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On Chloral.*

BY PROFESSOR CHARLES A. JOY.

This interesting compound was discovered in 1832, by Liebig, and was obtained by the action of chlorine upon absolute alcohol. The name is significant of its origin, and suggests at once the method of its manufacture. Chlorine alcohol is abreviated to chloral, just as aldehyd is al(cohol) de(prived of) hyd(rogen). The Germans have a name for chloral so long that it ought to be mentioned as a curiosity. They call it trichlormethylhydrocarbonoxyd, and sometimes trichloracetoxylwasserstoff, and again, trichloraldehyd, or trichloracetyloxydhydrat. It is not probable that the medical profession will adopt any of the long names in making up their prescriptions, but that chloral will reign in all its simplicity. It is worthy of note that nearly simultaneously with Liebig's discovery of chloral in Germany was Guthrie's preparation of chloroform in the United States, and it is somewhat remarkable that, while the former is just coming into notice as an hypnotic agent, the latter has been employed since 1847 as an anæsthetic, and the present investigations upon it would not have been undertaken if it were not for its relations to chloroform. Although Liebig first prepared chloral, yet we are chiefly indebted to Dumas for a knowledge of its properties and constitution, just as we were for the best investigations upon chloroform. In order to understand how chloral can be made from alcohol, it would be well to write down the formulas of alcohol, aldehyd, &c., and then trace the decomposition that takes place:—

Alcohol.....	$C^4H^6O^2$	C^2H^6O
Aldehyd	$C^4H^4O^2$	C^2H^4O
Chloral.....	$C^4Cl^3HO^2$	C^2HCl^3O
Chloroform.....	C^2HCl^3	$CHCl^3$

When chlorine is passed through absolute alcohol, we can see, from the above table, how it takes the place of hydrogen, and forms hydrochloric acid. The reaction may be represented by the following formula:— $C_2H^6O + 8\ Cl = C^2HCl^3O + 5\ HCl$. The actual manufacture of chloral is attended with considerable difficulty and expense.

It is necessary to pass well dried chlorine gas through pure anhydrous alcohol for many hours, as long as it is absorbed, and to keep the vessel cool in the early stages of the operation; later, the temperature must be gradually raised until the liquid boils. If dilute alcohol be employed, instead of the anhydrous, no chloral is formed, but, in its stead, aldehyd, acetic acid and hydrochloric acid; hence the necessity of using absolute alcohol. It is also difficult to prevent the formation of other compounds, especially chloride of carbon, which serve to contaminate the chloral and render its administration dangerous. After the chlorine has been passed through sufficiently long, the crude product is mixed with three times its bulk of oil of vitriol and distilled at a gentle heat. It is sometimes necessary to repeat this operation several times, and finally to distil over quick lime. This is a long and tedious process, and it is not at all probable that it will be followed on a large scale should there be a demand for chloral in medicine. The action of chlorine upon bodies that yield alcohol by fermentation, such as starch, sugar, &c., will be tried, and even wood, after it has been treated with sulphuric acid, might afford it when acted upon by chlorine. Professor Staedeler, formerly of Gottingen, now of Zurich, thought of the possibility of such a reaction, and actually succeeded in making chloral by distilling a mixture of one part of starch (or sugar) with 7 parts of hydrochloric acid and 3 parts of peroxide of manganese; formic acid, carbonic acid and other bodies accompanying it. Some of these latter methods may eventually prove successful, and thus enable us to obtain chloral at a cheap rate. At a recent meeting of the Chemical Society of Berlin, a pound of chloral hydrate was exhibited by two chemists, Martius and Mendelssohn, who stated that, with the co-operation of Dr. Liebreich, they had discovered a cheap and easy method for its preparation, but they refrained from giving the method because they are not thorough with the research. We also understand that the hydrate is offered for sale in Berlin for about a dollar gold, per ounce. As a dose only consists of a few grains, an ounce can be made to go a long way, and the price may be considered very moderate. We can hardly expect to procure it in this country for any such price until the demand for it has occasioned the discovery of cheap methods for its manufacture. We are sorry not to be able to give more definite hints in reference to a new way of preparing it, but we feel confident that our skillful pharmaceutists will soon be able to get on the right track.

We now propose to give an account of the properties of chloral. It is a limpid, oily, colorless liquid with a fatty taste, and a strong caustic smell, producing lachrymation. Its specific gravity is 1.502, and it boils at 95° C., and can be distilled unchanged. It mixes in all proportions with water, also with ether or alcohol. It dissolves sulphur, phosphorus, bromine and iodine, and combines directly with water to form a hydrate. A little chloral put into a moist flask deposits star-shaped crystals of the hydrate on the sides. The aqueous solution of chloral is indifferent to vegetable colors; oxides of silver or mercury have no effect upon it. concentrated sulphuric acid deprives it of water and separates the anhydrous crystals.

One of its most remarkable properties is the change it undergoes spontaneously when kept; it is altered into a porcelain-like mass called metachloral, which is insoluble, though isomeric with the liquid form. It can be reconverted into chloral by distillation. The white metachloral is insoluble in alcohol and ether, as well as in water, but by contact with water it is gradually converted into the crystalized hydrate of chloral.

Fuming nitric acid changes chloral into trichloracetic acid. An alcoholic solution of potash converts chloral immediately into formiate of potash and chloroform. This reaction may be represented as follows:— $C^2Cl^3HO + KHO = KCHO^2 + CHCl^3$. For pharmaceutical purposes chloral hydrate must form a hard, white crystalline mass, be completely soluble in water, not smell of chloride of carbon or hydrochloric acid but retain the peculiar, penetrating odor characteristic of chloral. It would be dangerous to employ hydrate of chloral, contaminated by chlorous acetylene, chloride of carbon and other incidental products, and hence great care must be observed in its preparation.

Much attention has recently been called to the hydrate of chloral in consequence of the physiological researches of Dr. Liebreich. This gentleman in presenting his paper to the Chemical Society of Berlin, May 24, 1869, gave the following interesting explanation of the occasion of his research.

"There are some substances which pass through the body without decomposition and without exercising any appreciable influence on the even tenor of our life; there are others which go to build up and nourish; others take up something from the body by chemical decomposition and then leave it; some are useful, such as acetic acid and sugar. I experimented recently to ascertain if, by the splitting up of certain compounds in the body, the separated compound would exert the same influence it would if administered alone.

"Trichloracetic acid of Dumas and chloral of Liebig appeared to be the most favorable for experiment. It is known that these bodies when brought in contact with alkaline solutions split up into chloroform and formiates and carbonates of the alkalies. Both of these substances being soluble in water are easily absorbed; after they have passed into the circulation they come in contact with the alkali of the blood. My experiments proved that the formic acid and carbonic acid had no particular effect, while the chloroform exerted its full influence."

Dr. Liebreich reasoned that what took place outside the body in the chemist's laboratory ought to follow in the alembic of the stomach; but he preferred to bring his agents directly in contact with the blood by subcutaneous injections rather than wait for the action by the way of the stomach; although in some experiments he injected the compound into the stomach.

Some animals slept ten minutes after the application, and continued in this state for eighteen hours with quiet pulse and respiration. One man slept for sixteen hours without bad effects. The length of the action is explained on the theory of the gradual elimination of chloroform in the body, and its continuous effect upon the patient until the whole of it was decomposed.

Dr. Jacobi, a distinguished physician of New York, has repeated many of Dr. Liebreich's experiments with great success, and he recently read a very interesting paper on the subject before the New York County Medical Society, giving a detailed account of what he had done. On the other side of the question, we find in the *Medical Gazette*, of New York, so ably edited by Dr. A. L. Carroll, a translation of some experiments conducted by M. Demarquay and communicated to the Academy of France, from which the experimentor draws the following conclusions:

"1. Chloral has a well marked soporific effect upon debilitated and weak subjects.

