impulsive and do things on the spur of the moment know it, and we should guard ourselves against the dangers of this disposition in dealings with our fellow-men; on the other hand, those who deliberate long before coming to a decision should take care lest they may be hours or days too late to enjoy the success that would have followed their decision had they made it in time. Sizing up one's own limitations requires great moral courage, but a good business man will have this courage and will call upon his associates or employees to do the things which he knows he can not do well himself. The greatest organizers who get results are those who can marshall the brain and brawn of their fellow men and get them to accomplish what they know they can not accomplish themselves.

So it is in the apothecary shop. It is no sin for the proprietor to be less skillful than his clerks in certain branches of the business, but it is nothing short of a sin for him to continue to do things in a mediocre way which he can afford to have others do for him to much better advantage. If the proprietor is not a good mixer, and has pronounced likes and dislikes, he should endeavor to meet, in the store, only those people with whom he can make a favorable impression, and send one of his clerks out to the counter to meet those with whom he has nothing in common and whom he is likely to offend by an indifferent manner. That is good business judgment and tends to hold trade.

If the conditions in the soda fountain department make it necessary to require buying checks of a cashier before serving, this requirement should be enforced as graciously and inoffensively as possible. It is very annoying to the customer to be told to buy checks when he is treating some friends, because he must find out what each person wants and then tell the cashier so as to get the right amount in checks to hand to the dispenser. If one person changes his mind before a drink or sundae is served it means trotting back to the cashier's desk to have the checks adjusted. How much simpler for the customer to order and then be told how much he must pay or to be handed a check for the amount due and pay the cashier as he leaves. The easier you make it for the customer to spend his money the better he likes it. Don't forget his viewpoint when you evolve your system.

LABORATORY NOTES.*

By George E. Ewe.[1]

THE GERMICIDAL POWER OF OXALIC ACID.[2]

The National Standard Dispensatory, on page 71, states that oxalic acid "is a good antiseptic and is used by many surgeons to disinfect the hands."

While the fact that oxalic acid does possess considerable germicidal power is quite generally known, yet its relative power in comparison with phenol, which is the generally accepted standard

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* Scientific Section, A. Ph. A., City of Washington meeting, 1920.

[1] Unless otherwise stated the reports are by the author.

[2] Credit is due Mr. R. J. Monson, of the Biological Laboratories of the H. K. Mulford Company, Glenolden, Pa., for making the phenol coefficient tests mentioned in this communication.

upon which the statement of germicidal power is based, is probably not so very well known. Therefore, these notes are to be considered as a contribution to this subject.

Determinations of phenol coefficient by the Hygienic Laboratory Method were made on crystallized oxalic acid from six sources with the following results:

Source.	Phenol coefficient.
1	10.83
2	10.27
3	11.66
4	10.27
5	9.85
6	10.69

Therefore, the average phenol coefficient of crystallized oxalic acid is 10.6 and can be stated in round numbers as "10 to 11."

Oxalic acid, when dried, increases in phenol coefficient in practically direct ratio to the concentration effected by the loss of water of crystallization. The crystallized oxalic acid from source No. 1 when rendered anhydrous possessed a phenol coefficient of 14.4, the theoretical being 15.3.

The "Pharmaceutical Codex" 1911 also reports the phenol coefficient of oxalic acid essentially as 10 in the following words:

"A 0.5% solution is equal to a 5% solution of phenol as a bactericide and disinfectant."

Oxalic acid, therefore, is a very effective germicide, but its general use is not to be encouraged because of its decidedly toxic nature. It seems likely, however, that its germicidal power may find some special uses in the hands of persons properly informed of its virtues and shortcomings. If sold for general disinfecting purposes, it is desirable that its appearance be strikingly altered so as to call attention to its poisonous nature. Probably the best way to do this is to color the crystals with a dye. This can be readily done by spraying or sprinkling the crystals with an aqueous solution of a dye, mixing well and then allowing the dyed crystals to dry in the air. A blue color is very appropriate and "Soluble Blue B" is a very satisfactory blue color for this purpose.

