

The advantages of saccharin in the manufacture of aërated waters, cordials, &c., together with full instructions, valuable recipes, and testimonials from users.

Publication/Creation

[London] : [Wilson, Salamon & Co.], [1891]

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THE ADVANTAGES
OF
SACCHARIN
IN THE MANUFACTURE OF
AERATED WATERS, CORDIALS, &c.,
TOGETHER WITH
FULL INSTRUCTIONS, VALUABLE RECIPES,
AND
TESTIMONIALS FROM USERS.

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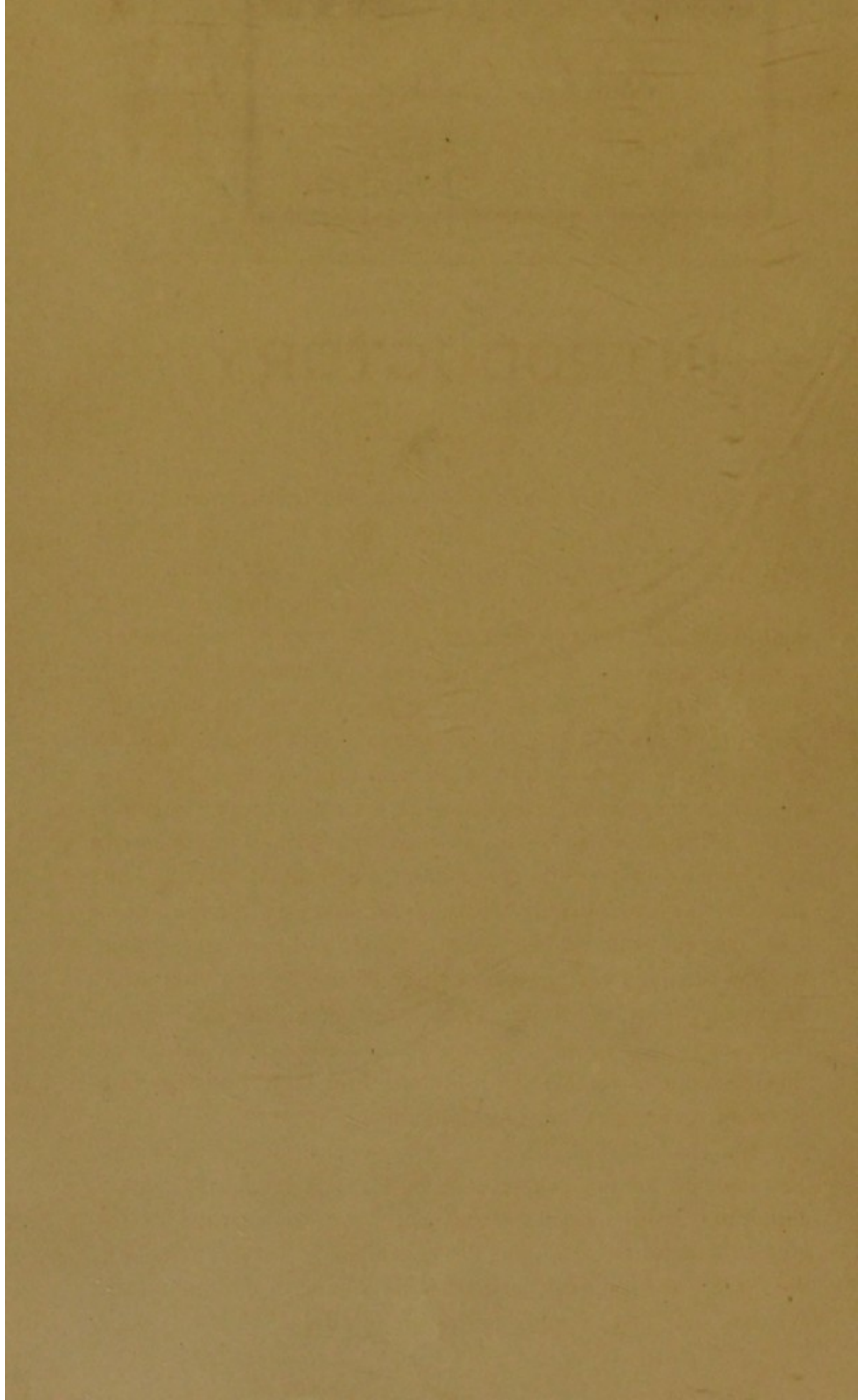
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→ INTRODUCTORY. ←

