The oil possesses excellent lubricating qualities, and is useful for soap-making and for lamps. The quantity of oil produced, even in England, is large, the imports of cotton seed exceeding, in some years, 400,000 tons.

In the States the production of seed exceeds 3,000,000 to 4,000,000 tons, of which half is available for oil; 100 pounds of seed will yield two gallons of oil. There are four qualities of oil made. The crude oil is of a dirty yellow to reddish color; on standing it deposits a slimy sediment. The second quality has a pale orange color, and is obtained by refining the crude oil with a solution of caustic soda. The yellow oil resulting from this process is further purified by being heated and allowed to settle again, or by filtration, and is called "yellow summer oil." "Winter yellow oil" is made from the above material by chilling it until it partially crystallizes, and separating the stearin (about 25 per cent.) in presses, similar to those used for lard.

This is then treated with fuller's earth in a tank, which holds back the coloring matter, and the oil which issues from the filter press is almost white.

In 1893, there were probably 1,250,000 tons of cotton seed crushed in the United States. From this seed there were obtained 1,000,000 barrels of oil. It is estimated that 300,000 barrels were used in Chicago for making oil lard; and St. Louis, Kansas City and Omaha took 200,000 for the same purpose. About 250,000 barrels went to Holland for making margarine, and large quantities to Southern Europe for mixing with olive oil.

Cotton-seed oil appears to be useful for table purposes, and it is desirable that its use in the pure state, rather than as a mixture, should be encouraged. It ought, however, to be sold on its merits, and with the addition of some qualifying term, which will indicate its origin.

This oil has entirely replaced olive oil in America, and there is scarcely a restaurant in London or Paris in which this new "salad oil" has not taken the place of the old Lucca product. In Portugal every means are now taken to prevent the sophistication of olive oil with cotton-seed oil, or passing it off as a food oil of the same value as olive oil.

For pharmaceutical purposes cotton-seed oil cannot be regarded as a good substitute for olive oil. It saponifies with difficulty as a drying oil, and the coloration which it gives with nitric acid shows that if used for any preparation liable to oxidation it may give curious results. The density of crude cotton-seed oil is 0.920 to 0 933, and when refined 0.925 to 0.930.

To distinguish cotton-seed oil from olive oil, take pure, colorless nitric acid of the density of 1.40 and mix it with half the quantity of oil in a test tube, closed with gum. After shaking it for several seconds, allow the tube to rest in a vertical position for five or six minutes. If the oil is from olives, the liquid is at first pale or colorless, changing to an ashy gray, with a slight yellowish hue. On shaking, a coffee-color will be seen if cotton-seed oil is present. The reaction is delicate enough to detect an adulteration of 5 per cent. of cotton-seed oil.

The shipments of cotton-seed oil from the United States have progressed as follows in decennial periods:

	Gallons
1873	709 576
1883	415,611
1893	9,462,074

With the extended production of cotton in various countries—India, China, Egypt, Brazil and the United States—a great future awaits cotton-seed oil. Some idea of the magnitude of the future may be formed from the fact that British India produced in 1889 a little over 9,000,000 cwt. of cleaned cotton; that amount must have been obtained from 27,000,000 cwt. of seed. Allowing half this to be required for home consumption and seed for next crop, over 6,000,000 cwt. of seed should have been available for export, whereas the export of seed has hitherto seldom reached 37,000 cwt. This year the export of seed will be larger, as for the nine months already expired, nearly 89,000 cwt. has been shipped. The weight of seed may be estimated at three pounds for every pound of cleaned cotton.—*American Journal Pharmacy.*

BISMUTH OXYSALICYLATE.

By D. B. Dott.

This salt is usually simply described as bismuth salicylate, and there is probably no objection to the practice, as the normal salt (if it exists) is immediately decomposed by water into the basic salt and free acid, so that there is little likelihood of it obtaining a place in medicine. The formula of the basic salt is $BiC_7H_5O_3(OH)_2$ or $BiO{\cdot}C_7H_5O_3 H_2O$. This salicylate has within recent years come considerably into demand for the treatment of gastric catarrh and some intestinal disorders. Like most of the basic salts of bismuth, it is not perfectly white, but possesses a perceptibly grayish hue. It should yield mere traces to ether. This is a most important test.

I have examined a sample commended on account of its whiteness, which gave 47.23 per cent. to ether. Such a salt is irritating and objectionable. When dissolved in two or three parts of boiling hydrochloric acid it should yield plenty of crystals on cooling. On complete ignition there should remain 61.31 per cent. of oxide or very near it. If any of the oxide becomes reduced to metal by the ignition, it must of course be oxidized by nitric acid or otherwise. The salt must be free from chloride and nitrate, which it is very liable to contain when prepared by the method of double decomposition usually recommended. I have tried the most approved processes of this kind, but with quite unsatisfactory results. Addition of glycerin, of sodium choride, and of ammonium chloride, has been recommended to prevent precipitation of basic salt of the stronger acid. Causse has given † detailed instructions for the preparation of the salicylate, using a large proportion of sodium chloride to prevent formation of oxychloride of bismuth. If the figures as given in the "Year Book" are correct, the amount of hydrochloric acid is insufficient to dissolve the oxide (40 C.c. acid to 35 grams oxide of bismuth). However, I have followed the process exactly, and also tried some obvious modifications of the same, with the result that oxychloride was invariably present in very considerable quantity, salicylate being correspondingly deficient.

In one experiment a large amount of uncombined salicylic acid was found in the product. In the experiment, which was conducted exactly as described in the abstract so far as that could be understood, the resulting compound contained 10.2 per cent. free salicylic acid, and left 94.5 per cent. on ignition, an amount which is far in excess of the proper quantity. These experiments tend to explain the defects of some of the preparations found in the market, and show the necessity for testing this salt, which will probably take a permanent place in the "materia medica." The tests above described will be found sufficient to practically indicate the purity of the preparation.

Circular Letter Forwarded to the Pharmaceutical Associations of Canada.

To the Council of the Pharmaceutical Association of the Province of

Gentlemen

At the annual meeting of the Pharmaceutical Association of the Province of Quebec, held in June 1893, the question of the formation of a Dominion Pharmaceutical Association, similar to that existing in the United States, was very fully discussed, and in the following July, a circular letter was sent to all the Pharmaceutical bodies of the Dominion, asking their co-operation in the object contemplated. Some of the Associations responded at once, but it was sometime before this Association received replies from all the provincial bodies, hence the delay in taking further steps to promulgate the formation of the new Association, we may however say, that with the exception of one provincial association all the others offered hearty co-operation. Some four months ago the Council of this Association appointed a committee to take up the matter, and this committee has drafted a Constitution and By-laws, which in their opinion would be suitable for an association such as was contemplated, this council at its last meeting approved of the draft of con-

* *Pharmaceutical Journal,*

† *Comptes rendus.* cxiii, 547. "Year Book of Pharmacy," 1892, p. 29.

stitution and By-laws submitted, and instructed their secretary to forward to each Provincial Association a copy of said constitution, with the request that each Association through its Council or President should consider the draft and return to this association an early reply, with such comments or suggestion as they desire to make. The council of the Quebec Association have undertaken to meet the preliminary disbursments in the formation of the new association, with the understanding that if it becomes organized, each association shall pray on their pro-rata share of the expenses, which will include the expenses of the preliminary meeting. As the Quebec Association has been the prime mover in this undertaking, they naturally suggest that the preliminary meeting for organization be held in Montreal.

In the formation of this new association it is not intended to interfere in any way with the rights of the various provincial association as they now exist.

In accordance with my instructions I now have much pleasure in forwarding you a copy of the proposed Constitution and By-laws for the new Pharmaceutical Association and will be pleased to receive an early reply from your association, hoping that it will be favorable to an active co-operation on behalf of your association.

Yours respectfully,

E. MUIR, Secty.

EXAMINATION OF URINE FOR SUGAR.

BY FERDINAND LASCAR. PH. G.

The testing of urine for sugar is a subject on which much has been written, and a great many methods have been suggested from time to time to accomplish such a test quickly and accurately. It is, however, a fact that a great many of the processes recommended are unreliable, if not counter-checked by other tests to verify their accuracy. The truth of the matter is that a perfect trustworthy and quickly performed test to accomplish this aim is still wanting.

Experience points unerringly to the fact that neither Trommer's, Fehling's nor Pavy's tests invariably give positive results; the same may be said as to Moore's test and a great many others which will be mentioned later on.

The most positive and most correct test for sugar in urine is the yeast test, but to apply this properly time is required, 24 hours or more space of time being needed to fully ferment the last trace of sugar present, Again, in perfoming this test a countercheck must be practised; the yeast employed must under equal conditions be mixed with pure water as is done with the urine, because the yeast of commerce at times contains some sugar itself. By simply fermenting the urine containing sugar with the yeast and leading the evolved carbon dioxide gas into baryta water or lime water, very little is, however, learned of a clinical import, because a multitude of voided urines contain sugar in minute quantities and still no diabetes is diagnosed. To diagnose properly, it is necessary to ascertain the quantity of sugar present in the urine, and here again exists a great divergence of opinion among practitioners of what really is a diabetic urine. Some, like Bruecke, for example, tell us that healthy urine contains normally 0 01 per cent. of sugar, while others tell us that the amount of sugar present in the normal urine voided by an adult during 24 hours varies from 60 to 75 centigrams. According to Bruecke, it would amount to about 15 grains, which corresponds nearly to the highest estimate.

When a urine is tested for sugar great stress is generally laid upon the specific gravity of the fluid, but here again much is met with which is liable to interfere with a correct diagnosis. Many state that if the specific gravity is 1030 or above, sugar is most likely to be present, and that in urine of a very low specific gravity, the test for sugar may be entirely dispensed with. How misleading such a view is, may be learned when I state that only a day or two ago I had submitted to me a urine for analysis which had the lowest specific gravity I ever encountered, viz., 1001, and which contained considerable sugar. I regret that I did not receive in this instance enough of the specimen to properly examine it quantitatively, but ocular examination proved unerringly by Fehling's test considerable sugar present. The urine in question was colorless, slightly acid, contained no albumin, but only a little epithelium from the urethra and the bladder. It had been voided by a patient being under a great mental strain, under which condition sugar is frequently voided in the urine.

In testing suspected urine for sugar by other methods than the yeast test, it must not be forgotten that may constituents of urine give reactions identical with those of sugar with the many reagents commonly employed. The first thing to do is to test for albumin, and, if present, to remove it from the urine, which is best done by acidulating 25 c.c. with a couple of drops of acetid acid. c. p., boiling and filtering the coagulum out. If the urine is found to be highly colored—sometimes from drugs, as rhubarb, etc.—the filtrate ought to be precipitated by acetate of lead and filtered again.

Notwithstanding these precautions, there is at times another circumstances met with which may interfere with the coppertests for sugar, and that is the presence of urates in greater quantities. The tests for sugar which employ copper, such as Fehling's and others, depend upon the ability of grape sugar or glucose to reduce oxide of copper to a sub-oxide. The oxide of copper is reduced in an alkaline solution of sugar, a theory being held by some that oxygen is separated, which acts as an oxidizing agent on sugar. Without entering

further into the chemical action which actually takes place here, let us remember that in perfoming these copper tests for sugar, substances other than albumen are likely to interfere, as I already mentioned. There is specially uric acid, urates and mucus when present in considerable quantities; others are hypoxanthinic acid, peptons, pepsin and creatin; also free ammonia, or substances which by boiling develop ammonia when potassa is present.

But for all this, Fehling's test is still one of the most practical of all tests for sugar in urine. It is quickly performed, and gives the best results, but only when other tests are employed at the same time as counterchecks upon it, and if the aid of the microscope is enlisted. In my daily routine of urine analysis, I have come to rely almost solely upon this test, taking due caution in every instance to verify the results obtained by other tests. I employ the official solutionof the Pharmacopœia, mixing 1 c. c. of standard copper solution with 1 c.c. of water then adding 1 c.c. of standard solution of alkaline tartrate, mixed with 1 c.c. of water, to the former, shaking the two solutions and heating the mixture. The test solution is always freshly prepared when wanted for use, because when kept in stock it is likely to decompose. To the 4 c.c. of freshly prepared Fehling's solution I now add 1 c.c. of the urine to be tested, and the mixtue is shaken and brought to the boiling point. According to Squibb, if it becomes of a dirty greenish color as soon as it boils, 1 per cent. or more of glucose is indicated; if it becomes of a lighter dingy blue, with a greenish tinge, 0.25 per cent. of glucose is indicated. On cooling during five or ten minutes it assumes a dirty green color, and deposits sub-oxide of copper. Each 1 c.c. of the mixed test solution is equal to 5 m.g. of glucose; the 2 c.c. taken for the above test are equivalent to 0.01 gram of glucose, or just 1 per cent. in the 1c.c. of urine used.

