of endeavors) was there a more appropriate time for the professionalizing of pharmacy than there is at present during prevailing conditions.

The average graduate from a reputable pharmacy school (especially if the student was a high school graduate) has had a sufficient preliminary training in inorganic, organic, and analytical chemistry, preliminary bacteriology and hygiene, and allied subjects to be able to take advanced post-graduate study (at least one year) in chemistry, bacteriology and advanced pharmacy, to quite readily assume the responsibilities and master the situations that will confront him in a professional pharmacy, where the many-sided problems should be more of a scientific and of a professional character, rather than commercial, if pharmacy is to still keep its roll among the sciences. Students thus trained to deal with medical bacteriology, perform the commonly applied clinical tests and further apply their knowledge in quest of scientific research, will greatly benefit themselves financially, socially and otherwise; and they will raise pharmacy to that high professional standard that it should and I hope will possess.

Let us all remain alert and take advantage of that which bacteriology has to offer us and which pharmacy can well handle. Let us approach it with the right spirit and with this most fertile field for study and investigation let us try to bring pharmacy back to where we all (I am sure) would like to see it and where it rightfully belongs.

Department of Bacteriology and Hygiene,
Philadelphia College of Pharmacy.

THE USE OF SACCHARIN AS A SUGAR SUBSTITUTE.*

BY SAMUEL T. HENSEL.

The United States Government having restricted the use of sugar employed by the druggist to the extent of 20 percent of his requirements, we are confronted with the problem of meeting this restriction in the most practical way.

Various substitutes for sugar have been recently suggested, some of them absurd, and all of them of doubtful utility.

In my opinion, the very best way to conform to this regulation is to make up the 20 percent reduction in sweetening power entailed by governmental requirement, by the employment of an equivalent amount of saccharin carefully calculated with respect to its sweetening power, and mathematically correct.

Such a method I am prepared to suggest, and herewith present the same in detail.

In view of the present status of saccharin, it would of course be necessary to secure permission from the United States Food Administration, basing our plea for the necessity of its use as a temporary recourse, to be employed for the period of the war only.

I am of the opinion further, that much of the prejudice against saccharin heretofore existing, has been the result of unsupported statements which have been made against the use of that substance.

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* Read before Denver Branch, A. Ph. A., May meeting, 1917.

According to the *London Lancet*, there is evidence that saccharin does not appear to produce harm to the human organism, and that since the compilation of that evidence last September, there is still no ground for thinking that it is in any way harmful.

My plan is very simple, entails no additional expense to the druggist, and will solve the problem completely, preserving an important department of our business from disaster and at the same time sustain us in our efforts to serve the public with a pure and wholesome product.

As you all know, 100 pounds of granulated sugar or crystal A, when subjected to percolation, will yield 13.7 gallons of syrup having a density or specific gravity of 1.320 representing 65.5 percent of sugar. Now since $\frac{100}{13.7} = \frac{80}{x}$ we find the value of x to be 10.9 gallons, therefore, $13.7 - 10.9 = 2.8$, the amount of water to be added to the percolate of 80 pounds of sugar.

The employment of the following solution of saccharin will provide the equivalent of the sweetening power of the 20 percent reduction required by the Government:

Take

Saccharin	235 grains
Sodium bicarbonate	117.5 grains
Alcohol	$1^1/_2$ fluidounces
Water sufficient to make	2.8 gallons

The above solution[1] when added to 10.9 gallons of concentrated syrup, will make the same volume of syrup as that obtained by the percolation of 100 pounds of sugar, its specific gravity will be less than the former, but its density will be nevertheless sufficient to assure its freedom from fermentation, and consequently its quality as a preservative of many of the delicate fruit flavors.

A syrup of this composition will represent a 1 : 4000 solution or approximately 1/10 of a grain of saccharin in the fluidounce of syrup, an amount so small as to be negligible when compared with the medicinal dose of that substance, which is from one to five grains.

The above combination will represent the sweetening power of 100 pounds of sugar, when saccharin of the highest purity is employed.

When saccharin was first introduced, it had a reputed sweetening power of from 250 to 300 times that of sugar, it was also known that the then commercial quality consisted of from 40 to 60 percent of an inert or nonsweetening substance. Since then, saccharin of the highest purity has been obtained possessing a sweetening power of from 550 to 600 times that of sugar, and it is to this product that I refer.

Before I close, I would like to say that the saccharin used in this way is not intended to replace the food value of the sugar displaced, and that should the

[1] Editor's note.—Mr. Hensel makes the statement, "that the density of the syrup will be sufficient to assure its freedom from fermentation." As the addition of the saccharin solution is a simple dilution, it is not necessary to reduce a large volume of syrup for stock until individual experiments have proven satisfactory. In some states the use of saccharin is not permitted in soda fountain syrups, though probably, under present conditions, permission would be granted by the State Food Departments.—Since this was written further restrictive orders have been issued.

United States Food Administration at any time in the future deem it advisable to further restrict the supply of sugar, the proposed method will serve as the basis of a sliding scale, which can be readily adjusted from time to time.

Great Britain, according to the *Lancet*, has taken control of the entire output of British saccharin which is to be distributed under supervision of the British Food Administration, having in mind its sweetening power; therefore its availability to displace the sugar employed by the British public in the use of tea and coffee, and with no reference to its food value.

INVERSION OF SUGAR IN U. S. P. SYRUP.*

BY G. W. LLOYD PLETTE.

Observing that certain concentrated sugar solutions developed more or less invert sugar after standing for a time, when at first they contained none of the single sugar or at least a mere trace, the question arose as to the cause of the inversion of the sugar: whether it was due to the action of molds or bacteria, or whether conditions of storing with reference to light and temperature might have been responsible for the change.

Simple Syrup, or the *Syrupus* of the U. S. P. IX, is a 64.7 percent by weight solution of sugar in water. It seems that the best quality of cane sugar—"Crystal A"— is preferred for the manufacture of this syrup.

In the investigation of this question, samples of syrup were made up by both methods mentioned in the U. S. P., *viz:* the "hot" and "cold" methods, and stored under as large a number of different heat and light conditions as possible. The samples were prepared on the 10th of February, this year (1917), and were analyzed for glucose at regular intervals until June the 9th, the volumetric estimation of glucose with Fehling's solution being the method employed. The following results were obtained:

The first sample, made by the cold method and stored in a warm, dark place, showed 45.5 percent glucose after the four months.

The second, made by the cold method and stored in medium light and changeable temperature (almost exact drug store conditions), showed 25.5 percent glucose.

The third, made by the cold method and stored in a cold, dark place, showed only 10.7 percent glucose.

The fourth sample was lost.

The fifth, made by the "hot" method and stored in a cold, dark place, showed only 8.93 percent glucose.

The sixth, made by the hot method and stored in a warm, light place, showed 11.1 percent glucose.

The seventh, made by the hot method and stored in a dark, warm place, showed 16.67 percent glucose.

The eighth, made by the hot method and stored in a cold, light place, showed 15.15 percent glucose.

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*Read before Scientific Section, A. Ph. A., Indianapolis meeting, 1917.