WHEN, after searching experiments, we determined, two years ago, to introduce Saccharin to the Mineral Water Trade, we met with but slight encouragement. Here and there, one or two, more far-sighted than their neighbours, decided after careful trial to adopt it under a sort of seal of secrecy. As a rule, however, the statement that eight pounds would sweeten as much water as a ton of sugar was received always with suspicion and generally with ridicule. Had we been guided by the measure of success which attended our first endeavours, Saccharin might now be relegated to the forgotten past. Sustained, however, by the conviction that its many merits must eventually procure recognition, we worked steadily and perseveringly onward, until to-day we are rewarded by the knowledge that our faith has been fully justified, and that our opinions are now shared by a large proportion of the Trade. Moreover, the secrecy with which its use was first attended has entirely disappeared, and it stands in the recognized position of a most valuable adjunct to the Syrup Room; every day bringing fresh proofs of its probable universal adoption.

We have, as will be seen by a perusal of the appended Testimonials, the full concurrence of many well-known practical authorities in the assertion that Saccharin is regarded as the greatest acquisition which has for very many years been offered to the Trade, and one calculated to work quite a reform therein. We dare state that the unanimous opinions we are able to publish,

including three such Testimonials as those from a large majority of the Sheffield and Portsmouth makers, and the one so heavily signed by the members of the Northumberland and Durham Mineral Waters Trade Association, have rarely been accorded to any other substance, and are somewhat unique in the history of the Trade.*

IT is our duty, and one which we gratefully discharge, to acknowledge our hearty appreciation of the high sense of kindness and public spirit which prompted the many signatories to these Testimonials. Notwithstanding a not unnatural reluctance to share with their competitors the benefits they were nevertheless deriving from the use of Saccharin, they have come forward to assist us in our efforts to generalize its adoption, and have thus stamped it in a manner, which nothing short of the lengthened practical experience of independent men could do, as an indispensable necessity in the manufacture of aërated and fermented beers.

We are certain that those of our readers who will follow our remarks with care, and will be sufficiently interested to themselves essay a practical test, will cordially agree with the authorities above cited; will coincide with the high encomiums they bestow on Saccharin; and will speedily perceive for themselves the truth of the statement we now make that the use of

Saccharin affords the following numerous important advantages:

1. A very marked saving in price over sugar.

Reckoning sugar at 18/- per cwt., *a saving of about £3 per ton can be relied upon.* From these data, makers can easily calculate the annual saving to be effected from this source alone.

* See p. 45.

2. A saving of one-half the carriage on sugar.

Sugar is necessarily bought at market prices *at the Refinery*; and carriage from that spot becomes unavoidable. When Saccharin is employed, only half the quantity of sugar is used, it follows therefore that half the carriage is saved.

3. A saving of from 12½% to 20% of Acid.

The combined Saccharin and Sugar Syrup being thinner than one composed of all sugar, the acid has less work to do in cutting its way through to the palate. The variation between 12½% and 20% is caused by the difference in strength of the various acids used, and the character of the drink it is desired to produce. Very slight experiments will determine the exact diminution possible.

4. Saccharin acts as a strong anti-septic or preservative.

This property is *very marked, and cannot be too highly emphasized*. We shall allude further to this point when we come to deal with fermentation.*

5. Saccharin produces a much fuller development of the various flavourings.

This is an established fact, and is probably due to the thinner, less viscous syrup, not masking or obscuring the effect of the essence on the palate to such an extent as a heavier one.