"2. The duration of its action is in direct proportion to the weakness of the patient.

"3. The sleep provoked by it is generally calm, and is only disturbed in patients laboring under acute pains. This leads me to advise it in diseases where it is desired to procure sleep and muscular resolution.

"4. Finally, this agent may be given in quite large doses, as it has not caused any accidents in the dose of from one to five grammes."

Dr. Demarquay thinks that the chloral is eliminated through the lungs, and states that the breath of the patients smells of it; he does not agree with the theory of Liebreich, that it is split up into chloroform and formic

* From the Journal of Applied Chemistry.

acid in the blood, but admits that it is the most rapid of all soporifics.

Dr. Jules Worms arrives at the following conclusions after conducting a series of experiments with the hydrate of chloral.

1. Chloral dissolved in ten parts of water can be drank without any inconvenience to the amount of ten grammes.

1. Its effect is felt with 1½ to 2 grammes, but there are some obstinate cases which require a dose of 2 to 3 grammes.

3. A calm sleep, often profound, during which there is no modification in the temperature, in the regularity of the pulse or of the respiration, ensues in ten or 15 minutes after the digestion of the chloral and continues for seven or eight hours. The waking is not accompanied by headache or nausea of any kind; there may be some dullness, but it is soon dissipated. It can be administered before or after meals, and exerts no influence upon digestion.

To sum up the experience of Dr. Worms, the hydrate of chloral appears to be an inoffensive agent in small doses, and may render important service as a hypnotic. In fact, the property which it possesses of determining sleep almost instantly is not possessed by any other agent that can be introduced internally. It possesses great advantages over opium and its derivatives in the rapidity of its action and the subsequent freedom from torpor and disagreeable sensations.

Trichloracetic acid was discovered by Dumas, in 1830, and was prepared by the action of chlorine on acetic acid. It crystallizes in octahedra and deliquesces in the air. As this acid is decomposed by alkalies into carbonic acid and chloroform. Dr. Liebreich proposes to employ it is a substitute for chloral, but no account of his experiments is available to us at this present writing. If his reasoning were to hold good with this compound also it would go far to sustain his theory in reference to the splitting up of chloral and the local action of chloroform. The whole subject is of great interest to physiologists and chemists, and may be the occasion of important discoveries.

NOTE.—The principal literature may be found in the following original papers.

Liebig'Ann. Chem. Pharm.....	I, 189
Staedeler, Ann. Chem. Pharm..	LXI, 101
Dumas, Ann. de Chim. Phys. ..	LVI, 123
Regnault, Ann. de Chim. Phys.	LXXI, 409
Wurtz, Ann. de Chim. Phys.....	XLIX, 58
Kolbe, Ann. Chem. Pharm.....	CVI, 144
Kopp, Ann. Chem. Pharm.....	XCIV, 257
Kopp, Ann. Chem. Pharm.....	XCV, 307

Medical Gazette, New York, Nov. 6th, 1880, page 307.

Liquor Hydriodatis Arsenici et Hydrargyri.*

BY WILLIAM HUSKISSON, JUN., F.C.S.

Your Journal of the present month contains an interesting memoir by W. E. Heathfield, upon the preparation of Donovan's solution, with reference to its relative strength and colour, as prepared by the various processes adopted since its first introduction to pharmacy. It is unquestionably of great importance that the solution bearing Mr. Donovan's name should be prepared strictly in accordance with the results of his formula, so as to contain the exact amount of ingredients therein specified.

It is, however, admitted that the process is unnecessarily tedious, and the result has not always been successful, even when it has been manipulated by chemists of considerable reputation. In some cases failure has been attributed to the want of attention to details, and more particularly to the long continued incessant trituration until perfect union is affected of the double metallic iodides. Any abridgement of the time during which the trituration should be continued tends to leave the arsenic undissolved.

Mr. Draper "states that unless the greatest care be taken to ensure the effectual combination of the iodine on heating the mixture, instead of its becoming, as intended, nearly colourless, a great part of the arsenic remains undissolved; and any continuance of ebullition only vaporizes the free iodine, as may be seen from the application of starch-paper. Thus, not only is its preparation troublesome, but the strength of the product itself is liable to variation."

I am far from wishing, in any way, to disparage the efforts of the author in his desire to explain some of the causes of the failure, and obtain a perfect preparation; still, it is difficult to reconcile the diversity of opinion that exists amongst chemists.

First, as regards the exact colour the solution should have;

Secondly, as to whether Mr. Donovan's process is really the best for effecting the desired result with certainty and success; and

Thirdly, as to the relative strength of the solutions prepared by Mr. Donovan's and M. Soubeiran's process.

Mr. Heathfield states, "When Mr. Donovan first made the solution, he found that it generally proved to be of a very pale yellow, and then only when seen in large quantities, sometimes being as pale as water." In referring to Mr. Donovan's original memoir, I find he states, "It is scarcely worth while to observe on the color of the liquor of hydriodate of arsenic and mercury. I have described it as yellow; Dr. Kane says it is colorless, and that it soon becomes yellow by the decomposition of hydriodic acid. During an extensive manufacture of it, I have never procured it colorless, except when the process failed. With me, it has always been of a light yellow hue from the first; and, so far from its becoming yellow, when its color was purposely deepened by dissolving in it an excess of iodine, a short exposure to light was sufficient to restore its original pale yellow tint. The liquid is also yellow when made by Soubeiran's process.* Dr Periera states that the solution is a pale yellow color with a green tinge."

With regard to the difference in the strength of Donovan's and Soubeiran's solutions, Mr. Donovan states thus: "The quantities of the respective ingredients employed by me were—

Arsenic....	6·08	+ Iodine	30·24 Plisson.
Mercury.	15 38	+ Iodine	19·38 Gay-Lussac.
Total Iodine.....			49·62

I employ 50 grains, for the sake of round numbers. M. Soubeiran, in preference to my method, recommends iodide of arsenic and biniodide of mercury to be dissolved in boiling water. He finds them dissolved perfectly. Yet between his method and mine there is no difference in the ratio of materials used; for, calculating from the data contained in his memoir, the quantity of iodine necessary for the above quantities of arsenic and mercury would be as follows:—

	Grms.		Grains.
Arsenic.....	6·08	+ Iodine....	31·70
Mercury...	15 38	+ Iodine....	19·12
Total iodine.....			50.82

Which is, within a grain and one-fifth, the same as I employ; and the only difference is, that he uses the two iodides ready formed, while I form the same extemporaneously. If his method succeeds, so must mine."

Of the five processes referred to by Mr. Heathfield, there is one well deserving of especial attention, viz., that of M. Soubeiran, in which he proposes to unite the biniodide of mercury with the teriodide of arsenic,—two definite chemical combinations,—and thus form the solution.

Mr. Heathfield, in commenting upon M. Soubeiran's process, states that it is open to this objection, that the biniodide of mercury and the teriodide of arsenic vary in the proportion of moisture they contain. This difficulty, however, can be easily overcome; if the biniodide of mercury has been prepared by precipitation, and has been imperfectly dried, the moisture can readily be removed by sublimation; but in the case of the sublimation of the iodide of arsenic, much care is required to prevent the formation of arsenious acid in the sublimate. But if dry sublimed iodine be fused with finely-divided metallic arsenic, and the mass afterwards be finely levigated and then re-fused, any doubt as to the presence of moisture would at once be removed. Having prepared large quantities of the solution by both processes, and after carefully reviewing the two methods, and forming a comparison between them both, I should decidedly give the preference to M. Soubeiran's, on the grounds of its easy manipulation and absolute certainty of success, the two metallic iodides being perfectly soluble in boiling water, and the two sometimes differing from each other by one grain and one-fifth of iodine in eight ounces of the solution, the proportion of arsenic and mercury remaining exactly the same. I would, therefore, *venture* to recommend for practical adoption the following proportions:—

Sublimed Biniodide of Mercury.....	172½ grs.
Teriodide of Arsenic.....	188½ "
Distilled Water.....	40 oz.