Pavy's test is identical in principle with Fehling's as for that matter, Trommer's is nearly so, but both are less practical than Fehling's. That Fehling's test really is a reliable one long practice has taught me. I have in several instances eliminated the sugar from urine by the other usual methods, and found the amount to be very near to the results obtained by Fehling' solution.

In boiling urine with Trommer's test and frequently with Fehling's test, a change of color takes place. This, however, is per se no proof that we have to do with a diabetic urine; the typical red precipitate of sub oxide of copper has to be looked for. If under the microscope uric acid is found to be present in a considerable quantity, or if the urine contains much mucus; we meet the main objections to the rapidity of Fehling's test because these substances will by boiling reduce the oxide of copper. In this instance the urine should be mixed with the test solution, boiling being omitted and the cold mixture should be left standing for 18 or 20 hours. when if sugar is present a precipitation of red sub-oxide of copper will have taken place. I, however, rarely take recourse to this procedure, for if other resources were not available the yeast test would be a preferable one, for by that the quantity of sugar present can be fairly correctly calculated. It can be done by the aid of the specific gravity of the fermented and unfermented urine. The calculation is very simple in this instance. Take, for example, 4 fluid ounces of urine and ferment it in one bottle; keep a specimen of the same urine in another tightly tightly corked bottle, and after 24 hours standing in a moderately warm place take the specific gravities of both specimens. By deducting the specific gravity of the fermented urine from that of the unfermented, the figure obtained indicates the number of grains of sugar contained in each fluid ounce of urine. This method of estimation was suggested many years ago by Dr. Roberts of Manchester, and while somewhat antiquated, is still a very convenient one for its purpose.

Still, such tests as just described required time, and as in nearly every instance, a rapid and accurate test is wanted, I proceed differently. I reply on other tests quantatively. After having freed the urine from albumin, if present, or, if highly colored, gotten rid of most of the coloring matter, I mix equal parts of urine and official solution of potassa in a test tube (Moore's test), and by careful heating boil the upper layer of liquid only. If sugar is present, the heated part at once becomes red or dark-brown. The test is a most excelleut one. Still here, also caution is required, because if the urine in question contains much phosphates a darkening when boiling will also occur in the liquid. The potassa employed must be free from lead, and for this reason, the solution should be freshly prepared, as by standing for a long time in a glass bottle it may become contaminated with lead from the glass; and the danger then exists that sulphide of lead may be formed in the urine, and impart to it a darker color. These objections being guarded against and having obtained the typical sugar reaction by Moore's test, I now proceed with Fehling's test, and have rarely had occasion to deviate in my examinations from this mode of procedure.

For those who for some reason or other, however,object to Moore's test, other tests are available. A test tube with a strong solution of picric acid is taken, to which solution a few drops of the suspected urine are added; this indicates the minutest quantity of albumin present. One now carefully frees the urine by the usual method from albumin, as already described, and the bismuth test may be applied. The urine free from albumin is mixed with an equal volume of a 25 per cent. solution of carbonate of sodium, and a little basic nitrate of bismuth is added. If the bismuth salt turns dark or gray, sugar is indicated, If albumin is present

the test is worthless, because sulphate of bismuth may be formed through this source.

Another test is Horsley's, which employs a solution of chromate of potassium and solution of potuss. When an alkaline solution of the chromate is boiled with urine containing sugar a deep green color will occur, due to oxide of chromium formed in the alkaline of solution.

A similar test is Luton's test, which has the advantage over the former that albumin and uric acid do not interfere with the proper chromic reaction for sugar. To a concentrated solution of bichromate of potassium an excess of sulphuric acid is added, and the solution is filtered. If urine containing sugar is added to such a solution it will develop a deep-red color, which by boiling, if considerable sugar be preseut, will turn to a deep-green, or if less, a bluish-green color.

After having performed any of these tests for sugar, I recommended the employment then of Fehling's test, with the due cautions, one of which is the previous testing of the reagent as to its correctness; another being that when the equal volumes of the test solution and suspected urine have been well mixed, the liquid is only brought to a boiling point, and longer continued heating is avoided.

In examining urine in suspected diabetes there are many points which will at the beginning of the analysis already give the examiner a clue to the ultimate result of the analysis. The pale color of the urine is the first one, and next is the specific gravity, which in most instances is above 1030, for sugar is a very common cause of a high specific gravity, which, however, may also be due to other causes, such as urates, etc. If under the microscope the urine shows many uric acid crystals, especially in large solid groups of wedge like forms diabetes may often be suspected, and a very careful examination for sugar is then needed, because in diabetes much uric acid is frequently set free through the action of the sugar present. In such cases it is well to remember that a solution of uric acid in water alone, if boiled with Fehling's test solution, will give the same reaction as sugar will, and for this very reason great care and nicety of manipulation is demanded. The claim that in a diabetic urine hippuric acid interferes with the copper test, I believe is too far-fetched, because while it is claimed that in diabetes the quantity of hippuric acid is augmented, the fact remains that normal urine freguently contains considerable quantities thereof, due, as the presence of oxalate of lime frequently is, to the partaking of much fruit.

The quantity of sugar present in urine is frequently a matter of great clinical importance, especially in cases of patients under treatment, where it is desired to keep a record of the quantity voided during certain lengths of time, and where it is desired to observe whether there is an increase or a decrease. For this purpose certainly nothing answers better than the copper test, by which the quantity can easily be determined by a simple calculation.

Another method is determination by the polariscope, which, however, requires considerable practice, and is rarely called into use.

My aim in this paper has been to lay stress upon my belief that the so-often wrongfully abused Fehling's test still has some merits left; that, in fact, considering everything, it is the best sugar test for rapid work which we possess. That it is an infallible test, no one who has had experience in urine analysis, I think, will claim, but its practice in conjunction with other tests which act as a check upon its accuracy, I think, will demonstrate its intrinsic value, its nicety and its rapidity.
—*Druggist Circular.*

THE COCAINE HABIT.

BY ALBERT N. DOERSCHUK, PH.G.

Reprinted from the Bulletin of Pharmacy, April, 1895.

The cocaine habit is a comparatively new addition to the evils by which humanity is beset, and it promises to excel even morphinism in the insidiousness of its growth, in blasting destructiveness, and in the number of its victims. Under the influence of cocaine, the subject seems to enjoy a renewal of youth. Capacity for labor is augmented, and the need of sleep much diminished. The occasional use of cocaine leaves a highly illusive impression on the professional mind, producing pleasant sensations, inspiring courage, and causing a general feeling of exuberant vitality, with apparently no unpleasant after-effects; but while the immediate action of cocaine is more animating and agreeable than that of morphine, it is not nearly so induring, and the bitter sequelæ are manifested earlier and in a form far more disastrous than in morphine intoxication. Cocaine *habitués* are utterly unreliable and disregard all personal appearance, going about unkempt, bedraggled, and forlorn. While under the influence of the drug they feel equal to any task, forget the past, cherish hopes for the future, are happy in and oblivious to their sad condition. Without it they are nervous, maniacal, morose, and even dangerous. The cocaine habit is a swift road to destruction, and leaves in its wake a blight most terrible to behold.

The growing prevalence of this vice is largely due to the greatly reduced price of cocaine, occasioned by improvements in the process of extracting it from the crude drug. Less than ten years ago, cocaine was worth 75 cents a grain; it can now be bought at the rate of two grains for 5 cents.

Several distinct causes result in the acquirement of this habit. Prominent among these is the pernicious practice of a certain class of druggists (fortunately small in number) who offer

cocaine when asked for something that will relieve toothache, neuralgia, and countless other aches and pains. It is impossible to estimate the ruinous effect of such recklessness. To the chronic sufferer, cocaine proves at first an inestimable boon; but the first dose breeds an insatiable and almost insuperable appetite, and with this comes all the trickery and depravity of an experienced victim. Misery and the bitterness of remorse would fill the soul of the druggist who is so rashly indifferent as to incur this responsibility, had he sufficient imagination to see before him a panorama of the degradation, suffering and ruin for which he has become chargeable.

In some way the erroneous notion has come to prevail that in treating the morphine habit, cocaine is of great value, counteracting the effects of the morphine. Proceeding on this principle, numberless quacks have claimed ability to cure the morphine habit. The unfortunates whom they have succeeded in deluding are perhaps cured of the morphine habit, but in its stead they become cursed with a vice far more ruinous than all their former ills. Cocaine may counteract the effects of morphine, but when the action of the cocaine is exhausted the system demands greatly increased quantities of morphine, and this in turn produces a desire for more and more cocaine. To use cocaine for curing the morphine habit is like jumping from the frying-pan into the fire.

Another class of victims comprises those to whom cocaine has been administered in minor surgical operations, and who, rembering its exhilarating effects, subsequently obtain and use the drug to their ruin.

Some, ignorant of its possibilities for injury, begin this habit voluntarily; others are led into it by what seems to them a necessity; and others, again, are innocently beguiled into it by the influence of environment and friends.

The cocaine habit is apparently incurable, unless the subject possesses a powerful will and renounces the use of the drug ere its vicious effects are manifest. After the habit is once acquired, the system craves the drug very much as the body craves food. When this drug-hunger is not gratified, the *habitué* suffers all the consequences of natural starvation, until his system recovers its normal condition. With overwork or any mental strain the craving for the drug returns, and is repelled only with the utmost difficulty. Each dose creates a demand for a larger dose the next time, and a point is seldom reached where a constant quantity produces uniform results.

A single instances will illustrate the terrible possibilities of this drug. A prosperous young lawyer, being very much overworked and in great demand, sought renewal of his exhausted energies in cocaine. For a long time this served him remarkably well, stimulating his energies and producing an appearance of renewed vitality. Presently his system failed to respond to the usual quantities of the drug; then began a gradual increase in the dose, with simultaneous reduction in the effect. Finally the drug seemed to lose all potency, and the subject was completely prostrated. Under skillful treatment he recovered after a time and appeared to be restored, but with returning labor and anxiety came the old craving and morbid desire for stimulus. This he resisted with all his energy, but to no avail. An extreme hunger prevailed in his system, and he could have no peace until this was satisfied. Notwithstanding his former experience, one night he stole from his home and satisfied his longing with cocaine. Pleasant thoughts and blissful dreams were the result. And thus he sustained himself from day to day. By stealth his wife obtained some of the drug, and finding exhilaration in its use, continued to administer it to herself, guarding her secret from her husband. To-day one is a raving maniac, and the other is behind the bars clamorous for cocaine.

Such instances are numerous. There is no end to the misfortune that lies in the train of this vice. Virtue, wealth, honor, social position, all that is dear to the human heart, are sacrificed; as if in a night, happy home are made desolate, pillars of society crumble, the flower of youth is blasted, manhood is wrecked and womankind defiled, cultivated intelligence stoops to the mire, and the dearest hopes and prospects vanish as in a dream, when once this poison has gained full sway.

In one city of 300,000 inhabitants there are by actual count over 2,000 cocaine *habitués*. In a single city, in a single decade, 2,000 human beings are deprived of happiness and hope by a single vice! A daily paper, commenting recently on the spread of cocaine intoxication, said: "The police are powerless to check its progress." While the hopeless victims curse the day when they were ensnared in the meshes of this vice, and pray Heaven to take their all and give them back their liberty, a shudder of horror siezes the heart of mankind, to think this sin was ever born into the world; and while it is hard to decide who most ardently desire to abate the evil—the people or the victims,—government stands idly by and takes no measures which will enable Authority to act. Yet government is by the people and for the people; if it is not bound to minister to the preservation and protection of the people, what then is its mission?

Measures for restricting the cocaine habit have long been discussed. In common with morphine and many other poisons that are often used illegitimately, cocaine has been an "elephant" on the hands of many legislative committees charged with formulating poisons laws. Custom is a strong lever, and a natural timidity opposes innovation. Fearful of overstepping custom, and yet conscious of duty, legislators have compromised this matter when dealing with it at all. The necessity for some stringent action has long been self-evident;

but the only possible remedy is looked upon with suspicion because it is an innovation. The ideal poison law is yet an unknown and uncertain quantity. A clear-cut, logical and simple proposition, comprising all the necessities of a poison law, has yet to appear. This much is certain, however: that in the great labyrinth of modern life certain vital rights of the individual must, in a measure, be vested in the State. On this principle alone can the vices of cocaine and opium intoxication be restricted and abated. These drugs should never be dispensed, save on regular prescriptions from physicians. So long as this plan is not adopted, and so long as people can obtain these drugs by simply making certain representations, just so long will these vices continue to spread, and the police *remain* powerless to check them.