Because of the poisonous nature of oxalic acid, it is inadvisable to use it on the person or on animals of any kind. Therefore, its use seems limited to the disinfecting of waste matters and localities from which there is no possibility of its finding its way into the economy of persons or animals.

The acidic nature of oxalic acid suggested the possibility that corrosion might result from its use on metallic articles, and it was supposed that by neutralizing it, or, in other words, using a neutralized oxalic acid, similar germicidal effect might be obtained without the accompanying corrosive action. But actual determinations on sodium oxalate, from two different sources, showed that these salts of oxalic acid possessed no germicidal power.

NOTES ON DENIGÈ'S TEST FOR CITRIC ACID.

Denigè's test is very useful for the detection of citric acid for the reason that tartaric acid, which is the acid most commonly associated with citric acid in mixtures, does not react with this test.

The test is applied as follows: The sample is dissolved in water and acidified with dilute sulphuric acid if it is not already acid. It is then filtered if necessary and a strong solution of mercuric sulphate in diluted sulphuric acid is added. The mixture is heated to boiling and a saturated solution of potassium permanganate is added drop by drop.

If citric acid is present, the pink color of the potassium permanganate is discharged and copious white precipitate is formed. Many substances other than citric acid will discharge the pink color of the permanganate, but only citric acid gives the copious white precipitate.

The test was applied to commonly met-with mixtures with perfect success:

Sample.	Result.	
Tartaric acid	Decolorized	No precipitate
Citric acid	Decolorized	Copious white precipitate
Tartaric acid, 80 parts Citric acid, 20 parts	Decolorized	Copious white precipitate
Tartaric acid, 80 parts Sugar, 20 parts	Decolorized	No precipitate
Tartaric acid, 80 parts Sodium bicarbonate, 20 parts	Decolorized	No precipitate
Tartaric acid, 60 parts Sodium bicarbonate, 20 parts Citric acid, 20 parts	Decolorized	Copious white precipitate
Tartaric acid 50 parts Citric acid, 20 parts Sodium phosphate, 50 parts	Decolorized	No. precipitate
Tartaric acid, 30 parts Sodium phosphate, 50 parts Tartaric acid, 40 parts	Decolorized	Copious white precipitate
Sodium phosphate, 40 parts Sodium bicarbonate, 20 parts Tartaric acid, 20 parts	Decolorized	No precipitate
Citric acid, 20 parts Sodium phosphate, 40 parts Sodium bicarbonate, 20 parts	Decolorized	Copious white precipitate

COCAINE HYDROCHLORIDE—A (NEW?) QUALITATIVE TEST.

Upon igniting Cocaine Hydrochloride a characteristic odor is given off. The odor resembles that given by atropine or one of its salts when heated with sulphuric acid as directed by the U. S. P. VIII for the identification of atropine. The odor was described by the U. S. P. VIII as recalling the odor of a mixture of rose, orange flower and melilot.

No record of a previous report of this test can be found by the writer.

NOTES ON THE ESTIMATION OF REDUCING SUGARS BY THE BENEDICT METHOD.

RATE OF OBTAINING END-REACTION.

In the description of the method and the manner of conducting sugar estimations, as outlined in the *Journal of Biological Chemistry*, Volume 9, pp. 57 to 59, by Benedict, particular emphasis is laid upon the necessity of exercising care in adding the sample to the boiling test because of the tardiness of the end reaction.

Quoting Benedict: "Measure 25 Cc. of the reagent into a porcelain evaporation dish (25–30 cm. in diam.) and add 10–20 Gm. of crystal Sodium Carbonate (or $^1/_2$ the weight of the anhydrous salt) and a very small quantity of powdered pumice stone. Heat the mixture to vigorous boiling over a free flame and run in the sugar solution quite rapidly until a heavy white precipitate is produced, and the blue color of the solution begins to diminish perceptibly. *From this point the sugar solution is run in more and more slowly with constant vigorous boiling, until the disappearance of the last trace of blue color, which marks the end-point* * * * * In this method, as in any other where the disappearance of color is made the end-point, there is a tendency to run in an excess of the reacting substance unless *special care* is exercised throughout the titration and particularly at the end. The solution must be kept vigorously boiling over a free flame during the entire process, and towards the end the sugar solution must be added in portions of a drop or two, *with an interval of about 30 seconds after each addition.* Should the mixture become too concentrated during the titration process, distilled water may be added to replace the volume lost by evaporation."