The solution should measure exactly forty ounces, and should not give a blue colour when starch-paper is immersed in it.

Mr. Donovan expressly states that the solution prepared by his method should be of a pale yellow colour. Mr. Heathfield following Dr. Kane, states that it should be colourless. Now I think this discrepancy may be easily explained, for I find if the yellow solution, prepared either by Mr. Donovan's or M. Soubeiran's process, be agitated, without the assistance of heat, with a few grains of finely-levigated metallic arsenic, they become at once permanently as pale and colourless as water; hence it is quite possible that both these chemists may have had a slight excess of arsenic present. That the yellow colour is not due to the presence of free iodine may be readily proved by its not giving a blue colour with starch-paper.

*From the Pharmaceutical Journal, London.

* I should infer that on the addition of a few grains of iodine to the solution when exposed to light, the water becomes decomposed, its hydrogen uniting with the iodine, forming hydriodic acid. I believe it is a well-known fact that a solution of chlorine exposed to light becomes converted into hydrochloric acid.

CANADIAN PHARMACEUTICAL SOCIETY.

PRESIDENT, - - - WM. ELLIOT, ESQ.

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

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HENRY J. ROSE, *Secretary.*

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

TORONTO, ONT., DECEMBER, 1869.

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

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

All communications connected with the paper to be addressed, post-paid,

"EDITOR CANADIAN PHARMACEUTICAL JOURNAL, TORONTO."

THE Pharmacy Act obtained a second reading on Thursday, Nov. 25th; and on motion of Dr. McGill, was referred to a Select Committee, composed of Hon. Mr. Wood, Messrs. Boulter, Baxter, Rykert, Pardee, Matchett, and the mover. A meeting of the Committee was appointed for Wednesday, Dec. 8th, but as it was found impossible at that time to obtain a quorum, owing to the great press of business before the House, the meeting was postponed until the succeeding Friday, when, from a like reason, a further postponement was found necessary. On both occasions the committee on legislation, appointed by the Society, were in attendance to make such explanations as might be required. Several amendments were spoken of and discussed—of course, in an informal way—and from the general tenor of conversation, it appeared evident that the measure was regarded with unequivocal favor by the House.

Up to the present time, nothing further has transpired, but as soon as it is possible to get the members of the committee together, business will be proceeded with, so that the bill can be brought forward for a final reading before the close of the session.

THE JOURNAL.

The present number of the JOURNAL will be forwarded to every druggist in Canada whose address we have been able to ascertain. It is hoped that those who are not members of the Society, or subscribers, will at once favor us with their names, as the next number marks the commencement of a new volume. The JOURNAL is the only paper in Canada which is published in the interests of chemists and druggists, and, as such, certainly claims their support. Whether such support is merited by actual worth may be readily decided by referring to the contents of our second volume, issued with this number. We question whether any journal of this class can show a larger or more varied amount of useful information as the record of the year—certainly none for the same amount of money. The JOURNAL is not only the cheapest in this continent, but in all English speaking countries. The aim of the Pharmaceutical Society, of which it is the organ, is not to make money, but to promulgate knowledge, and, by every means within its power, to further the cause which it has espoused. We ask mutual aid in the undertaking, and trust our friends will respond.

BACK NUMBERS.

We can supply the numbers of Volume I., with the exception of that for May, 1868—the first number, also, Volume II., complete. The price is one dollar per volume; single numbers, ten cents.

On some new Substances extracted from the Walnut.

Dr. Phipson, F. C. S. read a paper, on this subject, before the British Association, in which he announces the discovery of a new species of tannin—for which the name *nucitannin* is suggested. The new substance was obtained by digesting the skin of the walnut in alcohol, and possesses the property, when boiled for several hours with dilute hydrochloric acid, of splitting up into glucose, and a red substance, which the author proposes calling *rothic acid*. This acid is described as a brown amorphous substance, combining readily with bases; soluble in alcohol; and having the composition $C_{26}H_{12}O_{14}$. The rothates of potash, soda, and ammonia are soluble, the rothate of silver forms a fawn colored precipitate, becoming darker by drying, but not very sensitive to the action of light. The preparation, properties, and composition of nucitannin, are reserved by the author, for a future paper.

LEGISLATURE OF ONTARIO.

Second Reading of the Pharmacy Act.

THURSDAY, Nov. 25, 1869.

After recess, Dr. MCGILL moved the second reading of Bill No. 11, "To regulate the sale of poisons, and respecting chemists, druggists, and apothecaries." He said the necessity for such a Bill had been felt for a long time, as well by the community at large as the druggists themselves. This necessity had been felt in consequence of the number of uneducated men throughout our country who had entered into the druggist business. They assumed (he meant the word in its fullest sense) that important business without education or experience to fit them for it, and serious blunders and fatal mistakes were of frequent and alarming occurrence. Instances of fatal mistakes from ignorance on the part of druggists, were on the increase, notwithstanding the fact that they were increasing in general intelligence and education. The public felt that it was high time to put a stop to these frequent mistakes, and this measure was now introduced for that purpose. The amount of injury was greater than was at all supposed by the public, for many a constitution had been ruined by over-doses of powerful medicines given by ignorant druggists who undertook to prescribe for ailments about which they knew nothing. The respectable, educated chemists felt that they required protection from such men. They required that men should be educated and serve an apprenticeship before setting up as druggists themselves. They should be required to come up to a reasonable standard, and be submitted to a fair examination. This was all the druggists required, and it would be only fair to grant them this protection. The Bill before the House was calculated to give that protection. It was not designed to be severe against any one now engaged in the business. It proposed to allow all such to continue their avocation, and was only designed for the future. Such an Act was in force in all the civilized nations of Europe, and it was proposed to have such a measure passed in the United States. Quebec was also asking for such a Bill; and before the close of the present session of the Legislature of that Province they would have it. Wherever this law was in force, it had worked well. There were over four hundred druggists in Ontario, of whom about three hundred had united for instruction in their profession. These were unanimous in favour of this measure; and the hundred that did not belong to the Association did not oppose it. He might almost say, therefore, that the druggists of Ontario were unanimous in favour of it. He hoped the House would receive it in the light in which it always did all measures calculated to promote the public good.

MR. BAXTER approved of the principles of the Bill, and suggested that it should be referred to a Special Committee. The object of the Bill was to form the druggists into a close Corporation, and it would be well to exercise some care in passing it.

MR. MATCHETT coincided with the hon. member for Haldimand (Mr. Baxter) that care should be exercised in passing it. He, also, would recommend that the Bill be referred to a Select Committee.

MR. BOYD desired to call the attention of the House to the fact that this was a measure

to regulate trade and commerce, and the House might be exceeding its powers in dealing with it.

Atty.-Gen. MACDONALD, while he believed that the Bill was a good one, desired to have it referred to a Committee. There all the particulars of the case could be considered, and when the report should come before the House, he would then be prepared to discuss it on its merits.