6. Saccharin makes much clearer Syrups than sugar.

This is probably owing to the same cause which operates to produce fuller flavour—viz., the lighter density of the syrup.

* See p. 15.

7. Saccharin Syrups never throw any deposit.

Cloudiness and deposit are invariably the result of fermentation, more or less intense, which the antiseptic properties of Saccharin are sufficient to prevent.

8. Saccharin effects a considerable saving of storage room.

As 8 lbs. will do the work of one ton of sugar, the truth of this statement is self-evident.

9. Saccharin effects a considerable economy of labour, time, and trouble.

Only half the sugar has to be lifted about, and Saccharin does not take one minute to dissolve. We have been many times assured that these considerations alone would induce many makers to use Saccharin, even at equal prices with sugar.

10. Saccharin preserves Brewed Beers for practically an unlimited time.

(See the article on Fermentation, p. 15).

11. Saccharin is purer, cleaner, and far healthier as a dietetic than sugar.

(See Medical opinions, p. 13).

12. Saccharin produces far better products than can be possibly obtained without it.

WITH ALL THESE ADVANTAGES THE APPARENT BODY OF THE DRINK IS FULLY MAINTAINED.

(See Testimonials, pp. 45-52.)

One experiment will suffice to demonstrate the complete accuracy of these statements.

No.

Objections to Saccharin Answered.

We have placed before our readers briefly, and without exaggeration, the advantages and benefits which are to be derived from the use of Saccharin. We have next to deal with the objections to its use which have been raised by makers, who, it is only just to state, have spoken without practical experience. The fact that we proposed to them to use 56 lbs. of Sugar instead of 1 cwt. seemed, not without reason, to imply that beverages made under such conditions would lack that quality which has hitherto been considered a *sine qua non*, viz. :—

⇒* BODY. *⇐

With regard to "Body," it would become a fruitful theme for a trade debating society to consider what would now be the cry were Saccharin as old as the century, and sugar a discovery of to-day. Would not mineral water makers exclaim that, whereas their drinks had hitherto been clean and full, yet without the least tendency to viscosity, it was now sought to make them thick and cloying to the palate? It is abundantly clear that "Body," of which we hear so much, is the outcome of necessity, and not desire. Hitherto sugar has been the only available edulcorating material, and in the manufacture of sweet beverages its use has been compulsory. Equally compulsory therefore has been the obligation to have "Body" in the drinks. This objectionable necessity is so old in origin that it has come to be regarded as a requisite condition of high class productions. The advance of science, however, has provided a new sweetening agent in Saccharin—one which will give to the palate the sensation of sweetness without what we are bound to say (entirely apart from interested motives) is a most objectionable characteristic of sweetened beverages, and one

which we have no hesitation in saying greatly limits the consumption of such goods amongst men. This characteristic is that peculiar cloy or sticky flavour, miscalled "Body." Men in Great Britain, at least, prefer dry to sweet wines. Until the discovery of Saccharin it was impossible to gratify a taste for uncloying aërated waters. This is so no longer, and we feel as sure as we did that Saccharin would ultimately receive its due recognition, that it is merely a question of educating the public mind to the fact that it is now possible to obtain a clean, non-viscous Lemonade, or Ginger Ale, for manufacturers to discover that the demand for "Body" in their goods has ceased ; it will no longer be tolerated. To this fact may be assigned the continuously increasing demand for Ginger Beer and Hop Bitters, which are consumed by men in preference to Lemonade, &c., this class of drink being left to women and children ; whilst so high an authority as Baron Bush declares that "the less sugar used in the manufacture of aërated waters, the better will be their keeping properties."*

While on this subject we may mention that there are many essences, such as Jargonelle, Pine Apple, and the compounds sold as Champagne Cyder, &c., which impart a much greater fulness to the drink than the less pungent flavourings, such as Lemon ; there are others, as Kola, which are so undeniably superior when made with Saccharin only that, even in the present state of public opinion, it will be found possible to discontinue the use of sugar altogether in these cases.