No public measure can expiate sin, nor can evil be legislated out of the world. The enforcement of law can rise no higher than its fountain-head, public opinion; and, judging from the past, it seems that vice must gnaw almost to the very heart's core, ere conscience and morality rise and stamp it out. Education is the one and only hope of the masses, who need but to know the terrible possibilities of these vices to shun them in the interest of self-preservation, and disclose the hidden danger to others. The druggist is in a position to know this folly in all its viciousness. He becomes perfectly acquainted with the sufferings and ills of humanity, with the regrets and struggles of the deluded. He is the confidant of many sufferers, and is preeminently qualified to warn the curious and to speak a word of caution to the unwary. If he has a conscience, he will do this from a sense of duty, thereby conferring upon society and posterity a benefit which will outlive him and his memory.

PHARMACY IN JAMAICA.

We are indebted to Mr. Albert J. Salmon, Apothecaries Hall, Montego Bay, Jamaica, for the following interesting notes regarding the practice of medicine and pharmacy in Jamaica. In an earlier part of the communication Mr. Salmon speaks of the topography of the Island, its marvelous fertility, its medicinal flora (in general terms), and its great need—enterprise and capital. The population of the island is close upon 650,000.

There are several fine pharmacies ("doctors' shops") in Jamaica, many of them fitted up in the European and American styles, especially those in Kingston. The majority of those in the country are minature emporiums, as nearly every conceivable article is sold, so as to make up a living turnover. Prior to 1881 there was no pharmacy law, consequently anyone could keep open shop for the sale and compounding of drugs and poisons; and the writer remembers one of these shops, in a populous district of Kingston, carried on by a pretended disciple of Galen, who was just able to sign his name.

Pharmacy Law.

In 1881 the "Drugs and Poisons Law" was enacted, which compelled all persons to obtain by examination a licence before they could keep open shop for the sale of drugs and poisons, but no curriculum was enforced, except in the case of apprentices at the public hospital, who were required to undergo three full year's tuition at its dispensing school before presenting themselvs for examination.

A new law was enacted last year repealing that of 1881 and its amendment of 1885, and the new Act requires a curriculum of two years, and the second year at least must be under a medical practitioner, or one already licensed. Candidates must be 21 years of age, and must pay a fee of 2l. Persons licensed under the Pharmacy Acts of Great Britain and Ireland are exempt from examination, but must produce certificates of qualification and pay a fee of 2*l*. In the case of anyone requiring a special examination a fee of 5*l*. is demanded. Licensed druggists of other countries are allowed an examination, provided the superintending medical officer is satisfied with the certificates of their curriculum. Anyone licensed under the law is, in case of any conviction as a misdemeant, liable to have his licence suspended by the superintendent medical officer on the approval of the Governor.

Nature of the Trade.

Patent medicines are in great demand, and American and Canadian proprietary medicines are fast becoming the leading ones—such as Scott's Emulsion of Cod-liver Oil, Ayer's Cherry Pectoral, Pills and Sarsaparilla, Bristol's Sarsaparilla, Northrop & Lyman's Vegetable Discovery and Canadian Healing Oil, Perry Davis's Pain Killer, Morse's Indian Root Pills, Ross's Life Pills, American Specific, &c.—simply from the fact that these firms "work up" the country by means of their travelling agents and advertisements.

Druggists, as a rule, do very little dispensing as the majority of doctors supply their own medicines. A feeling of strong antipathy exists among a large number of the doctors and druggists, on account of the latter carrying on a prescribing business. Druggists are frequently called "doctors," and this seems to be the cause of the bitter feeling on the part of the regular practitioners. The origin of the appellation "doctor" for a druggist is not generally known, but it arose in this way. During the days of slavery, there was scarcely any system of skilled medical aid provided for the slaves; but there always at hand some intelligent man who was able to administer medicines to the sufferers, practising a recognised empiricism. These persons were styled "hot-house doctors," and were looked upon by the slaves as great benefactors. The poor

creatures not being placed in a position to know the difference between a qualified man got to know no one else but these "doctors," consequently the name has been handed down as a manner of addressing anyone who is publicly recognised as having anything to do with preparing or prescribing medicines. And so it will continue, unless the present generation at school are taught to address druggists differently.

The Obeahman.

Apart from prescribing druggists, there is a class of persons who get a good share of patronage from the peasantry—viz., the obeahman, who, to some extent, differs from a "doctorman," another class of practitioners. One who is acquainted with tha ways and peculiarities of the Jamaica labouring class can easily spot any of these votaries of the healing art. The obeahman is generally dressed in some quaint grab, carries a peculiarly-shaped stick, which usually has a snake carved around it, and spotted with black, red, and white. In his stock or miniature "curiosity-shop," which he carries in his pockets, are to be found phials containing the mixtures to "pour out his wrath of vengeauce" on his client's adversary, and it is in this direction that this *portege* of Obi is dangerous, for by some means which he skilfully contrives, he gives a dose of some potent poison to his client's enemy. A law is strictly enforced for his punishment, which consists of flagellation during incarceration.

Their manner of working is somewnat as follows:—Obadiah (the people are very fond of Biblical names) has a few acres of land, and with hard work he manages to reap a good harvest. This incurs the displeasure of his indigent or lazy neighbour Joshua, who also owns a similar number or more acres of land. A row ensues between both parties, and Joshua threatens Obadiah, "I wi' do fe you" (I will put obeah on you), and prehaps as a coincidence, Obadiah becomes sick, no doubt from overwork, but instead of consulting a doctor, he goes to the obeahman, to work "tranga (stronger) obeah," who strengthens his belief by agreeing with him. All sorts of evil practices are now brought into play, and either Obadiah, or Joshua, or both, become the const nt customers of the druggist by their purchases of ol. origani and ol. succini rect. to sprinkle about their person and habitation, sulphur to fumigate the path supposed to be traversed by the evil spirits sent by the opponents to do harm to each other, cort. cascarillæ to be mixed with tobacco and smoke hen alone, especially at nights, a charm of as tida and garlic worn on the body or kept in the house, and so on.

The "Doctorman"

simply tries to earn a living, and if tune smiles on him in curing a case—*e.g.*, a so leg—he is looked upon as "him han gree wid wi. end" (he is skilful in the treatment of sores). The peasantry call an ulcer a "wound," and a wound is called a "cut." When the "cut" is very severe, it is designated a "murderation." He treats diseases by making a decoction of various herbs, the intrinsic value of which he professes to know, and his supercilious air towards his less favoured brethren favours the deception. Perhaps some great grandmother of his dreamt to him "the night before" that so many leaves of this boiled down and mixed with so many drops of the juice of that would cure the worst case of disease, and so long as he tells his patient that it was prepared by the direction of a dream, the mixture is looked upon and taken with reverence. He also uses the above-mentioned drugs, and invariably calls for such articles, the names of which are not to be found in any pharmaceutical vocabulary. Sometimes it is ile of pippewippey, ile of trent, scorcher, ile of clearance, &c. His treatment for yaws or ringworm is to take the unfortunate sufferer to a running stream, and scrub the affected parts with a corn tick (corncob), then rub in gun powder, or laundry blue, and administer his decoctions.

There are some doctresses, too, whose pharmacy is carried on in a modest style; their applications to the druggists are generally made for "dem tings whey (that) you know good fe feba, &c." Their practice is on the lines of the "doctorman.

Bedwardites.

There is yet another class of "practitioners"—the Bedwardites—who practise hydropathy in a peculiar manner. The cure was introduced two or three years ago by an exeunatic named Bedward. The system is to attribute curative properties to a river. A religious service is held by the "prophet," who declares he is sent by God, and is divinely commanded to cure diseases by means of the river. After preaching and singing of hymns, a procession headed by the "prophet" and numbering hundreds and sometimes thousands, moves on to the "healing stream." The "prophet" blesses the water and commands the afflicted to enter and be washed. Here a disgusting scene takes place. Men, women and childern in a state of semi and sometimes complete nudity, and exhibiting all kinds of diseases, plunge into the "water or life" for purfication. They are then told to drink the water, which, of course, becomes contaminated to a certain extent with foul matter from the bodies of the bathers. It is necessary that a "white" cup be used to dip up the water, and when the craze is on there is great business done in these cups. It is not uncommon now to hear a "healing stream bruk out" at such and such a place, and it is safe to conclude that it is only another means adopted by these "prophets" to escape the arm of the law. Bedward carried his religious and hydropathic practices into politics, and is now under arrest awaiting trial for sedition.

Drastic Treatment

The labouring class is not particular about "elegant pharmacy." On the contrary, drugs must have strong odours, and a 10-grain pill is just as pleasant to them as any other of its kind in gelatine or sugar-covering. They generally suffer from biliousness, and it is amusing at times to listen to Keturah saying to Martha, "You know how lang me nebba tek physic?" Whereupon a conversation ensues as to how each one goes through the ordeal of taking "physic." Physic is antibilious medicines, and "medsin" is medicines prescribed, but generallly called "dacta medsin." Taking "bilious physic" is a recognised institution among them, and should your servant feel sick, he or she "gwine tap home week fe tek physic." A shilling is generally sufficient to supply their requirements, and this is the way they go about it:—"Truppance" (or "fipney") (3*d.*) bilious pill, truppance "antimony wine," truppance "jullup" (if pulv. is required the 'dry" is asked for, if "wet" the tincture: all powdered and liquid preparations are designated "dry" and 'wet" respectively), "naggin" (or gill) (¾*d.*) salts and "naggin" "sena," tup (1½*d*) "nat ile" (crube castor oil, an abominable, nasty, stinking black stuff of a tarry consistence prepared by the peasantry from sem. ricini officin., and which the druggist must keep, as the expressed ol. ricini is very seldom asked for). The *modus operandi* is to clear the "tummuck" of "bwile" by means of the antimonial wine; then take the pills at night; the following morning the oil to "work off" the pills, the same night the jalap to "work off" the oil, the next morning the salts and senna to "work off" the jalap, and if all the "bwile" has not been 'worded off" then it is considered as having "broken in the person. A "truppance calimel" is taken and another dose of oil—sometimes 3 oz. to 4 oz.—to "work off" the calomel, and salts and senna again to "work off" the oil. Your servant, perhaps, is able to crawl out to work the next Monday morning. The cure has lasted a fortnight, and if the patient is still sick it is time to get "dacta medsin." Even this sometimes is considered unsuitable if no purgatives are given. In cases of diarrhœa a request is often made for something to "work it off." Many years ago a famous preparation called.

Risbys

was popularly used, and is still in demand to some extent by some of the old people. The following is the formula:—

Gum camph.	℥j.
" guaiaci.	℥j.
" opii.	℥iss
Rad. serpentariæ.	vel
Pimentæ.	℥ij.
Rad. gent.	℥iv.
Hydrarg. oxymur. (perchlor.)	℈ ss.
Sp. xaymacensis (sp. tenuior).	Oj.

Misce.

Dose: ℥iv. in Oss. infus. sarsæ bis die.

This preparation, being considered as a powerful alterative, was extensively used as a "cure-all," and many patients got worse from the "mouth run" (excessive salivation) which it produced. During its administration the patient was commanded not to be seen outdoors after 6 P. M., not to "touch" (eat) salt or salted food, no water but inf. sarsae to be taken in lieu, the daily ablutions were allowed to a limited extent, but complete immersion of the body was strictly forbidden. The preparing of this "cure-all" was generally relegated to some quaint old woman, whose *modus operandi* was kept an inviolate secret so as to inspire awe in those around her, especially her patient, who would believe that her knowledge of medicine was unquestionable, and the preparation a production of one of the occult sciences.—*Chemist & Druggist.*

MONTREAL COLLEGE OF PHARMACY.

The annual meeting of the College took place May 9th in the College building. Among those present we noticed Messrs. Mann, Tremble, Dawson, Pinck, Gillespie, Lecours, Johnson, Goulden, Lawrence, Lunny, Chapman. The annual report which was read by the secretary showed that affairs were in a very prosperous condition, the attendance during the past session was the largest in the history of the College, cash to the credit of the College was $996.13 while only about $2,000 was now due on the building, a state of affairs upon which the institution was to be congratulated. The president, Mr. David Watson then delivered his annual address in which he referred to his frequent re-elections this making his ninth term in the chair, and expressed the hope that as he had again been re-elected that it would be the last time and that some one else would be chosen to fill the position, he also referred to the very satisfactory condition of the finances, the increasing attendance and the possibility that in a few years other quarters would have to be found as the present building would be entirely too small, and to the improvements already made and those proposed for adoption in the new curriculum.