The use of care in slowing down the addition of the sugar solution when obtaining the end-reaction was also emphasized by J. L. Mayer in an article entitled "Quantitative Estimation of Glucose in Urine" (JOURN. A. PH. A., July 1919, p. 551) in the following words: "Add the sugar solution * * * with *sufficient slowness* to allow the reaction to proceed, putting the flask back on the hot plate until disappearance of color."

No other references were available to indicate the rate at which this method could be quantitatively carried out, so this was determined as follows:

Standard Material: Merck's Reagent Dextrose dried at 75° C. to constant weight; the anhydrous dextrose then being made into exactly 1% solution with distilled water, weighing the dextrose on an analytical balance.

Procedure of Test: The 1% solution was placed in a burette and the test conducted as directed by Benedict, with the exception that after the test was brought to boiling, the sugar solution was added 1 Cc. at a time until a heavy white precipitate was produced and then reduced to one or two drop portions until the last trace of blue color disappeared and the time over which the sugar solution was added was varied. The results of these tests were as follows:

Time allowed to obtain end-reaction.	Assay of the 1% dextrose solution.
1 1/2 minutes	0.724%
2 minutes	0.961%
3 1/2 minutes	1.00%
4 minutes	1.00%
4 1/2 minutes	1.00%
5 minutes	1.00%

Therefore, it is evident that at least 3 1/2 minutes must be allowed for obtaining the end-point when the sugar solution averages around 1 percent. In using this 3 1/2-minute period with the Benedict method, it is necessary to dilute sugar solutions of higher sugar content than 1 percent down to approximately 1 percent. At least 3 minutes must be allowed in obtaining the end-reaction with solutions containing less than 1 percent of sugar.

ACCURACY OF THE BENEDICT METHOD.

In the description of the method by Benedict in the *Journal of Biological Chemistry*, mentioned above, no figures are given regarding the accuracy of the method, but the following statement is made:

"As regards the accuracy of the process, it may be noted that repeated determinations by different workers during the past year have convinced the writer that the method is probably more satisfactory than any other titration method for sugars at present available. Check determinations with the gravimetric (Allihn's) and polariscope processes have shown that the method gives highly satisfactory results, the figures in the various applications of it differing even less than those reported for the writer's previous quantitative sugar process."

Experiments to ascertain the accuracy of the method were carried out as follows:

Standard Material: Merck's Reagent Dextrose was dried at 75° C. to constant weight and solutions of 2 percent, 1 percent, 0.5 percent and 0.25 percent strength were prepared by weighing out the proper quantities on an analytical balance. The assay of these standard solutions was carried out as directed by Benedict with the exception that at least 3 1/2 minutes were allowed for obtaining the end-reaction, and in the case of the 2 percent solution 50 Cc. of the reagent and 30 Gm. of crystal sodium carbonate were used. The results were as follows:

Strength of standard solution.	% found upon assay.	
2%	1st assay, 2.00% 2nd assay, 2.00%	
1%	1st assay, 1.00% 2nd assay, 1.00%	
0.5%	1st assay, 0.500% 2nd assay, 0.495%	av. 0.498%
0.25%	1st assay, 0.253% 2nd assay, 0.245%	av. 0.249%

APPLICATION OF THE METHOD TO SUCROSE-DEXTROSE MIXTURES.

Standard Materials: Sucrose—market quality of table cane sugar assaying 0.03% invert sugar by the method outlined on page 43 of *Bulletin* 107, Bureau of Chemistry, U. S. Dept. of Agriculture.

Dextrose: Merck's Reagent Dextrose dried at 75° C. to constant weight.