As we have said, the chief objection taken to Saccharin by those inexperienced in its use, has been that products made from a mixture of relatively equal proportions of sugar and Saccharin would lack "Body" ; but let us consider what are the real facts of the case, as proved by practical knowledge. In introducing Saccharin, we have invariably offered to make a sample batch of Syrup, and let the manufacturer judge it side by side with his own production. To guard against prejudice we have always

* "Recipes for the Manufacture of Aërated Waters," page 15. London : Bush & Co.

endeavoured to let a third party open the two bottles, so that neither the maker nor our representative should know which was which. In cases so few as to be practically isolated, the sugar drink has been preferred; very frequently the Saccharin drink has been chosen as the better; but in the majority of cases an utter inability to distinguish any difference has been declared; whilst we have even heard makers exclaim, "I wouldn't send that stuff out," and the foreman has had to refrain from laughing when he replied, "Why, sir, that's our own make."

Now the real facts are these. If the two drinks—one compounded of sugar alone, and the other of Saccharin and sugar—were tested by taking their specific gravity, the one containing double the quantity of sugar would be found the heavier, but, apart from the question of cloying, no palate can detect the difference in "Body" between the two drinks, even when tested side by side. *Saccharin imparts a fulness and roundness to syrups which take the place of "Body,"* hence the similarity of the two beverages so distinct in their composition. The difference that even an untrained palate can detect is, that one beverage will far surpass the other in fruit flavour, and in absence of "cloy" in the mouth. This one, we need hardly say, will be the one containing Saccharin, as these are essentially the characteristics imparted to aerated waters by this substance.

In the early days of Saccharin, we were occasionally told that saccharinated drinks left a nasty taste on the tongue, as of bitter almonds. Unfortunately, when this objection was raised, it was true. We speedily found, however, that Saccharin, when exposed to a certain temperature, became slightly decomposed, and one of the products of this decomposition involved the production of the taste and smell complained of. Communications with the Discoverer of Saccharin led to alterations in the preparation of the material, and since this was effected, now more than a year ago, we have never since heard such a remark. As an additional guarantee, however, that no Saccharin is sent out which is in any degree tainted with this taste, *we most carefully analyse every case that reaches us before distributing it.* Makers who have condemned

Saccharin from this cause may therefore take courage to try again, as they may now be *absolutely certain that Saccharin possesses no flavour other than sweetness, and no smell whatever*. It may be well to remark in this place, that if Saccharin be put into cold water, and boiled up, this taste is apt to be developed, especially if the boiling be prolonged for any time. If, however, our instructions for use are followed, no decomposition will ever arise.

Another trouble which also dates from our earlier days has been caused by our selling "Soluble Saccharin," for mineral water purposes. Soluble Saccharin is a most valuable compound in the kitchen and on the tea table, but it is not well adapted for the purpose we are discussing. Its merit in the manufacture of aerated waters was supposed to consist in its solubility in cold water, but sight was lost of the fact that the presence of soda in acidulated Syrups was undesirable, and in course of manufacture caused a partial precipitation of the Saccharin. The result was a cloudiness from the undissolved particles of Saccharin floating about, accompanied by an unpleasant saline taste. We have only referred to this, lest there should be amongst our readers some few who, having tried Saccharin in this form, have been deterred from pursuing the subject upon lines dictated by our maturer experience. If there be such, we ask them, in common fairness to themselves, as well as to us, to try one more experiment, only substituting "Pure" Saccharin for the "Soluble" form.

These are the only objections we have ever heard raised at any time, and we venture to think that to each we have afforded an ample answer, more especially if these remarks of ours be taken in conjunction with the Testimonials of members of the Trade, which we are privileged to publish as an appendix to this pamphlet.*

THE WHOLESOMENESS OF SACCHARIN.