The prizes won at the sessional examination, were then distributed as follows: T. Osborne Pinck, 2nd year, Botany; W. Gillespie, 2nd year, Chemistry and Materia Medica; R. J. Lunny, 1st year, Materia Medica, Messrs. Rogalsky and Roch, 1st year, Chemistry. As none of the candidates at the recent semi-annual examination of the Association obtained sufficient marks to secure the gold medal offered by Mr. A. E. Holden, this will probably be held over for another year. Mr. A W. Gillespie with the very high score of 935 points, secured the minor prize, a Remington's Pharmacy, 3rd Ed. offered by Mr. J. E. Morrison The president congratulated the prize-winners on their success and expressed the hope that it would be an incentive to still further efforts on their part to add to their store of knowledge.

The question of the new curriculum was then brought up, the whole matter being thoroughly explained from different standpoints by Messrs. Morrison, Chapman and Lawrence, who have had charge of it and who have spent considerable time in studying the question and have proposed a scheme which in all probability will be adopted without further change. Other members spoke upon this question and some of the students present gave their views upon the subject, the general consensus of opinion being that a change was necesssary, the present curriculum being altogether behind the age.

The report of the scrutineers appointed to count the ballots for election of members of the council was then brought in and read; the following nine being elected:

W. S. Kerry	Re-elected.
J. E. Tremble	"
A. J. Lawrence	"
W. H. Chapman	"
C. J. Covernton	"
J. E. Morrison	"
R. H. Bryson	
R. W. Williams	
W. Lecours	

These gentlemen with Mr. D. Watson, president; Mr. S. Lachance, vice-president; Mr. A. Manson, Treasurer; and Mr. E. Muir, secretary; will direct the affairs of the College during the coming year.

During the meeting the question of inviting the American Pharmaceutical Association to hold their meeting in Montreal in '96 was brought by Mr. Morrison, and it was decided to have a joint meeting with the Council of the Pharm. Assoc. to discuss the question as was done last year.

After some remarks upon the new curriculum by Profs. Bemrose and Reed, and the distribution of refreshments provided by the president the meeting adjourned.

PHARMACEUTICAL NOTES.

CASEINE AS AN OINTMENT BASE.—Unna has recently recently recommended Caseine emulsified with about 3 per cent. of potash or soda, as a base for ointments and pomades.

EASY METHOD OF PURIFYING ETHER.—Ether, pure enough for most analytical operations, may be easily prepared by adding 5-10% by volume of liquid paraffin to ordinary impure ether and distilling between 40° and 50° C. The paraffin, which boils above 300° C. remains behind in the retort and retains the impurities, so that pure ether only distils over. In cases where the ether contains large quantities of water and alcohol, these separate and form a distinct layer beneath the paraffin. By heating the paraffin afterward to 120° C. the impurities are driven off and it can be used over and over again. This method suffices to free ether from acids and badly smelling substances, and if not altogether too impure one distillation gives an ether which contains only minute traces of alcohol and water. This method is also useful in separating ether from chloroform, benzine, etc.—*Jour. Chem. Ind.*

Pharmaceutical Association of the Province of Quebec.

PRELIMINARY EXAMINATIONS.

The next preliminary examinations for candidates entering the study of pharmacy will be held in the Montreal College of Pharmacy, 595 Lagauchetiere Street, Montreal, and Laval University, Quebec, on Thursday, July 4th, 1895.

Candidates must give notice to the registrar, in writing, of their intention to present themselves at *least ten days* before the date fixed for the examination.

A printed form of application must be obtained from the registrar, which must be duly signed by the applicant.

No application will be accepted after the 25th day of June 1895.

These preliminary examinations are held on the first Thursday in the months of January, April, July and October of each year.

E. MUIR, *Sec.-Registrar*

595 Lagauchetiere St., Montreal.

TRADE NOTES.

Messrs Smith Bros, of London, Ont are pushing their Fly felt very actively this season. They are put up very neatly and packed 100 packages in a case. How is your stock?

MILLIONS OF PACKAGES.

(*From the Lynn item.*)

The Rising Sun Stove Polish factory sold 23,000,000 packages of stove polish in 1894. These packages, placed so as to touch end to end, would reach 1000 miles. The factory at Canton, Mass., covers four acres, and turns out the enormous product of 10 tons per day. Most of the material used is mined by natives in Ceylon, India, and brought by sailing vessels to New York.

The Rising Sun Stove Polish has the enormous sale of 3000 tons per year but Morse Bros. have recently added to their business the Sun Paste Stove Polish in answer to the demand for a perfect stove paste. This Sun Paste is already meeting a large sale. The Rising Sun Stove Polish in cakes is recommended for general blacking of a stove and for economy, and the Sun Paste Stove Polish in tin boxes for a quick after-dinner shine.

PRICES CURRENT.

MAY, 1895.

Acetum cantharides	lb	$0 60	
" colchici corm	lb	50	
" ipecac	lb	40	
" opii	lb	1 20	
" scillæ	lb	12	
Acetanilid	lb	90	oz. 15
Acid. acetic glac	lb	45	demi 16 00 ea.
" " fort P.B.	lb	15	carboy 11
" benzoic German	oz	15	lb 1.75
" " " ozs. Hwds		25	Bulk 20
" boracic	lb	12	25 lb 11
" " pulv.	lb	14	25 lb 12
" butyric conc	oz	30	lb 3.75
" camphoris	oz	50	
" carbolic cryst 1 lb bot	lb	30	10 lbs 25
" " 10 " tins	lb	22	
" " Calvert's No. 1 lb		2 25	
" " " 2 lb		1 40	
" " " 5 gal		1 50	
" " Crude " 5 gal		80	
" chromic	oz	10	lb 1.00
" chrysophanic	oz	30	
" citric	lb	45	10 lb. 42
" " pulv	lb	50	
" gallic	oz	10	lb 90
" hydro-bromic dil	lb	45	
" hydrochloric	lb	5	carboy 2½
" " C P. s.g. 1.20.	lb	25	Wins. 20
" " dil	lb	15	
" hydrocyanic P. B.	doz.	90	in 1 oz. 10c per oz.
" " Scheele's	doz.	1 00	do 10c do
" hypophosphor	lb	1 10	
" hydrofluoric (in patent ceresine bottles)			½ lb bottles .50 ea. 1 lb " 1.25
" lactic dilutum	lb	1 00	
" " conc. pur	lb	1 75	
" nitric	lb	15	Wins. 12 carb 8½
" " C.P. s.g. 1.42.	lb	30	Wins. 25
" " dil	lb	15	
" oleic pale frozen	lb	40	
" osmic	gm	1 25	
" oxalic	lb	12	50 lb 10
" perchloric	oz	35	
" phos. dilut	lb	17	Whr. qt. 14
" " conc S.G. 1.5.	lb	45	
" " glac. pur stick	lb	1 00	
" " syr s.g. 1.750	lb	50	Whr. 45
" picric	lb	75	
" pyrogallic Schering's	oz	35	8 oz. 30
" " Merck's	oz	33	8 oz 28
" pyroligneous	lb	10	gall 50
" salicylic	lb	1 00	
" sulphuric	lb	5	carboy 2½
" " C.P. s.g. 1.84.	lb	25	Wins. 20
" " pur Eng		20	Wins. 18
" " aromat	lb	65	
" sulphuros	lb	12	
" tannic	lb	70	5 lb 65
" tartaric pulv	lb	35	10 lbs 30
" trichlor. acet. pure	oz	40	
" valerianic	oz	40	
Aconitina exot	gr	4	60 gn. 3
Adeps benzoatus	lb	35	
Æther S. G. 735	lb	40	Whr. qt. 35
" acetic	lb	55	do 50
" butyric	oz	15	lb 1.50
" chloric	lb	65	Whr. qt. 60
" Anæsthetic tin 500 gms		1 50	each. }
" 250 "		80	" } Squibbs.
" 100 "		40	" }
" " L. S. & Co	1 lb tins	1.00	each
	½ lb tins	0.55	"
	¼ lb tins	0.30	

Alcohol brl.....cash	4 25	10 gall 4.55 5 gall 4.60 1 gal 4.65	
" absolut.....lb	1 00	Wr. 90	
" methylated .....gal	2 00	5 gals 1.90 Brl. 1 70	
Aloes Barb opt.....lb	30	10 lb 25	cash
" " pulv..... ....lb	35	do 32	
" Cape..... .....lb	15	10 lbs 13	
" " pulv.....lb	25	do 23	
" Socotrina..... .....lb	60	do 55	
" " pulv.....lb	70	do 65	
Aloin..... .....oz	30		
Alumen lump..... .....lb	3	brl 1⅞	
" pulv..... .....lb	4	brl 2½	
" chrom. .....lb	15		
" exsiccat ... .lb	20		
Alumnol.....25 gm	50	each	
Ammonii acet. pure cryst..oz	15		
" benzoas, ex gum.oz	25	lb 3 00	
" bichromate pure cryst.lb	1 00		
" bromid.....lb	65		
" carb .....lb	15	7 lb tins 16	
" " kegs .....lb	11		
" " pulv.....lb	20		
" " resub.....lb	50	c. b.	
" chlorid.....lb	12	100 lb 10½	
" " gran .....lb	12	100 lb 11	
" " pulv .....lb	13		
" " pur .....lb	25		
" hydrosulph sol .. lb	40		
" hypophosph.....oz	25	lb 3.00	
" iodid.....oz	45	lb 5.50	
" molybdas.....oz	25		
" monocarb.....lb	35		
" nitras gran.....lb	32	25 lb 30	
" " cryst.....lb	35	25 lb 30	
" " pure cryst. lb	50		
" oxalas pur.....lb	75		
" phosph.....lb	1 25		
" salicylat.....oz	40	lb 4.75	
" sulphas com.....lb	9	pur 25	
" sulphocyanid.....lb	75		
" valerian..... ...oz	40		
Amygdala amara.....lb	35		
Amyl nitras..... .....oz	15		
" nitrite .....os	15		
" valerian. .....oz	35		
Amylum pulv.....lb	9		
Annatto Hispan opt .....lb	40		
" Fullwood ½ oz & 1 oz lb	1 00		
Antim crocus pulv.....lb	20		
" nigrum pulv.....lb	10		
" oxid.....lb	65		
" sulphurat precip....lb	50		
" tartarat pulv.....lb	40		
Antikamnia.....oz	1 80		
Antipyrin Knorrs'.....oz	1 10	5 oz 1.05, 10 oz 1.00	
" Swiss .. . .oz	85	10 ozs. .80	
" " .....lb	12 50		
Antitoxine, 7 c. c	1.50	nett.	
" 25 c. c	3.00	"	
Apiol green ....oz	65		
Apomorph hydroch.....gr	2	5 and 10 grain tubes.	
Aqua anethi.....lb	10		
" anisi.....lb	10		
" aurantii flor trip....lb	25	Win qt 20	
" camph.....lb	10		
" carui..... .....lb	10		
" cassia.....lb	10		
" cinnam.....lb	20		
" destillata..... ....gl	12	carboy 10	
" floridæ ....gl	5 00		
" lauro-cerasi.....lb	25	Whr qt 20	
" menthæ pip.....lb	10		
" rosæ trip. .....lb	25	Whr qt 20	
" sambuci flor.....lb	25		

Argenti chloridum	oz	1 50	
" iodide	oz	2 50	
" nitras cryst. L.B.& Co.	oz	85	9.00 lb cash
" " fus (4 to oz)	oz	90	
" oxidum	oz	2 40	
" sulphate	oz	1 50	
Aristol	oz cartoons	1 85	
Arsenicum alb. pulv	lb	10	
" rub "	lb	15	
Arsenici bromid	oz	40	
" iodid	oz	60	
" tersulph pulv	lb	25	
Asphaltum Egyptian	lb	18	
Atropina pure	⅛ oz	60 each	oz. 4 00
Atropinæ sulphas	"	60 "	oz. 4.00
" salicylas	⅛ "	80 "	
" hydrobromate	gr	5	
Auri chloridum (15 gr)	doz	4.00, 3 doz 3.75, 6 doz 3.50	
" " L. B. & Co.	doz	4.25	