Mixtures of these were made by weighing out the proper proportions on an analytical balance to obtain dextrose contents of 2 percent, 1 percent, 0.5 percent and 0.25 percent, and these mixtures were dissolved in water to obtain solutions 100 Cc. of which contained 50 Gm. of the mixtures. The assays were carried out as directed by Benedict except that at least $3^1/_2$ minutes were allowed for obtaining the end-reaction. The following results were obtained:

Dextrose content of sucrose-dextrose mixture.	% of dextrose found.	
2%	1st assay, 2.00%	
	2nd assay, 2.00%	
1%	1st assay, 1.040%	av. 1.043%
	2nd assay, 1.046%	
0.5%	1st assay, 0.540%	av. 0.542%
	2nd assay, 0.544%	
0.25%	1st assay, 0.240%	
	2nd assay, 0.240%	

Leaving out of consideration the negligible effect of the invert sugar content of the sucrose, the results may be called satisfactory and the method appears to be applicable to the estimation of invert sugar in sucrose.

It is interesting to record here for comparison the results yielded in my hands, on the standard sucrose-dextrose mixtures, used in the application of the Benedict method to sucrose-dextrose mixtures, by the method outlined on page 43 of *Bulletin* 107, Bureau of Chemistry, U. S. Dept. of Agriculture, for the estimation of invert sugar in materials containing 1 percent or less of invert sugar and 99 percent or more of sucrose.

Dextrose content of sucrose-dextrose mixture.	% of dextrose found.
2%	1.83%
1%	1.04%
0.5%	0.46%
0.25%	0.21%

FORMULA FOR BENEDICT'S REAGENT FOR THE ESTIMATION OF REDUCING SUGARS.

For the benefit of those to whom Volume 9 of the *Journal of Biological Chemistry* is not readily available, the formula for the reagent is appended here:

Copper sulphate (cryst.)	18.0 Gm.
Sodium carbonate (cryst.)	200.0 Gm.
Sodium citrate	200.0 Gm.
Potassium sulphocyanate	125.0 Gm.
5% Potassium ferrocyanide solution	5 Cc.
Distilled water, q. s.	1000 Cc.

With the aid of heat dissolve the citrate, carbonate and sulphocyanate in enough water to make about 800 Cc. of the mixture and filter. Dissolve the copper sulphate separately in about 100 Cc. of water and pour the solutions slowly into the other liquid, with constant stirring. Add the ferrocyanide solution, cool, and dilute to exactly 100 cc. Of the various constituents only the copper salt need be weighed with exactness. Twenty-five Cc. of the reagent are reduced by 0.050 Gm. of dextrose or 0.053 Gm. of levulose.

LYE AS A DISINFECTANT.

A commercial preparation consisting of an odorless, white, granular powder with an intensely caustic taste has been advanced as a "disinfectant."

Upon analysis the following composition was revealed:

Caustic soda (NaOH)	94%
Washing soda (Na_2CO_3)	2%
Common salt (NaCl)	2%
Undetermined (water, sodium sulphate, insoluble matter, etc., by difference)	2%
Total	100%

The phenol coefficient was 12.7.

Therefore the preparation consisted of a commercial lye and while it possessed strong disinfectant properties, its usefulness as a disinfectant is limited to such conditions and materials as will withstand the use of strong caustic alkali.

A NOTE ON THE SAMPLING AND DISPENSING OF PHENOL U. S. P.

The U. S. P. requires phenol to contain not less than 97 percent of absolute phenol and to have a congealing point of not below 38° C.

U. S. P. phenol frequently comes into the market in glass or tinned iron containers, in a solidified condition to the greater extent, but with a small proportion of it liquefied, the liquefied portion rising to the top of the container.

The congealing points of samples of this liquefied portion from 2 different shipments of phenol, were 25° C. and 24° C., respectively, and therefore very much below the standard of U. S. P. phenol in strength. Upon completely liquefying all of the phenol and mixing well to include all of the liquid layer in the bulk of the phenol, the mixtures had congealing points of 39° C. and 40° C., respectively, and therefore readily passed the U. S. P. congealing point requirements.

The chemical character of the liquefied layer was not determined but probably consisted of phenol deliquesced by absorption of moisture due to the likely convenient practice of packing phenol in a warm liquefied condition and permitting the container to remain unstoppered or poorly stoppered until the phenol attains room temperature.