Mr. BLAKE did not think it advisable to delegate to a Select Committee to decide whether this House had power to deal with it, but it would be well to allow a Select Committee to consider the details of the measure, and make alterations, if necessary. If it were within the competence of the House to deal with the sale of poisons, it would be well to make provision for keeping certain poisonous drugs in certain coloured bottles, so that there might be fewer of those heartrending cases of poisoning we so frequently hear of. It would be found that the bulk of such mistakes did not occur at obscure drug stores, but in the larger, more respectable establishments where inexperienced clerks were allowed to dispense drugs. It would be well, in examining the details of this Bill to subject clerks to an examination also.

Mr. LAUDER did not believe the House would do well to organize a close Corporation of this kind. Poisonous drugs were used in many arts and manufactures, and if the sale of such drugs were confined to certain persons, it would be throwing restrictions round trade. What was desired was to prevent the occurrence of fatal cases of poisoning by mistakes on the part of druggists. The suggestions of the hon. member for Bruce (Mr. Blake) would serve the purpose. He opposed going any further than this, but did believe it was necessary to make it compulsory on the druggists to label bottles containing poisonous drugs, and not to trust to inexperienced clerks.

Mr. CUMBERLAND was surprised that the hon. member for Grey (Mr. Lauder) should be opposed to close Corporations, for he belonged to one of the closest professions himself. However, he approved of the principles of the Bill.

The Bill was then read a second time.

Dr. MCGILL moved that the Bill be referred to a Select Committee composed of Hon. Mr. Wood, Messrs. Boulter, Baxter, Rykert, Pardee, Matchett, and the mover.

Mr. RYKERT would prefer not to serve on the Committee for two reasons. In the first place, because he had not sufficient time to spare, and in the second place, because he had a lively horror of medicine.

On request of Dr. McGill, Mr. Rykert consented to act, and the motion was carried. —*Globe.*

BOOK NOTICES.

OREGON MEDICAL AND SURGICAL REPORTER. Vol. 1, No. 1: November, 1869.

This is the title of a new periodical, issued monthly by the medical faculty of Willamette University, in the far-off territory of Oregon. Truly, our Pacific friends are fully alive to the spirit of the times, and the *Reporter*, which is a neatly-printed journal of thirty-two pages, speaks well for the ability of its projectors, and promises much for the advancement of its readers.

LESSONS IN ELEMENTARY CHEMISTRY: INORGANIC AND ORGANIC. By HENRY ROSCOE, B.A., F.R.S., Professor of Chemistry in Owens College, Manchester. New Edition. London: Macmillan & Co., 1869.

We have seldom seen a work better adapted to the requirements of an elementary class in chemistry than the work now before us. The arrangement of subjects is such that the student is carried, almost imperceptibly, through the most difficult, and what is often considered the dryest parts of the science. The general principles of chemical philosophy are not ushered in at once, nor is any particular section devoted to their elucidation; but by insensible gradations, and as the mind of the student becomes prepared for their reception, the leading facts of the science are introduced. The book is divided into forty-one lessons, and, at the close, a list of questions and exercises is appended. This arrangement is calculated to be of great service to the student; and if, after the careful study of a chapter, the questions and exercises are faithfully answered and performed, and a rigid system of self-examination is thus carried on throughout the work, no mean amount of knowledge will have been gained. The metrical system of weights and measures is fully discussed and adopted, and, in the appendix, tables are given for the interrutation of the new and old systems. All temperatures are stated on the centigrade scale, and, as might be expected, the pressure of the air is expressed in *millemetres* of mercury. The more modern views are advanced in regard to theoretical chemistry, and the notation and nomenclature resemble that of the last edition of Fownes' Manual. Not the least interesting is a chapter on spectrum analysis, a subject on which Prof. Roscoe is particularly at home. A handsome chromolithograph, from the drawings of Bunsen and Kirchoff, showing the spectra of the metals of the alkalies and alkaline earths, accompanies the volume, and serves well to illustrate the subject.

INTEMPERANCE AS A DISEASE: Report of the Committee appointed by the Medical Society of the State of Pennsylvania to inquire into the medical, social, and civil aspects of intoxication from alcohol and opium.

CANADIAN PHARMACEUTICAL SOCIETY.

The regular monthly meeting of the Society was held at the Mechanics' Institute, on Friday evening, 3rd instant, with the President in the chair.

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

PRINCIPALS.

Wm. O. Foster ..... Simcoe.
N. L. Holmes ..... Toronto.
Jas. Stork ..... Bolton.

ASSISTANTS.

Wellesley Howard ..... Orangeville.
Wm. R. Howse ..... Toronto.

The following communications were then read:—From Mr. Lowe, of Amherstburg, endorsing the action of the Society respecting legislation, and urging the junior members to more attention to the means for self-improvement placed within their reach by the Society. The letter was handed to the Editor of the JOURNAL, and in doing so the Chairman said that it would be well for the Society if more of the non-resident members would take the same active interest in the Society which Mr. Lowe had done since its commencement.—From Mr. Lawrence, of Montreal, regarding the clause urged as advisable, at the last meeting, regarding patent medicines, was laid on the table.

The Chairman then explained to the meeting that the Pharmacy Act was only waiting for the select committee of the Legislature to meet, when the gentlemen appointed by the Society would be in attendance to watch the proceedings.

In reply to a question by the Secretary, the Chairman said he had received notification regarding a committee appointed by the Medical Section of the Canadian Institute to watch the passage of the Pharmacy Act.

The Secretary said that he understood such a committee contemplated alterations in the schedule list, and the insertion of a clause to prevent druggists from prescribing.

The members present thought that the practice alluded to was not carried to such an extent as physicians feared, or as would warrant any such clause. It was suggested that the druggists might appeal against physicians dispensing prescriptions, there being more interference on their side than ours.

Mr. Hunter, in a few well-chosen remarks, urged the advisability of a public meeting to interest the public and others in the welfare of the Society, but after discussion the project was dropped.

Mr. Shuttleworth desired to call the attention of the meeting to clause IV. of the Act, as amended at last meeting. By that provision, apprentices were allowed the privilege of becoming "Associates" of the Ontario College of Pharmacy, on payment of a fee of two dollars. It was contended that the assumption of this title by junior members would only tend to bring the Society into disgrace, and would certainly do much to weaken the confidence of the public in the institution. Mr. S. also thought the provision unjust to those who really might with

propriety lay claim to the term "Associate;" he referred to qualified assistants. These, he contended, were not only entitled to associateship, but also to the same privilege as was conferred upon druggists at present in business; that is, the liberty to commence or carry on business without being subjected to the ordeal of examination.

Mr. Dillworth strongly supported the views advanced by Mr. Shuttleworth, and urged the advisability of the insertion of a clause allowing assistants, of a certain standing, the right to commence business without examination.

The President strongly disapproved of such a provision, as he held that persons at present in business possessed vested rights, which had to be respected. Such persons held property, and had money invested in the business, and these claims could not be overlooked.

Mr. Shuttleworth replied that he had no wish to underrate the claims of those who held vested rights of this nature; but he maintained that those who had spent five or more years in acquiring a knowledge of their profession, and really were qualified, possessed vested rights which demanded an equal respect with those of property. Moreover, a knowledge of pharmacy was not to be obtained only by an outlay of time, but required considerable sums of money also. Many persons in other countries had paid large premiums in order to enter as apprentices.

The meeting seemed to coincide with the speakers, and the Chairman said that most of the Legislative Committee being present, would know the wishes of the Society in that respect.

The meeting adjourned.

H. J. Rose, Secretary.

Montreal Chemists' Association.