Baccæ aurantii	lb	25	
" capsici	lb	25	pulv. 30
" cassiæ	lb	35	pulv. 40
" cubebæ	lb	35	
" " pulv	lb	40	
" juniper	lb	8	10 lb 7
" " pulv	lb	12	10 lb 11
" pimentæ	lb	10	
" " pulv	lb	12	25 lb boxes 11
" xanthoxylon	lb	40	
Balsam canad	lb	40	Winch. 35
" copaibæ	lb	60	Whr. qt. 55
" peruvian	oz	25	lb 3.00
" tolut	lb	55	
Barii carb pur	lb	39	
" chlorid pur	lb	25	
" hypophos	oz	25	
" nitras exsic	lb	20	
" nitrate C. P.	lb	35	
" perox anhyd	lb	60	
" sulphate pur	lb	50	
" sulphide "		10	
Bath Pipe	lb	40	
Bay rum St. D	gal	3 75	sec. 2.75
Beberinæ hydroch	dr	50	
" sulphas	oz	90	
Benzine refined	gal	40	
Benzoyl Guaiacol	oz	2 00	
Bismuthi Benzoas	oz	40	
" carb	lb	2 40	
" citras	oz	20	
" et ammon-cit	oz	30	lb 4.25
" oxide	oz	20	
" salicylas	oz	25	lb 3.50
" subgallas	oz	20	lb. 3.00
" subiodid	oz	45	
" subnitras	lb	1 75	
" valerian	oz	50	
Bismuthum (metal)	lb	2 25	
Bole armen	lb	6	
Borax	lb	9	keg 7
" pulv	lb	10	do 8
Bromine	oz	20	
Bromoform	oz	30	

Cadmium	oz	15	lb 1.75
Cadmii bromid	oz	20	lb 2.25
" iodid	oz	50	
" nitrate	oz	20	
" sulphas	oz	20	
Caffeina pur	oz	75	
" citras	oz	65	
Calamina præparata	lb	7	
Calcii bromid	oz	15	lb 2.00

Calcii carb. præcip	lb		V. Crata precip.
" chlorid. cryst	lb	25	
" " fusum pure	lb	30	
" chlorid fused crude	lb	15	
" hypophosphis	lb	1 40	
" iodid	oz	50	
" lactophosph	oz	15	lb 2.00
" nitras	lb	75	
" phosphas præcip	lb	20	
" sulphas	lb	3	
" sulpho-carbolas	lb	2 50	
" sulphid	lb	50	
" sulphis	lb	18	pulv. 20
Calx chlorinata	lb	5	keg 3½ brl. 2½
" " in packets 1 lb 7, ½ 8, ¼ 9			
Camphora Ang. Hd's	lb	65	
" " " ozs	lb	70	
" " " flowers	lb	75	
" Dutch	lb	60	
" " ozs	lb	65	
Camphor monobromid	oz	20	
Cantharides Russian	lb	1 40	pulv. 1 50
" Chinese	lb	—	pulv. 65
Cantharidine	grain	8	
Cap papav. alb	100	1 00	
Carbo animalis pur. pulv	lb	12	
" ligni	lb	6	
" ligni pulv	lb	10	brls 5.50 each
Carbon bisulphidum	lb	16	Whr qt 13
" " C. P.	lb	50	
Carmine	oz	40	lb 5.25
Caryophyllum, Zanzibar	lb	15	16 Pulv.
" Amboyna	lb	25	
" Penang	lb	50	
Cassia fistula	lb	30	
Castoreum	oz	1 40	
Celloidine Schering's. 40 gm bx		1 50	each
Cera alba	lb	65	sec 40
" " paraffin,	lb	18	50 lb 15
" flav opt	lb	40	secs 35
" " lithographers	lb	50	
Cerii nitras	oz	40	
" oxalas	oz	10	lb 1.20
Cetaceum	lb	55	10 lb 50
Cetraria Iceland	lb	16	
Chirata Incis	lb	30	
Chloralamid	oz.	35	
Chloralose	oz.	2 50	½ or 1 oz. vials.
Chlorodyne Lyman's	lb	2 00	
Chloral Hydrate recryst	lb	1 20	
Chlorof pure Smiths 1 lb g.s. bs.	lb	90	10 lb 80 Whr. qt 65
" D. F. & Co's pur	lb	2 00	
" " meth	lb	90	5 lb 85
" " blue label.	lb	90	
" Merck 1 s	lb	65	5 lb bottle 60
" " 56-lb tins	lb	50	28 lb tins 55
Chromium metal	gm	60	
" oxid anhydric	oz	10	
" sesquichloride	oz	1 00	
" sulphate	oz	20	
Cinchonidin sulph	oz	15	Hds. 20
Cinchoninæ murias Hds	oz	18	
" sulphas "	oz	18	
Civet	dr	1 50	
Cobalt chlor	oz	25	
" nitras	oz	25	
Cocaine hydrochlor crys.	oz	7 00	⅛ oz 1.00 each
" phenate 5 grain tubes		07	grain.
Cocculus Indicus	lb	10	pulv 20
Coccus cacti S. G		40	pulv 45
Codeina pure	⅛ oz.	80	ea. oz. 6.00
" phosphate	⅛ oz.	90	ea.
" sulph	⅛ oz.	60	ea. oz 4.50
Colchici corm	lb	30	
Collodium	lb	65	
" vesicans, P. B.	lb	2 25	

Collodium flexile	"	65	
Colocynthis Turc select	lb	60	pulv 85
Confectio rosæ Gallic	lb	50	
" sennæ	lb	40	
Cortex aurantii Ang	lb	70	
" " coml.	lb	15	
" " opt. ⅛s	lb	20	
" canellæ	lb	20	pulv 25
" cascara sagrada	lb	25	
" cascarillæ	lb	25	
" cassiæ	lb	15	pulv 18, 25 lb box 16
" cinchon flav	lb	90	pulv. 1.00
" " " coml.	lb	30	pulv. 35
" " rub quill	"	60	pulv. 70
" granat fruct	"	20	
" " radicis	"	40	
" limonis ang opt	"	55	
" " com	"	16	
" mezerei	"	25	
" myricæ (bayberry)	lb	20	
" pruni virginianæ	"	15	20 lbs 12
" quillaiæ	"	15	grd. 20 pulv. 25
" sassafras	"	15	pulv. 22
" ulmi	"	16	pulv. 16 grd 14
Creolin, Pearson's	"	70	litre bot. 1 25 each.
Creosot. Ang (Morson's)	oz	20	lb 2.00
" (Beechwood) Merck's	lb	1 50	Whr. 1 35
" (Beechwood) French	lb	2 75	
" white, from coal tar	lb	75	
" Carb	oz	80	lb 12 00
Creta gallic	lb	18	
" " pulv	lb	5	bgs 3½.
" præcip	lb	10	keg 8
" præparata	lb	6	25 lbs 5
Crocus stigmat amer	lb	60	
" " Valent	oz.	75	Alicante 60c oz.
Croton chloral-hydrate	oz	45	
Cudbear	lb	20	
Cupri ammonio-sulphas	lb	1 00	
" chloridum pur	lb	60	
" nitras pur	lb	60	
" oxidum nigr. pur	lb	1 75	
" " coml	lb	50	
" sulph	lb	7	keg 5 brl 4½
" " recryst	lb	25	
Cuprum scales	lb	40	
Curare	grain	4	
Currie powder	lb	35	
Cusso "	oz.	10	

Damiana	lb	40	
Daturine, pure xtls	gr	10	
" sulph 1 grm. tube		1 15	each
Dextrine, white	lb	10	50 lb 8
" yellow	lb	8	" 7
Diapente	lb	30	
Diastase	oz	1 00	
Digitaline	⅛ oz	50	each
Diuretin "Knoll"	oz	1 75	
Dolichos pruriens pubes	oz	60	
Duboisin, pure Amp 5 gr. tube		60	each
" sulphate	gr	10	

Eikoneogen	25 gm. tins	40	each
Elaterine xtls P.B. 15 gr vials		1 25	each
Elaterium	dr	35	
Ergota	lb	50	pulv. 60
Ergotinum Bonjean	oz	75	
Ergotine Bonjean Gen.	30 gm	2 00	each
Eserine sulph 5 or 10gr. tube	gr	9	
" salycilate, 5gr. tube	gr	10	each
Ethyl, Benzoate	oz	40	
" Bromide	oz	35	
" Butyric	oz	15	

Ethyl, Chloride..... ...tubes	35	each	
" Iodid.....oz	65		
" Œnanthylate.....oz	1 00		
" Succinate.....oz	60		
" Valerian.....oz	50		
Eucalyptol.....oz	30	lb 3.20	
Eugenol pure.....oz	35		
Europhen .....oz	2 00		
Exalgine .....oz	1 25		
Extract, acon. (rad alco.)..oz	35	lb 4.80	
" aloes barb.....lb	75		
" " " pulv....oz	10	lb 1.25	
" " socot..... "	15	lb 1.75	
" anthemides ..... "	20	lb 2.50	
" " alcoh ....oz	25	lb 3.00	
" belladon P. B.... "	25	lb 3.00	
" " pulv .... "	30	lb 3.50	
" " aqueos...oz	15	lb 1.50	
" calumb.....oz	25	lb 3.25	
" cannabis indicæ...oz	25	lb 3.00	
" cascara sagrada....oz	25	lb 3.00	
" cinchonæ flav.....oz	25	lb 3.50	
" colchici.... .....oz	20	lb 2.60	
" " acet.....oz	15	lb 2.00	
" colocynth co.....oz	25	lb 3.00	
" colocynth co. pulv.oz	20	lb 2.50	
" conii P.B..... ..oz	20	lb 2.00	
" " pulv.....oz	25	lb 3.50	
" copaibæ resin ....oz	15	lb 1.50	
" damiana.....oz	40		
" digitalis.... .....oz	20	lb 2.50	
" " pulv.....oz	30	lb 3.50	
" ergotæ pulv.....oz	60		
" gentianæ.....lb	45		
" filicis maris ether..oz	25		
" hamamelis dest ...gr	1 25		
" glycyrrh mol.....lb	0 75		
" " pulv.....lb	0 75		
" hellebor nig.....oz	25		
" hæmatoxylin.....lb	80		
" hyoscyamine ....oz	20	lb 2.5. 0	
" hyoscyam aquos ...oz	15	lb 1.25	
" " pulv ....oz	25		
" " aug ....oz	25	lb 3.50	
" ignatia amara.....oz	60		
" ipecac acetic.....oz	1 50		
" jaborandi.... ....oz	60		
" jalapæ.....oz	25	lb 3.50	
" " pulv.....oz	35		
" krameria.....oz	25	lb 3.50	
" lactucæ..... ....oz	20	lb 2.20	
" logwood..... ...lb	11	(15 & 30 lb boxes)	
" " 1 lb pkts..lb	14	(30 lb boxes)	
" " ½ lb pkts .lb	15	"	
" " ¼ lb pkts..lb	17	"	
" " asst. pkts..lb	16	"	
" lupuli..... ...oz	25	lb 3.00	
" mezerei æther.....oz	60		
" nucis vomic..... .oz	40	lb 5.40	
" " " pulv...oz	40		
" opii..... .....oz	90	lb 13.50	
" " pulv.....oz	1 10		
" " liquid..... ..lb	1 90		
" papaveris ....oz	16	lb 2.25	
" physostigmatis....oz	2 00		
" podophylli.... ...oz	25	lb 3.00	
" quassiæ.....oz	20	lb 2.40	
" rhamni frang.....oz	50	lb 5.00	
" ramni pulv..... oz	40		
" rhei E. I.....oz	2!	lb 3.50	
" sarsæ jam.....oz	30	lb 4.00	
" sarsæ co..... ....oz	20	lb 2.75	
" stramonii fol.....oz	20	lb 2.50	
" " pulv ....oz	25	lb 3.00	
" taraxaci..... . ..lb	50		
" valerian.....oz	15	lb 2.00	