We have occasionally been asked, whether or no Saccharin is wholesome. As a reply to this query our readers will prefer

* See p. 45.

medical opinions to our own bare assertions, and we therefore print the following extracts from medical papers :—

By THOMAS STEVENSON, M.D., F.R.C.P., Lond.,
Lecturer on Forensic Medicine and Chemistry at Guy's Hospital,
and Official Analyst to the Home Office.

“Saccharin is quite innocuous when taken in quantities largely exceeding what would be taken in any ordinary dietary. It does not interfere with or impede the digestive processes when taken in any practicable quantity. Our personal experience is that Saccharin may be taken for an extended period without interfering with the digestive or other bodily functions ; hence there is *no reason to think that its continued use is in any way harmful.*”—*Lancet*, November 17th, 1888.

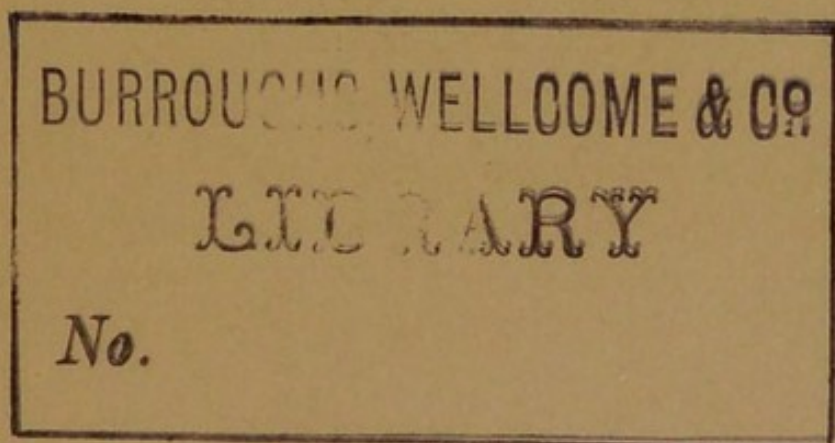
“Saccharin is perfectly wholesome.”—*Medical Press*, October 31st, 1888.

“Saccharin has no injurious action in man.”—*Pharmacology, Therapeutics and Materia Medica*, by T. LAUDER BRUNTON, M.D.

“As the result of experiments it is impossible to withhold the acknowledgment that any injury to health from the use of Saccharin is a groundless fear.”

Professor E. SALKOWSKY, of the Pathological
Institute, Berlin.

Many more extracts of a similar character could be cited, but the above are amply sufficient to answer fully any question as to the wholesome nature of Saccharin.



Saccharin in Aërated Waters FOR MEDICAL PURPOSES.

A NEW FIELD.

A fitting complement to the question just discussed is the use of Saccharin in cases where sugar is absolutely prohibited by medical men. These are far more numerous than is generally supposed, and frequently even the smallest quantity of sugar is strictly forbidden by the doctor. We do not propose writing anything in the nature of a medical treatise, and therefore do not attempt to enumerate such diseases in full, but we may mention that amongst these illnesses are Gout, Rheumatism, Sciatica, Lumbago, Diabetes, Corpulency, Diseases of the Bladder and Kidneys, Indigestion, &c., &c. Let any one glance over such a list, and he will at once see how many hundreds and thousands there are who are debarred from the luxury of a glass of Lemonade, or Ginger Beer; and since, for the same reason, they are prohibited Ale, Stout, or any beverage containing sugar, it is only a fair assumption that were a Lemonade, Ginger Ale, or Ginger Beer, "Guaranteed free from Sugar," placed within their reach, at a reasonable price, there would be a large demand. The idea is not new, but it has hitherto only been in the hands of a very few specialists, and the high prices charged (in some cases 5/- a dozen) have naturally tended to restrict the sale. Since Saccharin is materially cheaper than sugar, there is no reason why such beverages should not be sold at the ordinary rates, when a profitable return would be certain to ensue. *Recipes for such drinks will be found on pages 24-27*, whilst for Fruit Syrups, the only necessary alteration will be the substitution of Saccharin solution (page 24) for the mixed syrup.