The monthly meeting of the Chemists' Association was held last evening, Jno. Kerry, Esq., in the chair. After the usual routine business, Mr. H. R. Gray read a paper on "Opium Smoking," in which he gave interesting statements as to the extent to which opium is used among the different nations, especially the Japanese and Chinese. Mr. Gray depicted very graphically the effect of opium upon its votaries, showing that this narcotic affected the mental facilities, producing the most pleasing excitement and delightful hallucination. In moderation opium was not injurious, but once the limit was passed, it required almost a miracle to save the victim of the habit. Mr. Gray's paper was listened to with great interest, and was the subject of discussion, in which Messrs. Mercer, Reed and Lyman took part, giving their experience of opium-eaters in Canada. Mr. Lyman prepared a Chinese pipe with opium, and illustrated the mode of using it as well as that used by the Japanese—the latter use tobacco with the opium. The usual vote of thanks was passed, with very complimentary allusions to the interesting paper of Mr. Gray.

Communications.

To the Editor of the Canadian Pharmaceutical Journal

Dear Sir, In reading the report of your monthly meeting, on Oct. 6th, I was not a little surprised at the apathy displayed by the junior members of the Society, in not attending the lectures last winter. Did those young men know, as I do, what hard tugging and toiling many a medical student has, to procure the means necessary to pay the expenses of his attendance upon lectures, &c., I think the contrast would reveal ample cause for the deepest shame.

It seems that the Society, in its generous impulse, has been deceived in the material it had to deal with, and, as a consequence, I quite agree with the remarks made by your worthy Chairman, that when the Society becomes incorporated, let there be a rigid examination, which will compel the junior members to educate themselves. In fact, the whole of his remarks are to the point, and leave nothing to suggest.

In regard to the President's concluding remarks, regarding unqualified persons setting up in business, to avoid the examination, you will find by referring to your correspondence, that I called the attention of the Society to this fact, more than a year ago. I have under my observation three cases of the like nature. The usual method around here is to open a petty grocery, and, if possible, a liquor shop, in disguise, mixed up to some extent with patent medicines, &c., and place over their door—"Drug Store." All these parties are from the States, and some of them are very disreputable persons. But again, I have to endorse the opinion of your Chairman, that the only remedy consists in getting the Act passed this session; for if things go on much longer than at present, it will require many years for the profession to recover its respectability. Hoping that the Bill before the Legislature of Ontario will shortly become law,

I remain, yours truly,

John Lowe.

Amherstburg, Nov. 8th, 1869.

Hints on the Burning of Anthracite Coal.

As all our readers are interested in the fuel question, we may be pardoned for introducing the following hints, for which we are indebted to the *Scientific American*.

The burning of anthracite coal requires appliances quite different from those used for the burning of wood, or bituminous coal, but the reasons for these differences are not well understood by the mass of people who use anthracite, and as we are constantly receiving inquiries suggested by imperfections in the construction of stoves, furnaces, and heaters, we deem it timely to give some hints on this subject.

In doing this we shall necessarily be obliged to repeat in substance much that we have said in former seasons upon the same and kindred subjects, but the importance and practical nature of the topic must be our excuse.

The temperatures at which different kinds of fuel ignite, vary greatly, and as anthracite is the most difficult to kindle of all the fuels in use in this country, novices in its use often find trouble in lighting it. This can only be done by the use of some more easily kindled fuel, wood or charcoal being generally employed for the purpose. Anthracite coal being a much more dense material than the other fuels named, requires a concentrated and powerful heat to raise it to the temperature at which it will commence to combine with the oxygen of the air. A common fault with those unaccustomed to it, is to use too coarse wood for kindling, and too much of it. This, while it generally succeeds in lighting the coal, leaves a bed of ashes below the coal which interferes with the draft unless raked out; an operation which always retards the combustion of partially ignited coal.

The wood should be of some rapidly burning variety which gives a quick and high heat, and should be split fine. It should be so placed that the coal will remain on the top of it and not fall through to the grate, leaving the kindling on the top of any part of the coal. The amount of kindling wood required depends much upon the size of the coal. A common mistake is to use too large sized coal. A good rule, where stoves or furnaces have a good draft, is to use coal as small as can be used without inconvenience from its sifting too freely through the grate.

Grates should have their bars closely set for stoves that are cleaned out daily, and have fires lighted in them each morning, while those which are intended to have fire kept in them continuously for days or weeks will not admit of fine grates, on account of the accumulation of ashes and small "clinkers."

There is much difference in coal in regard to the formation of clinkers. These are nothing but vitrified, or partially vitrified earthy matters, and only can form when a high heat is maintained; they are apt to be troublesome when there is too great draft. A coal stove or furnace should therefore be so constructed that its draft can be perfectly controlled. The bottom draft should admit of being closed air tight, as nearly as is possible to make it, and there ought always to be provision made for a top draft. If, however, the draft of a chimney should be so strong, that air in too great quantities is drawn in at the bottom when the dampers are closed, a damper in the pipe which will close it partially must be employed, though in sluggish chimneys such a damper is apt to force the gases of combustion into the room, and therefore it ought always to be avoided when possible.

The practice of putting ashes on the top of a fire to keep it, is very productive of clinkers although it answers the purpose very well in other respects. Damp coal screenings are better, and may be economically burned in this manner.

If a coal fire gets very low, the quickest way to extinguish it, is to rake it at the bottom. To preserve a fire under such circumstance, a little coal should be placed on the fire, and when it has caught more may be added, and the raking deferred until it has got well ignited.

When the fire bricks have become burdened with clinkers which have fused and adhered, they may be cleared by throwing oyster or clam shells into the fire box when the fire is very hot, and allowing the fire to

go out. The clinkers will generally cleave off without the use of much force the next morning. From two quarts to one-half a peck, will be sufficient for most stoves, and the operation can be repeated if some of the clinkers still adhere.

On a New Reaction of Phenol.*

BY C. CRUMP.

If fragments of caustic potash be added to a solution of phenol in chloroform, the potash becomes covered with a rose-colored coat, which gradually dissolves in the liquid. Considerable heat is produced, and the action goes on rapidly until the mixture, which at first was red, has become brown and thick. It then slackens, but may be renewed by a gentle heat, until potash has been added equal in quantity to about three times the weight of phenol.

The final product of the reaction is a brown amorphous mass, soluble in alkaline liquids, and precipitated therefrom by acids. It seems to be a mixture of two substances, differing in solubility in alkalies and in their behaviour with strong sulphuric acid.

The first substance dissolves very easily in carbonate of potash or soda, less readily in strong sulphuric acid. From the latter solution a precipitate is thrown down by water, which behaves with alkalies like rosalic acid.

The second substance dissolves less freely in alkalies, very easily in strong sulphuric acid, forming a brown liquid from which nothing is precipitated on dilution. With tetr.chloride of carbon instead of chloroform no action takes place in the cold; at 100° C. the liquid assumes the color of rosalic acid.

When creosote from wood-tar is treated with chloroform and caustic potash, a reaction takes place very similar to that with phenol, but the product of the reaction is quite different, forming with sulphuric acid a deep crimson solution, from which a dingy green precipitate is thrown down by dilution. Moreover, the substances produced from phenol in alkaline solution color silk or wool brown, while those from creosote have no coloring power.

Phenol-Sulphuric Acid and Nitro-Phenol-Sulphuric Acid.*

M. Kekulé observes that he was the first who pointed out the fact that, when phenol and sulphuric acid act upon each other, there are formed two isomeric sulpho acids, para-phenol-sulphuric acid, and meta-phenol-sulphuric acid. Since there have been different experimenters on this subject, some of whom have entirely overlooked this meta acid, and since the author has found that, with different modes of preparation, the quantity obtained of this acid varies greatly, he instituted some experiments to ascertain under what conditions either of the two isomeric modifications are chiefly formed. The result obtained is that, when a mixture of phenol and sulphuric acid is left quietly standing at the ordinary temperature, it contains, not only at first, but for weeks, chiefly the meta acid. When the mixture is heated, the quantity of the para acid increases, and continues to do so until, when the temperature is for some time kept at from 100° to 110°, the para acid only is present in the mixture. When the meta acid, obtained in pure state from its salts, is heated for some time on a water-bath, it is thereby entirely converted into para acid. As regards the nitro-phenol-sulpho acid, M. Kekulé found that there does not exist any doubt that, by whatever method this acid is prepared, the product obtained is always identically the same.