Extract. veratri viride.....oz	45		
Faba ignatia amara .....lb	1	00	
" physostigmatis... ...lb	1	25	
" touca para..... .....lb		75	
" " surinam.....lb	1	25	
" " angostura.... .lb	2	25	
" vanillæ, short .....lb	3	00	
" " medium ....lb	6	00	Bourbon
" " 7½ in..... lb	7	50	
Fehling's solution.....lb	1	00	
Fel bovinum purificat.....oz		20	2.00 lb
Ferratine..... .....oz	1	25	
Ferri albumen..... .....oz		25	
" ammon chlorid.....lb		60	
" " persulph(iron alum) lb		40	
" " protosulph.....lb		30	
" " tartras..... lb		75	
" arsenias..... .....oz		15	lb 1.60
" bromidum .....oz		20	lb 2.00
" carb. precip.....lb		15	
" carbonas sacch.....lb		30	
" chloride..... .....lb		50	
" citras soluble .....lb		65	
" et ammonii citras....lb		65	
" et quin. cit., 4%.....oz		15	
" " 4 p.c. ..lb	1	75	
" " 10%.....oz		17	
" " " .....lb	2	40	
" " P. B....oz		20	
" " " .....lb	2	75	
" " Hd's....oz		25	
" " amorph....oz		15	
" " " .....lb	1	75	
" " et strych. cit., oz		35	
" " " Hd's, oz.		40	
" et strychn. citras 1%.oz		15	10 oz 13 lb 1.75
" hypophosphis..... .oz		20	lb 2.50
" iodide..... .....oz		40	
" lactas..... ... .lb		75	
" perchlorid..... ....lb		35	
" phosphas.... .....lb		85	
" pyrophosph.....lb		80	
" succinate .... .oz		35	
" sulphas commercl....lb		2	brl 90 gross
" " exsic .....lb		6	
" " pur ..... lb		7	10 lb 6
" sulphid..... .....lb		15	
" valerian.....oz		25	
Ferrum dialyzatum..... lb		40	
" redactum.....lb		75	
" tartaratum .....lb		70	
Flor. anthem. opt, French..lb		35	
" " Roman.....lb		30	
" " German.....lb		30	
" arnicæ..... ...lb		25	
" lavand.....lb		15	pulv. 25
" rosæ gall rub.....lb		75	
" " white.....lb		40	
Folia aconiti..... .....lb		25	pulv. 35
" belladon .....lb		25	pulv. 35
" buchu, ...lb		20	
" cocæ green.... .....lb		50	
" conii.....lb		20	pulv. 35
" digitalis.....lb		20	pulv. 35
" eucalypti glob.....lb		18	
" hyoscy. exot.....lb		20	powd. 40
" jaborandi.....lb		65	
" maticæ.....lb		40	
" pulegii .....lb		20	
" sennæ alex .....lb		60	
" " tenny.....lb		20	15, bale 16
" " " pulv....lb		25	
" uvæ ursi.... .....lb		12	
Fruct. anethi.....lb		30	

Fruct. anisi Germ.....lb		15	
" " pulv.....lb		20	
" " Star .....lb		45	
" capsici..... .....lb		18	25 lbs 16
" " pulv.... .....lb		20	" 18
" carui..... ..... . lb		12	
" " canad.....lb		10	
" " pulv .....lb		18	
" conii .....lb		30	
" coriandri..... ....lb		16	
" " pulv.... ...lb		18	
" fœniculi.....lb		15	pulv 20
Fuller's earth..... .....lb		4	100 lb 3
" " pulv.... ....lb		6	100 lb 5
Gaduol.....oz		40	
Gallæ cœrulæ.... .....lb		28	bag 25
" " pulv.....lb		30	grd 28
Gallanol .....oz	1	00	
Gallabromal .....oz	1	00	
Gasoline, 76° .....gal		60	
Gelatine, black label.....lb		35	10 lb 30
" bronze label.....lb		40	" 35
" silver " .....lb		45	" 40
" gold " .....lb		60	" 55
" pink gold label...lb		75	
Glue, black..... .....lb		12	
" amber .....lb		15	
" white.....lb		20	
" cooper's .....lb		39	
Glycerine (double dest)1260deg.lb		20	56 lb tin 16 case 15
" Price's .....lb		70	W. qt. 65
Grana paradis.... .....lb		20	
" " pulv..... ..lb		30	
Guaiacol absolute .....oz		60	lb 7.00
" benzoate .....oz	1	50	
" carb .....oz	1	60	
Guarana pulv.... .....lb	2	40	
Gum acacia, No. 1 ..... .lb		60	
" " " 2 ..... .lb		40	
" " " 3 .....lb		35	
" " " 4 .....lb		30	
" " " 5 .....lb		25	
" " pulv... .....lb		65	
" ammon guttæ .....lb		40	
" asafœtid. opt.....lb		45	
" " pulv .....lb		50	
" benzoin opt ....lb		75	
" catechu nig.....lb		12	20 lb 11 pulv 25
" catechu pallid cubes..lb		16	10 lb 15
" copal..... ....lb		35	
" damar.... .....lb		30	
" elemi..... .....lb		30	
" euphorb. pulv..... lb		40	
" galban opt.....lb	1	25	
" gambogiæ..... ....lb	1	00	pulv 1 15
" guaiaci.....lb		65	Sec. 40 pulv 50
" juniper.... ....lb		35	
" kino..... .....lb	2	50	pulv 2 60
" mastiche select.....lb		90	
" myrrh. turc opt.... .lb		70	
" " " sorts ....lb		45	pulv 65
" olibani..... .....lb		25	
" sang. draconis.....lb		50	reed 1 00
" " pulv...lb		75	
" scammon. aleppo " opt. (pulv) lb	6	50	
" scammon resin.....lb	3	50	
" seedlac..... .....lb		35	
" shellac, orange.....lb		45	10 lb 40
" " bleached.....lb		40	
" spruce..... .....lb		30	10 lb 25
" storax liquid		50	
" " dry .....lb		50	
" thus..... .....lb		15	

Gum tragacanth Ribbons ..lb	90		
" " Alleppo opt.lb	65		
" " " No.2.lb	50		
" " pulv. opt..lb	90		
Gun cotton.....	70	1 oz box	
Hæmogallol, 10 gm. vials....	50	each	
Hæmol " " "	35	" 25 gm. vials 80 ea	
Homatropine Hydrobrom ..gr	30		
" hydrochloric .gr	30		
Humulus lupulus..... ....lb	20	assorted packages	
Hydrarg. ammon chlor . ..lb	1 20		
" bisulphate.....lb	190		
" c. creta.....lb	60		
" cyanid.....oz	30		
" iodid rub.....oz	35	lb 4.50	
" " virid ..oz	25	lb 3.50	
" nitrate pure .....oz	15	lb 1.50	
" oleas 5%.....lb	55		
" " 10%.....lb	65		
" " 20%.....lb	80		
" " 28.3%....lb	1 50		
" oxide flav. .....oz	15	lb 1.50	
" " nig .....oz	25		
" " rub.....lb	1 10		
" " " liv.. ....lb	1 20		
" perchlor.....lb	90		
" " pulv .....lb	95		
" pill mass.....lb	70		
" salicylate.....oz	45		
" subchlor.....lb	1 00		
" " a la vapeur lb	1 50		
" sulph.....oz	15	lb 1.50	
" " c. sulph ....lb	1 00		
" tannas.....oz	35		
Hydrargyrum.... .....lb	75	10 lb 70	
Hydrastine alcaloid C.P....dr	50		
" hydrochlor C.P.dr	90	oz. 6.00	
Hydrastinine mur. Merck's 15 grain tubes	90	oz. 22.00	
Hydrochinone..... .....oz	30	1 oz cartons	
Hydrogen peroxid, Peuchot's.1 lb		doz. 8.00	
" " " ½lb		" 6.00	
" " " ¼lb		" 4.50	
" " Coml.....lb	35		
Hyoscine, hydrobrom, 5 gr. tub.1	75	each	
Hyoscyamine " .....gr	25	sulph gr 35	
Hypnal .....25 gms	1 25	each	
Hypnon, pure.... .....oz	1 50		
Iatrol .....oz	1 50		
Isinglass Brazil.....lb	2 00		
" Gridley's oz ....doz	1 80		
" Russian .....lb	4 75		
Ichthyol, Merck's .....oz	45	½lb 5.75 lb ½lb 5.60 lb 1lb 5.50 lb	
Indigo Madras opt.....lb	75		
" " pulv.....lb	90		
" Paste.... .....lb	20		
Insect powder Dalmatian...lb	35	25 lb 26 56 lb 25	
" " Persian. ....lb	30	25 lb 21 56 lb 20	
Iodoformum.....oz	40	lb 5.90	
" præcip.... ....oz	40	lb 5.90	
Iodol.....oz	1 40		
Iodum crude ....oz	30	lb 4.50	
" resub.....oz	40	lb 5.25	
Jalapin ang.....oz	1 00	lb 18.50	
Kamala ....lb	60		
Kousso.....oz	10		
Kava Kava.....lb	90		
Lactopeptin ozs.....doz	8 50		
" ½ lbs.....lb	10 50		
Lactophenine .....oz	1 10		
Lactucarium apg.....oz	70		
Lanolin .....lb	85		
Lapis calam. præp.....lb	7		
" pumicis select. .....lb	8	ordinary 6	
" " pulv.....lb	7	100 lb 5	
Leptandrin .....oz	45	Keiths 50	
Lichen Hibern opt.....lb	18	Sec 12	
Licorice Corig.....lb	35		
" Solazzi .....lb	50		
" Zuvia .....lb	30		
" Windsor, 4,8 or 16 1-5 lb	35	25 lbs 30	
" Y. & S. stick.....lb	35		
" Pellets Y. & S....lb	40		
" " M. & R....lb	40		
Lignum guaiaci rass.....lb	7		
" quassiæ incis.....lb	10	50 lb 9	
" sant. flav. grd.....lb	65	Rub 10	
Liniment aconiti.....lb	90	Whr. qt. 85	
" belladon.....lb	95	" 90	
" camph .....lb	55		
" camph comp.....lb	60	Whr. qt. 55	
" crotonis.... ....lb	1 25		
" iodi.....lb	1 50		
" opii.... .....lb	90		
" saponis co.....lb	45		
" " c pot iod..lb	90		
" sinapis co . ....lb	1 50		
" terebinth.....lb	30		
Liquor ammon. acet conc...lb	35		
" " fort s. g. 880lb	12	case 10	
" antim. chlor.....lb	20	W. qt. 18	
" arsenicallis.....lb	10	pt., Whr. qt. 8	
" arsenii et hyd. iod. .lb	25	W. qt. 20 (Donovans)	
" atropia sulph .....oz	25		
" bismuth et am. cit..lb	45	Wich. 40	
" ferri Acet ....lb	35		
" " " Ft .....lb	60		
" " perchlor fort....lb	12	Whr. qt. 11	
" " pernit.....lb	15		
" " persulph.. ....lb	15		
" plumbi subacet.....lb	12	Whr. qt. 10	
" potassæ.....lb	7		
" santal flav comp ....lb	1 50		
" sodii chlor..... ...lb	16		
" strychnine.....lb	50	Whr. qt. 45	
Lithii bromid..... .....oz	25		
" carbonas..... .....oz	25	lb 3.00	
" citras.....oz	20	lb 2.75	
" hippurate.....oz	1 50		
" iodid..... ....oz	50		
" salicylat..... ....oz	30		
Litmus.....lb	60		
Losophan .....oz	2 25		
Lucilline .....1 lb tins	20	each	
" .....5 lb "	90	"	
" .....10 lb "	1 60	"	
" ..... 25 lb tubs	13	lb.	
" ..... 50 lb tubs	12	"	
Lupulinum..... .....lb	60		
Lycetol Bayer, ½ ozs .....oz	4 00		
Lycopodium.....lb	75		
Lysol.....½ kilo bottles	1 00	each	
Macis..... .....lb	1 10	pulv 1 20	
Madder compound.... ....lb	10	carboy 9	
" Dutch .....lb	12	brl 10	
Magnes citr. gran. Bishop..lb	80	7 lb 75	

Magnes citr. gran. Lyman. lb	35	
" calcined ....1 lb tins	50	bulk 40
" " .... " bots	55	
" carb levis 1 oz pkt. lb	20	10 lb 18
" " " 2 " .lb	18	" 16
" " " powd...lb	25	1 lb tins
" chloride .....lb	30	
" sulphas.....lb	3	Brl. 1.50
" " hd's .....lb	5	" 4
Magnesium, wire or ribbon .oz	75	Powder 50
Maltopepsin ½ lb bots.... .lb	5 85	
" bots.... .... doz	6 85	
Maltose xtls..... .....oz	1 50	
Manganese chlorid.....lb	50	
" hyphosphite ..... oz	20	
Manganese oxyd. nigr ....lb	10	
" sulph. pur..... lb	60	
Manna flak select.....lb	1 40	
Maranta Bermuda.....lb	45	10 lb 42
" Jamaica .....lb	15	
Mel. canadensis.... .....lb	13	10 lb 12
Menthol.....oz	50	lb 7.00
Morphinæ acetas.....oz	1 90	10 ozs. 1.80
" hydrochloras....oz	1 90	" 1.80
" sulphas..... ..oz	2 00	" 1.90
Moschus, in grain, No 1....dr	6 00	
" " No 2....dr	4 50	
" " No 3....dr	3 50	
Mollin, pure .....lb	1 00	
Myrtol..... .. oz	1 00	
Naphtha mineral .....lb	50	
" vegetable .....lb	60	
Napthaline resublimed.....lb	30	
Naphthol Beta.... .....oz	10	lb 1 .40
" " Benzoate ...oz	35	
Nickel sulph cryst.....lb	50	
" ammon. sulp.....lb	30	
Nux. areca select.....lb	20	pulv 35
" kola.....lb	50	
" myristicæ (limed)....lb	35	pulv 1.00
" " opt.(unlimed)lb	90	
" vomica.....lb	12	pulv 32
Olio Resin Capsici.....oz	75	
" " Copaiba .....oz	25	
" " Cubeb .....oz	40	
" " Zingib.....oz	90	
Ol. absinth.....oz	40	
" amygd. dulc.....lb	45	Whr. qt. 40
" " essent. sine acid prus.....oz	50	
" anethi Ang .....oz	30	lb 4.00
" anisi.....lb	2 75	
" anthem Ang.....oz	1 50	
" aurantii..... .....lb	2 00	
" bergam super.....lb	3 00	
" buchu.....oz	1 60	
" cadi.....lb	30	Whr. qt. 25
" cajeputi..... .....oz	10	lb 1.00
" carui.... ....lb	2 25	
" caryoph .....lb	1 00	
" cassiæ.....lb	1 75	
" cedri opt .....lb	70	Whr. qt 65
" " coml .....lb	50	" 45
" chaulmoogra..... ..oz	25	
" cinnamomi ver.....oz	1 70	
" citronellæ.....lb	80	bot. 65 lb
" cocoanut.....lb	15	
" cognac.... ....oz	2 25	
" cologne..... .....oz	60	
" conii....spruce.....lb	70	Whr. qt. 65
" copaibæ.....lb	1 25	