The Rev. C. H. SPURGEON volunteers the following statement, with the desire that his words may be published with a view to assist in the popularizing of Saccharin :

"It must be a great thing for persons to whom sugar is injurious, to be able to have their food sweetened by another and equally pleasant means. Saccharin answers all the desirable purposes of a sugar to a gouty person, and yet it is not sugar, and does not go to form surplus nourishment. I regard the discovery of Saccharin as a great blessing, so far as my own health is concerned; and I am only one of thousands."

→ FERMENTATION. ←



Fermentation is, probably, of all chemical phenomena, the most complex and uncertain in its action. It is of itself a subject sufficient to fill volumes, but as the present work aims more at practice than at the exposition of scientific theory it will be only necessary to touch upon the question so far as it affects the aërated water maker and non-alcoholic beer brewer.

Fermentation may arise either from the chemical decomposition of sugar into carbonic acid gas and alcohol (alcoholic fermentation), or it may be the result of the growth of germs of ferment plants, akin, in their physiological structure, to yeast. Such germs may find their way into aërated goods through dirt, through the use of impure sugar (and every mineral water maker knows how much filth finds its way into even the very finest samples); they may float in the air and find a resting-place in the bottle, owing to the incomplete expulsion of air in the filling process, or they may even exist in the water, especially if it be charged with organic matter, as after heavy rains. The effect of any of these processes of fermentation on aërated waters (as distinguished from brewed beers) is absolutely detrimental to the goods, causing cloudiness, deposit, loss of sweetness, total destruction of the flavouring essences, and consequent ruin to the goods, and therefore loss of money and reputation to the manufacturer. It will be seen, therefore, how paramount is the importance of its prevention.

Many of the above causes of putrefactive fermentation, viz., those which arise from want of cleanliness, whether in the plant, bad bottling, or from germs contained in the water, are more or less within the control of the manufacturer, as he has only to keep his machinery, pipes, syrup vessels, and bottles thoroughly washed, expel all air from the bottle in filling, and purify the water by either boiling or filtration, or both, to be practically assured that

he will remain untroubled by such catastrophes as are above indicated.

There remains, however, the problem how to avoid fermentation arising from the alcoholic decomposition of sugar, or from ferment germs carried by dirt contained in the sugar. There are two possible ways—the one by the use of some such preventive as Salicylic Acid, *which adds to the cost of production*; the other is to decrease half the fermenting power of the sugar by the substitution of Saccharin, which, whilst sweetening the syrup up to the required standard, *will very materially cheapen the cost*, and WILL ACT SO STRONGLY AS A PRESERVATIVE AS TO EFFECTUALLY CHECK ANY TENDENCY TO FERMENTATION arising from the sugar used. We have invariably pointed out this property of Saccharin, the value of which cannot be overestimated, but we have hitherto considered we had not sufficient practical experience of this antiseptic action to warrant our giving that prominence to the question, which, from its vast importance, it so eminently deserves. The unanimous opinion of all users of Saccharin on the point, many of which we are by kind consent able to place before our readers, dispels all doubt on the subject, if indeed any ever existed, and the

Preservative Property of Saccharin,

quite apart from its many other sterling advantages, unquestionably stamps it as one of the greatest boons ever offered to the Mineral Water Trade. In our opinion the time is not far distant when the use of sugar in aërated waters will be wholly discontinued, and an additional reason for the consummation of this prediction is to be found in the fact that the day this happens, the greatest bugbear of the manufacturer—all chance of fermentation, except such as arises from dirt—is gone for ever.