* From the Chemical News.

Fancy Coloring of Metals.

The colouring matter of small objects in metal has recently occupied the attention of manufacturers and chemists, and M. Puschec, a German chemist, gives the following recipes for the application of sulphur to the purposes referred to: 1. A solution is made in the following manner: dissolve four ounces of the hypho-sulphite of soda in a pint and a half of water, and then add a solution of one ounce of acetate lead in the same quantity of water. Articles to be colored are placed in the mixture, which is then gradually heated to boiling point. The effect of this solution is to give iron the effect of blue steel; zinc becomes bronze: and copper or brass becomes successively, yellowish, red, scarlet, deep blue, light blue, blueish white, and, finally, white, with a tinge of rose. This solution has no effect on lead or tin. 2. By replacing the acetate of lead in the solution by sulphate of copper, brass becomes first of a fine rosy tint, then green, and, finally, of an iridescent brown color. Zinc does not color in this solution; it throws down a precipitate of brown sulphuret of copper, but if boiled in a solution containing both lead and copper, it becomes covered with a black adherent crust, which may be improved by a thin coating of wax. 3. If the lead solution be thickened with a little gum tragacanth, and patterns be traced with it on brass, which is afterwards heated to 212 degrees, and then plunged in solution No. 1, a good marked effect is produced.—*Manufacturer & Builder.*

New Reagent for Detecting Iron and Copper.

M. Félix Bellamy has indicated a new reagent for detecting minute traces of iron or copper in natural waters. He states that an alcoholic tincture of logwood constitutes a test for these metals of unrivalled sensibility. The hæmatoxylin combines with either iron or copper, immediately producing a pure blue colour resembling that of the iodide of starch. The tincture is best prepared by macerating 12 or 15 parts of fresh thin shavings of logwood in 100 parts of alcohol. The alcohol should be previously purified by digestion on quicklime, and distillation from a glass retort. On adding a score of drops of this tincture to 200 cubic centimetres of water free from iron and copper, the liquid becomes yellow if carbonic acid predominates, or rose-violet if the earthy or alkaline bicarbonates are present. If a clean iron wire be then introduced, the colour will be seen to change in the space of one or two minutes, blue strire forming round the metal and passing to the bottom.

Absolutely the same change is effected by copper, and it is impossible to distinguish the colour caused by the one metal from that produced by the other. The author states that by this test an appreciable change of colour is produced in water, containing only one part of iron or copper in twenty millions, and that it will give indications when galls, sulphocyanide, and prussiate of potash fail. He has even found that water passing through an iron pump or copper pipe will sometimes assume a blue tint with the tincture. In such a case he attributes the action on the metal to carbonic acid in the water, because he finds that, after boiling the water, the tincture ceases to react.

The blue colour which results from the union of the hæmatoxylin with one or the other metal, precipitates after several days in light voluminous flocks, in which it is easy to recognize either iron or copper. If an excess of the reagent has been employed the metals are completely precipitated, and the liquor remains violet or yellowish according to the nature of the water. An appreciable blue deposit is obtained when the water contains only a five-millionth of the metal.—*Pharm. Jour. London.*

Prevention of the Bumping of Boiling Liquids

Theo. Schumann *(American Jour. of Pharmacy)*, recommends the following method for the accomplishment of this end:—

The end of an ordinary glass pipe of about $\frac{1}{8}$ inch opening is shut at one end and this end bent into a little hook. The glass pipe is then cut exactly so long as to reach from the bottom of a glass retort to within $\frac{1}{2}$ inch or an inch of the stopper of the tubulus. By means of the hook and a piece of twine, or a little hook of thin wire, this glass pipe is placed into the retort, the open end at the bottom, and the retort can be filled; or the retort is filled first, and the glass pipe entered afterwards, which will probably be preferable. If the liquid now is warmed, the air in the glass pipe is expanded, and constantly bubbles out at the open end, and if the boiling point is reached, vapors of the tension of the atmosphere are created at the spot where the glass pipe stands on the bottom of the retort, and the boiling continues regularly and quietly in far the most cases for days. If the retort is to be refilled, the glass pipe is to be taken out, in order to empty it, and then is replaced again, also when the operation is not finished the first day, but the retort cooled and operation resumed next morning.

An Improved Battery.

We have recorded so many improvements (as they are called) in galvanic batteries, that the number and variety becomes bewildering. The last we meet with is that suggested by Böttger, who proposes to substitute metallic antimony for carbon. An amalgamated zinc plate is immersed in a strong solution of common salt and sulphate of magnesia. The antimony, like the carbon, is placed in a porous pot, but the liquid used is dilute sulphuric acid. A combination of this arrangement is said to give a stronger and more lasting current than a cell of Daniel's battery.—*Mechanic's Magazine.*

Substitute for Copper in Daniells Battery.

Few persons, in experimenting upon voltaic combinations, ever consider economy in their construction, and experiments which tend to cheapen their first cost should be made public.

An expensive part of the Daniells battery is the copper plate, the cost of which can be reduced two-thirds, in the following manner:

Procure sheets of the ordinary sheet tin of commerce, brighten and plunge into a very weak copper plating solution, in connection with a voltaic battery of very low quantity. In fifteen to eighteen hours a tenacious film of copper will have been deposited upon the tin, and the plate can then be bent in shape suitable for a Daniells battery.—*Telegraph.*

Notes and Queries.

H. H.—Cookstown.—The receipt for aniline blue dye, published in the current volume of the journal, page 43, is that to which, we suppose you refer. We have never experienced any difficulty in using such a form, and have always got a good colour. It may be necessary to add, however, that blue is generally dyed in an acid bath. A small quantity of sulphuric acid brightens the color, but any excess is injurious.

With regard to coraline, our experience has been similar to your own, the color produced never being satisfactory. We should be glad to learn the method of applying this dye, as it certainly cannot be used *per se*. An alkaline bath gives a very fine color, but of a very unstable character.

W. F. Stouffville.—Your letter came to hand too late to allow of our attending to it this month. Will do so at January meeting.

Changes.

Messrs. Ross & Martyn have opened the Apothecaries' Hall, Kincardine, with a new stock.

The business carried on for the last twenty-one years by Mr. John Howarth, of Yonge Street, Toronto, has been purchased by his son, Mr. Jas. L. Howarth.

Wm. Fead, Stouffville, has taken his brother, G. S. M. Fead, into partnership. The style of the firm is Wm. Fead & Bro.

Coulter & Son, now carry on the business in Lindsay, formerly Coulter & Chambers. Mr. Coulter, jr., is in charge.

Dr. J. W. Shirley, Walford, recently disposed of his business to Mr. Thomas, who, in turn, sold out to a third party. Mr. Shirley called a meeting of his creditors for a certain day, but in the meantime collected everything possible, and, at the appointed time, was not to be found.

C. W. Grossmith & Co., perfumers, Toronto, have removed from their former place of business to larger and more convenient premises, No. 174 Yonge Street.

Drs. A. C. Lloyd & Sons are about commencing a new business at Stouffville.

A. R. Hildreth has purchased the business formerly carried on by N. A. Wilson, Paisley.

Trade Report.