This liquefied portion of phenol should not be sampled or dispensed, but should be removed, the congealing point of the bulk of the phenol determined, and the liquefied portion then incorporated with the bulk of the phenol, provided it is not of sufficient amount to decrease the congealing point of the whole mixture below 38° C.

"LECHE DE HIGUERON."

This consists of a thick, creamy liquid used in Central America for the treatment of hookworm. It is the sap from the "Higueron" plant, as it is known locally. The "Higueron" plant is also known locally as a species of "rubber plant."

"Leche de Higueron" is a white, creamy liquid, resembling the cream of the cow, but more viscous in consistency. When fresh, it has a very faint, pleasant odor. Proximate analysis:

Fatty matter (fixed)	7.00%
Proteid	5.50%
Ash	0.50%
Moisture	78.72%
Undetermined	8.28%
Total	100.00%

Qualitative analysis of the ash showed CaO, MgO, Al_2O_3, Fe_2O_3, K_2O, Cl and SO_3.

The exact nature of the matter designated "undetermined" in the above analysis is in doubt, but it consists in part of a sulphur-bearing organic constituent.

No alkaloids, starch, sugars, glucosides or tannins could be found.

"Leche de Higueron" when fresh, possesses a very faint, pleasant odor, but soon decomposes and develops a very objectionable, putrid, sulphidic odor. It can readily be preserved by the addition of about 12 percent of alcohol. A one-gallon lot, so preserved, kept perfectly sweet in odor for three years. This preserved lot yielded the following analysis:

Color: Creamy white.

Consistency: Thinner than plain product.

Odor: Alcoholic.

Specific gravity: 1.019 at 25° C.

Absolute alcohol by volume: 11.1 percent.

Proximate analysis (calculated to alcohol-free basis):

Fatty matter (fixed)	11.19%
Proteid	11.21%
Ash	0.53%
Moisture	74.41%
Undetermined	2.66%
Total	100.00%

The "undetermined" matter contained organically combined sulphur. No alkaloids, starch, sugars, glucosides or tannins were present.

The ash contained the same constituents as the fresh sample.

As is to be expected, with a natural product, these two lots show considerable variation upon analysis.

No definite constituent likely to account for the vaunted efficacy of "Leche de Higueron" in the treatment of hook-worm disease could be demonstrated.

"BUTA."

"Buta" is a woody drug used with some repute in Peru, S. A., as a "blood tonic" and "in the delivery of children."

Alkaloidal extraction procedure yielded a small amount of residue which gave reactions for alkaloids with both iodine test solution and Mayer's reagent.

One-Cc. doses of a tincture prepared for injection and injected intravenously into dogs, by the proper procedure, produced an immediate and considerable rise in blood pressure, which, however, returned to normal in about five minutes. Injections of 2 Cc., intravenously, produced a much more sustained rise in blood pressure.

This blood-pressure raising effect probably accounts for the stimulating and "tonic" effect noted by users of the drug.—Reported by George E. Ewe and P. S. Pittenger.

"GOLENDRINA."

A plant drug, so called locally, is employed in Texas in the treatment of dysentery.

"Golendrina" is a stemmy plant averaging about 2 ft. in height and with small leaves.

Botanical classification: Family: Rubiaceae.

Genus: Opercularia.

Variety: Could not be determined.

Chemical examination: Contains large proportion of tannins, some gum and a little waxy matter.

No alkaloids or glucosides were present. Starches, sugars and resins were practically absent.

Physiological tests: 1-Cc. doses of a half-strength fluidextract of the drug when injected intravenously into dogs produced no apparent effect on the blood pressure. When the dose was increased to 6 Cc., however, a primary fall of 16 millimeters was produced, possibly due to the shock of injection, after which the pressure quickly returned to normal and then steadily increased until a few minutes after injection the pressure was 30 mm. above normal. This increased pressure returned gradually to normal in about one-half hour.