Ol.	coriandri	oz	1 50	
"	crotonis	oz	12	bot. 1.50 lb
"	cubebæ	oz	20	2.75 lb
"	cymini	oz	50	
"	erigerontis	lb	3 25	
"	eucalypti	lb	1 40	
"	fœniculæ dulc	lb	1 50	
"	gaulther	oz	20	lb 2.50
"	" synthetic	lb	2 00	
"	geranii rose	oz	50	
"	" super	oz	1 00	
"	juniperi bacc	oz	20	lb 2.75
"	" lig	lb	60	Whr. qt. 55
"	lauri	lb	40	
"	lauri essent Bay	oz	40	lb 4.50
"	lavand ang	oz	2 00	
"	" French	lb	3 50	sec 2.50 1.50
"	limonis super	lb	1 50	copper 1.35
"	macis	oz	25	lb 3.50
"	menth. pip. Amer	lb	3 00	Whr. qt. 2.75
"	" " English	oz	1 00	lb 14.00
"	" " Japan	lb	4 00	
"	" virid	oz	25	lb 3.50
"	morrhuæ Norweg	gl	2 25	brl. 2.00
"	" Munn's Nfld. by Norweg. process		1 50	kegs 20 gals 1 25
"	myrbane	lb	35	Whr. qt. 30
"	myristicæ	oz	25	
"	neatsfoot, pale	gl	1 00	
"	neroli, opt	oz	3 00	
"	olive sublime salad 1 gal		original tins 2.25 each.	
"	" green	gl	1 40	brl. 1.20
"	" " opt	gl	1 50	brl. 1.35
"	" yellow	gl	1 40	brl. 1.15
"	" " opt	gl	1 50	brl. 1.25
"	" (Salad American)	gl	90	brl. 80
"	origani	lb	85	
"	" Sec	lb	50	Winch 45
"	palmæ select	lb	15	
"	patchouli opt	oz	75	
"	petit. gran	oz	50	
"	picis	lb	12	Whr. qt. 10
"	pimentæ	oz	25	lb 3.20
"	pini silvestris	lb	1 50	
"	pulegii hed	lb	1 75	
"	rapii	lb	15	
"	rhodii	oz	80	
"	ricini E. I	lb	10	case 7 tins 7½
"	" Gal water pale	lb	10	brls 7
"	" Virgin		13	tins 11
"	" Ital	lb	16	tins 15
"	rosmarini exot	lb	90	W. qt. 65
"	rutæ	oz	25	
"	sabinæ	lb	1 30	
"	santali ang	oz	50	lb 7.50
"	" W. I	oz	40	lb 4.00
"	sassafras	lb	65	Whr. qt. 60
"	sesame	gl.	1 35	
"	sinapis essent	oz	65	lb 8.50
"	sperm	gl.	1 60	
"	spike	lb	25	
"	succin. rect	lb	65	Whr. qt. 60
"	tanaceti opt	oz	25	lb. 3.50
"	terebinthinæ	lb	45	
"	" coml	gl.	65	
"	theobromatis	lb	60	
"	valerian	oz	1 00	
"	verbenæ	oz	12	
"	vini	oz	25	lb 3.50
"	ylang-ylang	oz	7 50	
Opium	Turc	lb	4 50	
"	" pulv	oz	40	lb 5.50
Oss	sepiæ	lb	25	pulv 30
Otto	rosæ coml.	oz	6 50	
"	virgin	oz	9 00	opt 11.00
"	Turkish ounces	dr	1 00	bottles of 9-11 drms

Pancreatine, Morson's	oz	1 00	
" Merck's	oz	50	
" " absolute	oz	75	
Papoid	oz	3 25	
Paraffinum durum	lb	15	50 lb 13
Paradehyde	oz	20	lb 2.00
Paris Green	100 lb irons	16	
"	25 lb "	18	
"	1 lb tins	20	
Pelleterine Tannate	gm	45	
Pepsin	lb	225	
" pur.sol.pulv.Merck's	lb	8 00	
" Merck's scales	lb	5 00	
" ang. coml	oz	30	lb 3.50
" Boudault's	oz	1 20	
" medicinal Morson's	oz	85	
" porci Morson's	oz	2 25	
" saccbar	oz	25	lb 3.50
" Jensen's scales	oz	1 25	
" Armour's	oz	90	lb 12.00
Petrol Barbadens	lb	15	
Petroleum, see Lucilline			
Phenacetine Bayer	oz	35	lb 4.50
" schering	lb	4 00	
Phenetol pure	oz	60	
Phenocoll	gm	25	
" Hydroch	25 gms	1 50	
Phenolphthalein	oz	75	
Phenyl hydrasin hydroch	oz	60	
Phloroglucin puriss	dr	75	
Phosphorous	11 lb tins	lb 85	1 lb bots 1.00
Pil. hydrarg		lb 70	
Pilocarpin hydrochlor		gr 35	5 or 10 gr. tubes
" nitras		gr 35	5 or 10 gr. tubes
Pipe clay		lb 5	100 lb 4
Piperinæ		oz 1 00	
Piperazin Bayer, ½ oz bottle		oz 3 50	
" tablets	10x16 gr	2 00	each
" Schering, 5 gm vials		75	each oz. 3.50
Piper alba		lb 16	pulv 18
" cayenne		lb 25	10 lb 20
" nigrum		lb 12	pulv 14, 25 lb 13
Pix Burgund bladders		lb 10	20 lb 9
Platinum Bichlor		oz 8 00	
" " 10% solut		oz 1 25	
" Foil		grm 60	
" Wire		gum 45	
Plumbi acetas brown		lb 10	50 lb 9
" " Xtls		lb 12	50 lb 10
" " C. P		lb 25	
" iodid		oz 35	lb 4.50
" nitras coml		lb 16	
" oleas		lb 1 00	
" oxyd pulv		lb. 9	keg 7½ (litharge)
" " rub		lb 8	keg 6 (red lead)
Podophyllin resin		oz 35	
Potassa caustica sticks		lb 50	
" sulphurata		lb 35	
Potassii acetas		lb 45	gran 50 bot. inc.
" bicarbonas		lb 14	
" " pulv		lb 15	
" bichromas		lb 15	keg 12½
" binoxalas		lb 23	10 lb 22
" " pulv		lb 25	10 lb23
" bitart		lb 30	keg 24 brl 28
" bromid		lb 60	5 lb 55
" carbonas		lb 14	10 lb 12
" carbonas pearl ashes		lb 10	100 lb 9
" chloras		lb 17	keg 15
" " pulv		lb 18	keg 16
" chlorid. pur		lb 30	
" chromas		lb 45	
" citras neutral		lb 65	
" cyanid. C. P		lb 1 00	
" " fused 30 p.c.		lb 40	

Potassii cyanid fused 60 p.c.		lb 55	gold platers.
" hypophosph		lb 1 50	
" iodid		lb 4 00	5 lbs $3.75
" nitras		lb 10	112 lb keg 6½
" " gran		lb 10	" " 6½
" " C.P. Mercks		lb 30	
" nitrate pure stick		lb 1 20	
" oxalas, neutral		lb 25	
" permangan pur		lb 30	
" pruss. flav		lb 35	
" " rubr		lb 65	
" silicas		lb 30	
" " Liq		lb 20	
" sulphas		lb 12	pulv 13
" sulpho-cyanid		oz 15	
" sulphocarb		lb 1 60	
" sulphuret		lb 35	
Potassi tartras		lb 80	
Potassium		oz 2 00	dr. 40
Propylamine		oz 50	
Pulv. aloes c. canella		lb 40	
" amygdalæ co		lb 1 35	
" antimonialis P. L		lb 60	
" catechu comp		lb 70	
" cinnam comp		lb 75	
" cretæ aromat P.B		lb 1 20	
" " " c. opiô P B		lb 1 50	
" " comp Ph. Ed		lb 50	
" " " c. opiô		lb 75	
" " c. camph		lb 20	10 lb 18
" glycyrrh comp		lb 30	
" ipecac comp		lb 1 10	
" jalap comp		lb 75	
" kino comp		lb 2 25	
" rhei comp		lb 75	
" sapo cast		lb 25	
" " " alb		lb 30	
" scammon comp		oz 30	
" seidlitz Howards		lb 22	7 & 14 lb
Pyoktannin	25gms	1 25	
Pyridin Puriss		oz 25	

Quassine, ⅛ oz vials		oz 4 00	
Quininæ bisulph		oz 65	
" bromid		oz 90	
" citras		oz 80	
" hydrobrom		oz 99	
" hydrochlor		oz 75	
" hypophos		oz 1 20	
" iodid		oz 90	
" phosphas		oz 1 00	
" salicylas		oz 65	
" sulph German		oz 40	100oz tin 30 25 oz 32
" " Howards		oz 45	
" " " .4 oz		40	
" sulphocarbolas		oz 1 50	
" tannate		oz 50	
" valerian		oz 85	
Rad. aconiti		lb 20	
" " contus		lb 25	pulv 30
" anchusæ		lb 20	
" angelicæ		lb 30	pulv 35
" arctii (burdock)		lb 15	
" belladon		lb 18	pulv. 30
" calam. aromat		lb 20	
" calumb		lb 15	pulv. 20
" curcumæ Madras		lb 10	" 12
" enulæ		lb 20	
" galangal		lb 12	
" " pulv		lb 20	
" gentian, select		lb 10	
" " ground		lb 11	
" " pulv		lb 15	
" ginseng		lb 4 50	

Rad. glycyrrh decort.... incis	lb	25	
" " dec't pulv....	lb	15	
" " bundles	lb	12	
" " small bundles super.....	lb	18	
" " grd.....	lb	12	brl. 11
" helleb alb.....	lb	12	
" " " pulv.....	lb	16	keg 14 br. 13
" ipecac.....	lb	1 50	
" " pulv.....	lb	2 00	
" iridis Florentine.....	lb	40	
" " pulv.	lb	50	
" " verona.....	lb	25	pulv. 30
" jalapæ.....	lb	50	
" " pulv.....	lb	60	
" krameriæ opt.....	lb	30	
" pareiræ brava.....	lb	40	
" pyrethri.....	lb	35	
" rhei E. I. opt.....	lb	1 25	cubes 1.00
" " " sec.....	lb	75	
" " " elect opt...	lb	2 25	fingers 1.50
" " pulv elect opt...	lb	2 50	
" " " E. I. opt...	lb	1 25	
" " " " sec...	lb	80	
" sanguinariæ.....	lb	14	pulv 16
" sarsæ Hond.....	lb	40	incis 50
" " Jam.....	lb	60	" 70
" " Mexican.. ...	lb	18	20 lb 16
" scillæ sicc.....	lb	12	
" " pulv.....	lb	30	
" senegæ.....	lb	60	
" spigeliæ.....	lb	45	pulv 60
" sumbul.....	lb	70	
" taraxac sicc.....	lb	18	10 lb 15
" tormentillæ.....	lb	35	
" " pulv....	lb	45	
" zingib. Afric. u. b....	lb	16	25 lb 15
" " " pulv..	lb	18	25 lb 17
" " Jam. u.b.....	lb	22	10 lbs 20
" " " bleached.	lb	28	10 lb 27
" " " pulv opt.	lb	30	10 lb 28
" " " " sec.	lb	25	
Resin flav.....	lb	4	
" " pulv.....	lb	5	50 lb 4
Resorcin xtls.....	oz	20	lb 2.75
" resublim.....	oz	50	
Rhizoma arnicæ.....	lb	30	contus 40
" cimicifugæ.....	lb	15	
" podophylli.....	lb	14	
" serpentariæ.....	lb	60	pulv. 85
" valerianæ.....	lb	15	pulv. 22
Rouge—Jewellers.....	lb	65	
Rubidium chloride.....	gm	40	
Saccharine.....	dram	20	oz 1.00
Sacch. lactis pulv.....	lb	25	
Sago perlat. parv.....	lb	5	
Sal prunellæ glob.	lb	20	
Salicinum.....	oz	20	lb 3.00
Salipyrine..... 50 gms		2 50	each
Salol.....	oz	30	lb 3.50
Salophen Bayer.....	oz	1 50	
Santoninum.....	oz	20	lb 2.75
Sapo Castile Alb. Contis....	lb	16	box 15
" " " Shell....	lb	12	" 10
" " " Virgin....	lb	12	" 10
" " " " cakes box,		5 00	
" " Mottled opt....	lb	12	box 11
" " " com..	lb	10	" 9
" " " cakes gross		4 75	
" mollis ang.....	lb	10	20 lb 8
" " German Green.	lb	35	
" " Green opt.....	lb	55	