Since our last issue, trade has been rather dull, owing no doubt, in a great measure, to the bad state of the roads. Payments have also been far from prompt, or full. We trust that the establishment of winter roads will do away with both these evils.

In our quotations we have few changes to note. Alcohol has advanced five, or six cents; and, from the inadequate means of supply, is likely to maintain its high rate for some time, being hard to get, even at the present high figures. Opium has once more puzzled the shrewdest buyrs, having taken an upward turn; it is now held at an advance of two dollars per lb. Quinine remains very firm, with a probability of a further advance. Ergot is quoted very much lower. E. I. Rhubarb is also in favor of the buyer.

In spices we quote Mace and Nutmegs at much higher rates; the former is almost out of market.

In naval stores, turpentine is held at a high price, which combined with the rate of exchange renders it a very unprofitable article for dealers.

WHOLESALE PRICES CURRENT.—DEC., 1869.

Drugs, Medicines, &c.	$ c.	$ c.
Acid, Acetic, fort	0 12 @	0 15
" Benzoic, pure	0 28	0 35
" Citric	0 83	0 90
" Muriatic	0 05	0 07
" Nitric	0 11½	0 15
" Oxalic do.	0 26	0 32
" Sulphuric	0 04½	0 07
" Tartaric, pulv.	0 36	0 45
Ammon., carb. casks	0 17	0 19
" " jars	0 18	0 20
" Liquor, 880	0 18	0 25
" Muriate	0 12½	0 15
" Nitrate	0 45	0 60
Æther, Acetic	0 45	0 60
" Nitrous	0 22½	0 25
" Sulphuric	0 48	0 55
Antim. Crude, pulv.	0 10	0 12
" Tart. "	0 50	0 60
Alcohol, 95%	1 82½	2 00
Arrowroot, Jamaica	0 21	0 22
" Bermuda	0 45	0 65
Alum	0 02½	0 03½
Balsam, Canada	0 32	0 40
" Copaiba	0 75	0 80
" Peru	2 90	3 00
" Tolu	1 20	1 40
Bark, Bayberry, pulv.	0 20	0 25
" Cauella, "	0 17	0 20
" Peruvian, yel. pulv	0 42	0 45
" " red "	1 50	1 60
" Slippery Elm, g. b.	0 18	0 20
" " flour, pkt's	0 28	0 32
" Sassafras	0 15	0 18
Berries, Cubebs, ground	0 30	0 40
" Juniper	0 06	0 10
Beans, Tonquin	0 60	1 10
" Vanilla	9 40	9 60
Bismuth, Alb.	5 60	6 40
" Carb.	5 60	6 40
Camphor, Crude	0 43	0 48
" Refined	0 55	0 65
Cantharides	1 66	1 10
" Powdered	1 14	1 20
Charcoal, Animal	0 04	0 06
" Wood, pow'd.	0 12	0 15
Chiretta	0 55	0 65
Chloroform	1 30	1 50
Cochineal, S. G.	0 90	1 15
" Black	1 30	1 75
Colocynth, Pulv.	0 50	0 80
Collodion	0 55	0 60
Elaterium oz.	4 50	5 00
Ergot	0 75	0 90
Extract, Belladonna	2 00	2 20
" Colocynth, Co.	1 25	1 75
" Gentian	0 50	0 60
" Hemlock, Aug.	1 12	1 25
" Henbane, "	2 90	3 00
" Jalap	5 00	5 50
" Mandrake	1 75	2 00
" Nux Vomic. oz	0 60	0 70
" Opium	Variable.	
" Rhubarb	7 50	—
" Sarsap. Hon. Co	1 00	1 20
" " Jam. Co	3 25	3 70
" Taraxicum, Aug	0 70	0 80
Flowers, Arnica	0 26	0 35
" Chamomile	0 36	0 45
Gum, Aloes, Barb. extra	1 00	1 10
" " " good	0 50	0 55
" " Cape	0 15	0 20
" " " pow'd	0 25	0 30
" " Socot	0 75	0 90
" " " pulv.	0 90	1 00
" Arabic, white	0 60	0 65
" " " pow'd	0 57	0 65
" " sorts	0 34	0 37
" " " pow'd	0 50	0 60
" " com. Gedda	0 13	0 16
" Assafœtida	0 35	0 40
" British or Dextrine	0 13	0 15
" Benzoin	0 48	0 55
" Catechu	0 15	0 20
" " pow'd	0 25	0 30
" Euphorb, pulv.	0 32	0 40
" Gamboge	1 40	1 60
" Guaiacum	0 32	0 50
" Myrrh	0 48	0 60
" Sang Dracon	0 60	0 70
" Scammony, pow'd	5 60	—
" " Virg. "	14 50	—
" Shellac, Orange	29	0 32

Drugs, Medicines, &c. *Continued.*	$ c.	$ c.
Gum, Shellac, liver	0 21 @	0 28
" Storax	0 65	0 75
" Tragacanth, flake	1 05	1 40
" " common	0 31	0 00
Galls,	0 32	0 37
Gelatine, Cox's, 6d.	1 10	1 20
Glycerine, com.	0 25	0 30
" Vienna	0 35	0 40
" Price's	0 65	0 75
Honey, Canada, best	0 16	0 20
" Lower Canada	0 12½	0 13
Iron, Carb. Precip.	0 20	0 25
" " Sacchar.	0 40	0 45
" Citrate Ammon.	0 90	1 00
" " & Quinine oz.	0 13	0 48
" " & Strychnine "	0 17	0 25
" Sulphate, pure	0 08	0 10
Iodine, good	5 60	6 00
" Resublimed	5 60	6 00
Jalapin oz.	1 50	2 00
Kreosote	1 60	2 50
Leaves, Buchu	0 30	0 50
" Foxglove	0 25	0 30
" Henbane	0 35	0 40
" Senna, Alex.	0 30	0 60
" " E. I.	0 12½	0 20
" " Tinnevilly	0 20	0 30
" Uva Ursi	0 15	0 20
Lime, Carbolate brl.	5 50	—
" Chloride	0 04½	0 06
" Sulphate,	0 08	0 12½
Lint, Taylor's best	1 12½	1 25
Lead, Acetate	0 14	0 17
Leptandrin oz.	0 60	—
Liq. Bismuthi	0 50	0 75
" Opii, Battley's	7 60	9 00
Lye, Concentrated	1 50	2 00
Liquorice, Solazzi	0 37	0 45
" Cassano	0 23	0 40
" Other brands	0 14	0 25
Liquorice, Refined	0 35 @	0 45
" " Hessin's doz	2 00	
Magnesia, Carb 1 oz.	0 20	0 25
" " 4 "	0 17	0 20
" Calcined	0 65	0 75
" Citrate gran.	0 40	0 50
Mercury	0 65	0 75
" Bichlor	0 70	0 80
" Biniodid. oz.	0 25	0 35
" Chloride	0 90	1 00
" C. Chalk	0 45	0 60
" Nit. Oxyd	0 90	1 00
Morphia, Acet.	—	—
" Mur. about	6 00	—
" Sulph.	—	—
Musk, Pure grain oz.	21 00	—
" Canton	1 00	1 20
Oil, Almonds, sweet	0 48	0 55
" " bitter	14 00	15 00
" Annisced	4 00	4 50
" Bergamot, super.	6 00	7 00
" Carraway	4 00	4 20
" Cassia	3 00	3 20
" Castor, E. I.	0 16	0 20
" " Crystal	0 22	0 25
" " Italian	0 26	0 28
" Citronella	1 50	1 75
" Cloves, Ang.	1 00	1 10
" Cod Liver	1 40	1 50
" Croton	2 50	3 00
" Geranium, pure, oz.	2 00	2 20
" Juniper Wood	0 90	1 00
" " Berries	6 00	7 00
" Lavand, Ang	17 60	19 20
" " Exot	1 40	1 60
" Lemon, super.	3 30	3 60
" " ord.	2 70	2 80
" Orange	3 00	3 20
" Origanum	0 65	0 75
" Peppermint, Ang.	15 00	17 00
" " Amer.	4 60	5 00
" Rose, virgin	7 75	8 00
" " good	4 40	5 50
" Sassafras	1 30	1 40
" Wintergreen	4 90	5 50
" Wormwood, pure	5 80	50
Ointment, blue	0 65	0 70
Opium, Turkey, about	11 00	—
" " pulv.	13 20	—
Orange Peel, opt.	0 65	0 75
" " good	0 12½	0 20
Pill, Blue, Mass	0 70	0 75