So long, however, as sugar remains in use, it will not be out of place to remind our readers that the lower the quality of the sugar the greater the risk of putrefactive fermentation; also that although foreign beet sugars may be cheaper than best English refined cane kinds, they contain at least 12 % less sweetening matter, so that

the cheapness is only apparent, and is not a reality, since more must be used, and every half-pound of sugar adds to the risk of fermentation. There is also one further point which is apropos of the question, and that is, that most sugars, whether foreign or English, are what is technically termed "blued" with ultramarine, which gives an objectionable permanent blue tinge to all goods prepared from sugar in which it occurs. There are, however, several refiners who make a point of preparing unblued sugar, expressly for the Aërated Waters Trade, and such samples should invariably be used. Many makers dissolve their sugar in cold water; this is unquestionably a mistake, as should there be any fermentive bacteria in the water, no opportunity is given to kill them. Equally undesirable is it to boil the sugar, since that is to start alcoholic fermentation. The safest method of syrup making which can possibly be employed, is to *thoroughly boil* the water and then add the sugar and saccharin. This sterilizes the water and obviates the risk alluded to above, which is incurred by boiling either sugar or saccharin.

Fermentation, as applied to Brewed Beers.

In the brewing of non-alcoholic beers the use of sugar is a *sine quâ non*, as the preparation of the drink depends upon the formation of alcohol and carbonic acid, which are produced by the fermentative decomposition of sugar. In these beverages, however, makers are confronted with a problem almost as difficult as in the case of aërated waters. There are many kinds of fermentation, all totally different in their chemical action, only one of which is allowable (and that only to a limited extent), the others being objectionable in the highest degree, and as damaging to the brewed goods as fermentation in any form is in aërated waters. To prevent their occurrence therefore becomes a matter of primary import. Amongst those ferments, the appearance of which must at all costs be prevented, are the acetous, viscous, lactic, and butyric. Alcoholic fermentation is the only species which is permissible, and the greatest care must be observed that this does not proceed

too far. The brewer of non-alcoholic beers is excused from excise, so long as his beers do not contain 3 % of proof spirit at any stage. Now, "1 lb. of sugar in a gallon of water, fermented to its fullest extent, is capable of producing a liquor containing as much as 11 % of proof spirit."* This of course would lead to appearances before magistrates, followed by fines, and other unpleasantness. The Excise officers are always on the alert, and procure samples of brewed beers of all makes, which are analyzed at Somerset House, and if found to contain 3 % of spirit, the brewer is cautioned—if over, he is summoned. Great care, therefore, must be taken in checking the fermentation at a proper stage; but it must also be borne in mind that the longer these beers are kept in bottle, the more they ferment, until, if allowed to remain long enough, they may contain as much as 5 % to 7 % of spirit, and further, acetous fermentation may commence to set in; thus not only is the brewer in jeopardy from the Excise, but his produce goes bad, and is returned upon his hands with the attendant loss of money and reputation.

Now, if half the sugar be dispensed with, and Saccharin substituted for sweetening purposes, first of all, HALF THE FERMENTABLE MATERIAL IS REMOVED; secondly, the antiseptic action of the Saccharin acts as a check upon the primary or alcoholic fermentation for perhaps a couple of days, *but*, (1) it *obviates all risk of prosecution for excess of alcohol*, and (2) it *preserves the beer completely from acetous fermentation*. Thus, by the use of Saccharin the double danger above alluded to is completely averted, and the brewer may rest free from all anxiety on this score. We have ourselves had samples of Ginger Beer and Hop Bitters as sound and perfect in every respect twelve months from date of brewing as they were a week after they were made.

It is well known that Salicylic Acid does not answer as a preservative for these kinds of goods, as it imparts a peculiar "flatness" to the beers, and therefore the discovery of a substance which shall (1) cheapen the cost, (2) decrease the possible production of alcohol by one half, and (3) act as a strong preser-

* "The Manufacture of Aërated Waters," by Baron Bush.

vative to goods hitherto impossible of preservation for any length of time, not only deserves, but must necessarily obtain general recognition.*

The fact that Ginger Beer (brewed) will not keep for any length of time, has hitherto caused a good market to be lost in its export to hot climates. Having, as yet, had no experience, we cannot assert that by the aid of Saccharin it becomes possible; we do suggest, however, that it is a fruitful subject for experiment, and if successful would open up a new market of considerable commercial importance.