Possible therapeutic action: The presence of considerable tannin logically accounts for the successful use of this plant in the treatment of dysentery. The plant also appears to possess a stimulating and tonic effect on the circulatory system which is valuable in correcting the prostration accompanying dysentery.

NOTE ON A COMMERCIAL LECITHIN.

A sample of lecithin reputed to be derived from eggs and having a market price of $2.10 per ounce, assayed 91.6 percent of lecithin, calculated as $C_{42}H_{84}NPO_9$. The method of assay was the total P_2O_5 method of fusing with mixed carbonates, aiding combustion with potassium nitrate.

It is needless to say that *fresh* eggs could hardly have been the source of this product, since lecithin occurs principally in the yolk; one yolk contains only one drachm of solid matter, on the average; the maximum reported yield of lecithin from egg yolk is about 10 percent, and

therefore 80 eggs would be required to produce one ounce of this lecithin. This is not said in disparagement of this product, as it is often entirely possible to extract "pure chemical substances" from putrid matters.

"PLANT LOTION" FROM PORTO RICO.

In Humacao, Porto Rico, a "Plant Lotion" finds some considerable use. It is prepared from a local plant and is used for sprains and bruises.

Description: A brownish, muddy liquid, containing a dirty white sediment equivalent to about 5 percent of its volume. The liquid has an aromatic tincture-like odor.

The sediment: Is insoluble in cold water and consists practically entirely of a starch (shaped similar to corn starch under the microscope); the balance of the sediment being a very small amount of a dark brown, flocculent, non-resinous substance.

The liquid portion: Is slightly acid to litmus; reduces Fehling's solution directly and contains alcohol. Is free from tannin or other bodies which yield colors with ferric chloride (such as salicylic compounds). When distilled, a colorless, slightly acid distillate, having the odor of fresh popped corn, is obtained. The residue in the flask is a soft, light brown, sweet mass which chars on heating, giving aromatic and caramel odors free from acrolein odor or the odor of burning proteid matters. When the liquid portion is extracted with a mixture of ether and chloroform, a very slight amount of fatty matters, free from resin, is obtained. When rendered alkaline with ammonia and extracted with a mixture of ether and chloroform, a very slight, greasy residue is obtained which is free from alkaloids.

The ash of the extracted matter: Is very small in quantity, white, insoluble in water, soluble in dilute acids with effervescence and contains CaO, Fe_2O_3, Al_2O_3 and CO_2.

Efforts to obtain some of the plant used in the manufacture of "Plant Lotion" met with no response.

Evidently "Plant Lotion" is a dilute alcoholic extraction of an undetermined plant, made by cold maceration and expression. The plant is very likely similar to Zea Mays of the Gramineae family or some other saccharine plant, although a slight admixture of some aromatic plant is probable.

No definite constituent could be demonstrated warranting the claim of value for use on sprains and bruises, except traces of aromatic constituents and the alcohol.

SOURCES OF POTASH.

A lot of molasses ash assayed 27.4 percent of metallic potassium.

A lot of tobacco stems assayed 3.13 percent metallic potassium and a lot of dried apple peelings assayed 0.828 percent metallic potassium, 0.13 percent total phosphorus and 0.91 percent total nitrogen.

PHARMACEUTICAL LABORATORIES,
H. K. MULFORD COMPANY,
PHILADELPHIA, PA.

DRUG TRADE STATISTICS.

Drug Topics prints the following information, compiled by Saunders Norvell:

Number of retail drug stores in the United States, 49,000.

There is one retail drug store to every 2,048 of the population.

Forty-four and one-half percent of these stores are rated at $2,000 or less.

Of these 44½ percent, 92 percent are without rating in the commercial agencies. Twenty-three and one-half percent are rated at $2,000 to $5,000.

Of these 23½ percent, 67 percent are without rating in the commercial agencies. Seventeen percent are rated over $5,000 and less than $10,000. Eight percent are rated at $20,000 and over.

Thirty years ago the number of drug items on the market was 2,699.

The number of drug items now on the market is 45,900.

The patent medicine business of the average wholesale druggist is 54 percent of the total sales.

Of this 54 percent, only 12 percent are distributed in lots of one dozen or more.