Drugs, Medicines, &c. *Continued.*	$ c.	$ c.
Potash, Bi-chrom	0 15 @	0 20
" Bi-tart	0 25	0 28
" Carbonate	0 16	0 20
" Chlorate	0 40	0 45
" Nitrate	8 50	9 00
Potassium, Bromide	1 80	2 00
" Cyanide	0 70	0 75
" Iodide	3 80	4 50
" Sulphuret	0 25	0 35
Pepsin, Boudault's oz.	1 65	1 80
" Houghton's, doz	8 00	9 00
" Morson's oz.	0 82	1 10
Phosphorus	0 75	0 85
Podophyllin	0 50	0 60
Quinine, Pelletier's	1 67½	—
" Howard's	1 72½	1 80
" " 100 oz. case	1 67½	—
" " 25 oz. tin	1 62½	—
Root, Colomba	0 14	0 20
" Curcuma, grd	0 12½	0 17
" Dandelion	0 25	0 35
" Elecampane	0 14	0 17
" Gentian	0 08	0 12½
" " pulv.	0 15	0 20
" Hellebore, pulv.	0 18	0 25
" Ipecac "	2 40	2 60
" Jalap, Vera Cruz	1 55	2 —
" " Tampico	0 90	1 —
" Liquorice, select.	0 13	0 17
" " pow'd	0 12½	0 16
" Mandrake, "	0 20	0 25
" Orris "	0 20	0 25
" Rhubarb, Turky	4 40	5 50
" " E. I., China	1 25	1 75
" " " pulv'd	1 40	1 75
" " " 2nd	1 30	1 50
" " French	0 75	—
" Sarsap., Hond	0 45	0 50
" " Jam.	0 75	0 80
" Squills	0 10	0 15½
" Senega	0 40	0 50
" Spigelia	0 35	0 40
Sal., Epsom	3 00	4 00
" Rochelle	0 28	0 35
" Soda	0 02	0 03
Seed, Anise	0 16	0 30
" Canary	0 05½	0 07
" Cardamon	3 00	4 00
" Fenugreek, grd	0 10	0 15
" Hemp	0 06	0 07
" Mustard, white	0 14	0 16
Saffron, Amer.	1 25	1 50
" Spanish	14 00	16 00
Santonine	10 50	12 00
Sago	0 07½	0 09
Silver, Nitrate, cash	14 90	16 50
Soap, Castile, mottled	0 11½	0 14
Soda Ash	0 03	0 04
" Bicarb. Newcastle	4 00	5 00
" " Howard's	0 14	0 16
" Caustic	0 04	0 05
Spirits Ammon., arom	0 25	0 35
Strychnine, Crystals	2 30	2 75
Sulphur, Precip.	0 10	0 12½
" Sublimed	0 4	0 05
" Roll	0 03	0 04½
Tamarinds	0 15	0 20
Tapioca	0 20	0 23
Veratria oz.	0 25	0 30
Vinegar, Wine, pure	0 55	0 60
Verdigris,	0 35	0 40
" Pow'd	0 45	0 50
Wax, White, pure	0 85	0 90
Zinc, Chloride oz.	0 20	0 25
" Sulphate, pure	0 10	0 15
" " com.	0 06	0 10

Dyestuffs	$ c.	$ c.
Annatto	0 40 @	0 60
Analine, Magenta, cryst	5 20	—
" " liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitriol, pure	0 08	0 10
Camwood, pure	0 06½	0 09
Copperas, green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 03	0 04
Indigo, Bengal	2 40	2 50
" Madras	1 15	1 20
" Extract	0 28	0 35
Japonica	0 05½	0 06½
Lacdye, pow'd	0 35	0 40
Logwood	0 02½	0 03

Dyestuffs *Continued*	$ c.	$ c.
Logwood, Camp	0 02½ @	03½
" Extract	0 13½	14
" " 1lb bxs	0 15	—
" " ½lb "	0 16	—
Madder, best Dutch	0 16	0 18
" 2nd quality	0 14	0 15
Quercitron	0 03	0 05
Sumac	0 06½	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06

Spices.	$ c.	$ c.
Allspice	0 08½ @	0 10
Cassia	0 50	0 55
Cloves	0 15	0 16
Cayenne	0 18	0 25
Ginger, E. I.	0 12	0 14
" Jam.	0 28	0 30
Mace	1 15	1 20
Mustard, com.	0 20	0 25
" D. S.	0 40	0 45
Nutmegs	0 70	0 80
Pepper, Black	0 11½	0 12½
" White	0 20	0 22

Paints, Dry.	$ c.	$ c.
Black, Lamp, com.	0 07 @	0 08
" " refined	0 25	0 30
Blue, Celestial	0 08	0 12
" Prussian	0 65	0 75
Brown, Vandyke	0 10	0 12½
Chalk, White	0 01	0 01½
" Red	0 05½	0 10
Green, Brunswick	0 07	0 10
" Chrome	0 20	0 25
" Paris	0 30	0 35
" Magnesia	0 20	0 25
Litharge	0 08	0 09
Pink, Rose	0 12½	0 15
Red Lead	0 06½	0 08
" Venetian	0 02½	0 03½
Sienna, B. & G.	0 10	0 15
Umber, "	0 07	0 10
Vermillion, English	0 90	1 00
" American	0 25	0 35
Whiting	0 85	1 25
White Lead, dry, gen.	0 07½	0 09
" " " No. 1	0 06½	0 08
" " " No. 2	0 05½	0 07
Yellow Chrome	0 12½	0 35
" Ochre	0 02½	0 03½
Zinc White, Star	0 10	0 12

Colors, in Oil.	$ c.	$ c.
Blue Paint	0 12 @	0 15
Fire Proof Paint	0 06	0 08
Green, Paris	0 32	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1lb tins	0 14½	0 16
Putty	0 03¾	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25lb tins	2 35	—
" " No. 1 "	2 10	—
" " No. 2 "	1 90	—
" " No. 3 "	1 65	—
" Com. "	1 30	—
White Zinc, Snow	2 75	3 25

Naval Stores.	$ c.	$ c.
Black Pitch	4 50 @	5 50
Rosin, Strained	3 75	4 50
" Clear, pale	5 75	10 00
Spirits Turpentine	0 52	0 55
Tar Wood	4 00	5 00

Oils.	$ c.	$ c.
Cod	0 65 @	0 70
Lard, extra	1 25	—
" No. 1	1 12½	—
" No. 2	1 00	—
Linseed, Raw	0 75	0 80
" Boiled	0 80	0 85
Olive, Common	1 25	—
" Salad	1 80	2 30
" " Pints, cases	4 20	4 40
" " Quarts	3 60	3 00
Seal Oil, Pale	0 80	0 85
" " Straw	0 75	0 80
Sesame Salad	1 30	1 35
Sperm, genuine	2 40	—
Whale, refined	0 85	1 00