Scammoniæ resin pulv	lb	3 75	
Scoparii cacumin	lb	25	
Secale Cornut	lb	75	
Seidlitz Mixture hds	lb	22	
Sem. canary	lb	5	bag 4½
" cardam	lb	1 25	1.00 & 75
" " decort	lb	1 00	
" " pulv	lb	1 20	
" celery	lb	25	
" chenepodii	lb	20	
" colchici	lb	30	pulv. 40
" cydoniæ	lb	50	
" cymini	lb	20	pulv. 25
" fœnugræci	lb	5	
" " pulv	lb	7	ground 6 brl 5
" hemp	lb	5	bag 4
" hyoscyam	lb	30	
" jambul	oz	10	
" lini sifted	lb	4	brl. 3½
" " crushed	lb	5	brl. 4
" " " No. 2	lb	4½	brl. 3½
" " " No. 3	lb	4	brl. 3½
" lobeliæ inflaæ	lb	35	pulv 40
" maw	lb	15	10 lb 14
" millet	lb	5	bag 4
" pumkin	lb	25	
" rapii	lb	7	
" sabadilla	lb	50	
" sinapis alb	lb	10	
" staphisagriæ	lb	35	
" stramonii	lb	25	
Soda caustica stick	lb	50	
" " cake	lb	40	
" crystals	lb	2	brl 1.25 per 100 lbs
" tartarata	lb	25	
Sodii acetas pura	lb	25	
" arsenias	oz	10	lb 1.20
" benzoas	oz	15	lb 1.50
" bicarb. pulv Morson's	lb	10	
" " " Hd's	lb	16	14 lb 15
" " " coml	lb	4	keg 2.75
" bisulphis	lb	25	
" bisulphas pure	lb	30	
" bromid	lb	70	5 lbs 65
" carb. recryst	lb	15	
" carbolas pur	lb	3 50	
" chlorate xtls	lb	50	
" citras	lb	90	
" hypophosphis	lb	1 40	
" hyposulphis	lb	5	keg 3
" iodid	oz	40	lb 5.25
" nitras pur	lb	25	coml. 8
" oxalas	lb	50	
" phosph pur	lb	12	
" " pulv	lb	20	
" " C.P. xtls	lb	20	
" potass tart pulv	lb	25	
" salicylas	lb	1 10	
" silicas xtls	lb	15	
" " solut conc	lb	10	
" sulphas	lb	3	brl. 1¾ Hds 5 [brl.
" " exsicc. pulv	lb	15	
" " pur recryst	lb	30	
" sulphid	lb	60	
" sulphis	lb	7	pulv. 8
" sulphite C.P.	lb	30	1 lb bottles.
" sulpho carbolas	lb	1 10	
" tungstas	lb	40	
" valerian	oz	50	
Sodium	oz	30	
" molybdate	oz	40	
" succinate	oz	35	
Sol. acid osmic 1%	ox	1 50	
" cocain 4%	oz	60	
" nitro glycerin 1%	lb	1 75	
Somatose—Bayer, 2 oz. tins	oz	70	

Somnal.....25 gm. vials 75 each
Spartein sulph .....½ oz 30 ea. 1 oz. 2 00
Spice pickling.....lb 35
Spt. ætheris comp.....lb 60
" " nit S. G. 845.lb 65 Whr. qt. 60
" ammon. arom.....lb 60 " 55
" " fœtid.... ...lb 85
" camphor.....lb 70 " 65
" chlorof. S. G. 871....lb 70 " 65
" cinnam.....lb 2 00
" menthæ pip.... ....lb 1 00
" myristicæ.... .....lb 90
" rectificatus 65 o/p.. gl 4 65 5 gl. 4.60 in a/c. 4.55 10 gl
" " " .. Brl 4.25 cash. 1 p c. 10 days
" vini gall.....gl 4 75 opt. 6.50
Spongia usta.....lb 2 50
Stanni chlorid. crist.....lb 40
" oxid (putty-powder).lb 45
Stannum gran.....lb 50
Stearin.....lb 15
Strontii bromid.....oz 20
" chlorid.....lb 30
" iodid .....oz 70
" lactas .....oz 25
" nitras exsic.....lb 18
" salicylate.....oz 50
" sulphate precip....oz 35
Strophanthin pure.....gr 10
Strychnina cryst.....oz 1 00 10 oz 85
" sulph..... ....oz 1 00 in ½ oz bots 25 extra
Styrax liquid.... .....lb 50
Succus conii..... .....lb 75
" limæ fruct W. I....gl 90 brl. 80
" rhamni..... .....lb 20
" scoparii.... .....lb 70
" taraxaci.....lb 65
Sulphonal—Bayer.... ....oz 45 lb 6.00
Sulphur Lac..... 12 10 lb 11
" præcip (B. P.) ....lb 20 10 lb 18
" rotund.... .....lb 8 brl 2
" sublim.... .....lb 4 bag 110 lbs 2½
" vivum..... .....lb 6 10 lbs 5
Sulphuris iodid.....oz 40
Svapnia, ½ oz bottles.....oz 5 00

Tamarindus, W. I.... ....lb 12
Tapioca flake ....lb 6
" pearl..... .....lb 6
Terebene..... .....lb 60
Terebinth canadensis.....lb 45
" chian .....oz 30
" Venet.....lb 15
Terpine Hydrat .....oz 20
Terpineol .....oz 50
Terpinol.....oz 30
Terra Japonica (Gambier)..lb 10
Thallin Sulphate pure ...drm 40
Trikresol, Schering's .....lb 1 20
Theobromin .....oz 3 00
Thiol liquid.....oz 60 100 gm. tins 1.25
Thymol.... .....oz 35
Toluol pure.....oz 60
Trional-Bayer..... .....oz 1 20
Tripoli..... .....doz. 90
Triticum repens.... .....lb 20
Troch. acid carbolic G'sT.H.lb 75
" " tannic " lb 1 25
" aconite .....lb 90
" bath pipe .....lb 45
" black curran', Gibsons lb 90
" boracic acid .. T. H.lb 90
" bronchial P. D. & Co.. 5 lb can 1.75 each

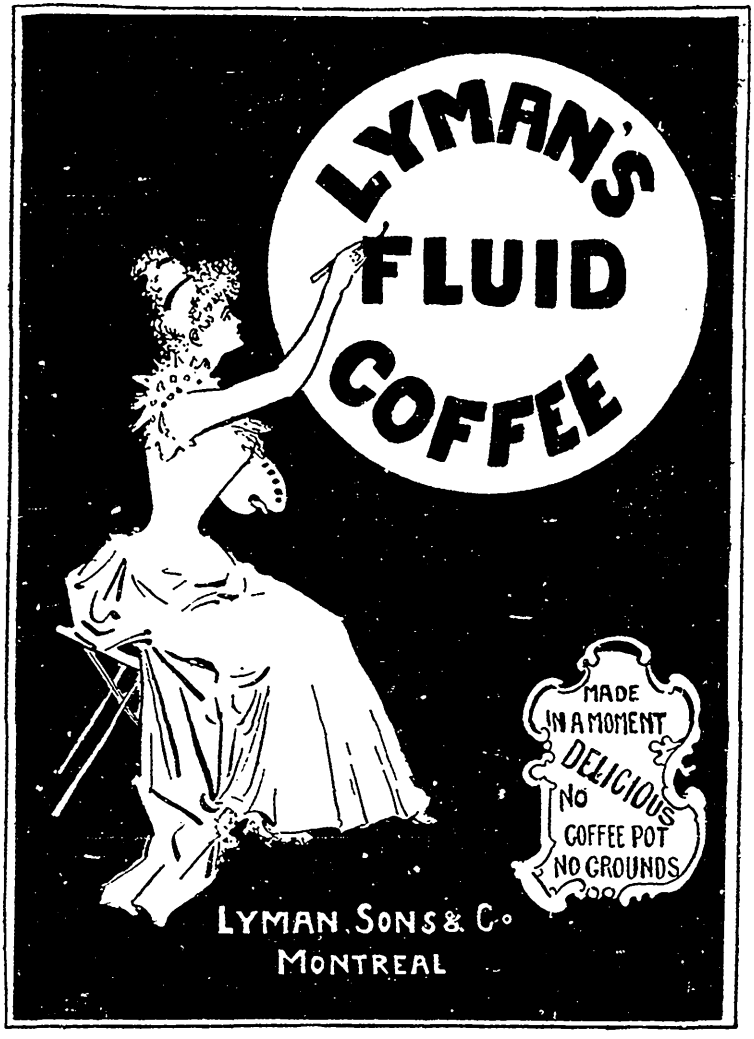
Troch. cachou dwf bouquet.lb 50
" " floral gems...lb 50
" camphor .....lb 75
" capsici Gibson's ....lb 65 Domestic 35
" catechu " ....lb 80
" chlorodyne.....lb 65 Gibson's 90
" coltsfoot.....lb 40
" cubeb T. H. .....lb 90
" gelatine.....lb 50
" glycerin [jujubes].. .lb 75
" guaiaci T. H.....lb 1 10
" ipecac..... .....lb 75
" kramariæ T. H.. ....lb 1 25
" lactucæ,....T. H ...lb 1 25
" licorice (pipe).....lb 35
" mentha pipC.S Gibson's lb 65 1lb bottles 75
" " " [XXX] .lb 50
" morphinæ..... ....lb 1 00
" " et ipecac. .lb 1 00
" mosch Gibson's ....lb 80
" opii..... ...lb 75
" paregoric.....lb 70
" pontefract.... .....lb 30
" potass. chlor..... .lb 50 Tablets 60
" pyrethri T. H.....lb 90
" rosæ Gibson .....lb 80
" sedative T. H.....lb 90
" tolu..... .....lb 70
" tussi [cough]..... ..bot 1 15 Gibson's
" " " .....lb 50 [Preston's]
" " " Watsons.tin 1 15 each
" vermifuge.....tb 50 worm
" voice [jujubes].... .lb 85

Uranii acetas .....oz 75
" nitras .....oz 60
Urethane .....oz 60

Veratrina pure .....oz 2 00
Verdigris..... .....lb 35 powd 40
Vinum rubrum [port].....gl 3 00 qr. cask 2.90
" " opt " .... .gl 3 50 " 3.25
" xericum [sherry]gl 1 75 " 1.65
" " opt. " gl 3 00 " 2.75
" " " fine... gl 3 50 " 3.25
Witch Hazel extract.... ..gl 1 50 5gals 1.25
Whiting..... .....lb 1 brl 60c per 100 lb

Xylol .....lb 60

Zinci acetas F.B. pure .....lb 45
" bromid.....oz 25
" carb..... ...lb 35
" chlorid. sticks.....oz 15lb 75, bt. free
" " cake .....lb 65 bot. free
" iodid..... .....oz 60
" lactas..... oz 20
" oleas..... .....lb 1 20
" oxidum Howard's P.B. lb 70
" " Coml .....lb 15 10 lb 12
" permanganate .....oz 75
" phosphas pur.....lb 1 25
" phosphid.... .....oz 40
" sozoiodol .....oz 1 50
" sulphas com.... ....lb 6 10 lbs 5
" " pur Merck's ..lb 10 10 lbs 9c.
" sulphocarb.....oz 10 lb 1.00
" valerian..... .....oz 30 b 4.00
Zincum granulatum.....lb 30


LYMAN'S
FLUID
COFFEE
MADE
IN A MOMENT
DELICIOUS
NO
COFFEE POT
NO GROUNDS
LYMAN, SONS & Co.
MONTREAL