There is one peculiar class of fermentation which is apparently getting very prevalent. It is sporadic, and spreads as quickly as cholera or small-pox. It is called mucoid fermentation, and appears as a rapidly-increasing gelatinous mass, which will run right through every bottle and piece of machinery in the factory. We only mention it in this place to caution makers that nothing short of *absolute cleanliness* will keep it away.

→ COMPETITION. ←

No business nowadays is exempt from the worry attendant upon competition; but there can be very little doubt that the Mineral Water Trade suffers to a greater extent than most others. Why makers should have reduced and reduced their prices (to benefit no one but the middleman), to their own detriment, is a question which does not seem easy to answer. However, such is incontestably the condition of things at the

* In case it should be considered that we have exaggerated the danger of Excise prosecutions, we know of a case where a large brewer was fined, first £5, then £10, and then £50, and he was on the point of throwing up his business when Saccharin was brought to his notice. He tried it, and has used it ever since; and although, for obvious reasons, we do not publish any testimonial from him, he has assured us that he has never had the least trouble since he began using it, and that he looks upon Saccharin as his business salvation.

present time. Hence, every bottler now looks for the slightest indication of a chance of economizing. Some do it by using $1\frac{1}{4}$ oz. of syrup instead of $1\frac{1}{2}$ oz.; others try and obtain smaller bottles than the usual size, or they use inferior ingredients in their syrup-room. Undoubtedly, a saving is thus effected; but is it not at the cost of loss of trade? An economy, to be really effective, must not only cause a decrease of cost, but must ensure a continued maintenance of high-class productions; this can ONLY BE DONE BY USING SACCHARIN, WHICH, WHILST IMPROVING THE CHARACTER OF THE DRINKS, PUTS INTO THE MANUFACTURER'S POCKET A CLEAR SAVING OF FROM 15% to 20%.

General Directions for the Use of Saccharin.

We have, in a former page, alluded to the existence of two forms of Saccharin—the “Pure” and the “Soluble”; and have already indicated the reasons why the latter is unsuited to the purposes we are discussing. It is, therefore, hardly necessary to emphasize the fact that

Only “Pure” Saccharin must be used.

It is freely soluble in about 140 times its weight of boiling water; but if left in this proportion to cool, a large part would deposit in the form of crystals. It may be taken that 1 oz. of Saccharin will dissolve in a gallon of boiling water; but, to maintain it in solution, it will be necessary to add about $2\frac{1}{2}$ gallons of cold water, bringing the total bulk to $3\frac{1}{2}$ gallons.

Attention should be drawn to the slightly acid reaction of Saccharin. Care should, therefore, be taken not to leave it longer than absolutely necessary in metal vessels, unless tinned or enamelled.

We have stated how Saccharin may be used, either alone, or in combination with sugar. If Saccharin only is to be used, it is

simply necessary to pour the required volume of boiling water upon the Saccharin. This, it will be seen, vastly simplifies the work of syrup-making, and is an additional argument in favour of ultimately using Saccharin alone.

If, as has hitherto been the general custom, the Saccharin is to be used in conjunction with sugar in the relative proportion (as regards sweetening power) of half-and-half—

First boil the water and dissolve the sugar in the jacket pan ; then, when the syrup is scalding hot, stir in the Saccharin, and immediately run it into the cooling-pan ;—or,

Having dissolved the sugar, as above directed, place the Saccharin in the cooling-pan, and run the scalding syrup on to it.

If, as in many factories, a jacket pan is not used, put the Saccharin in the crock or cask, and pour scalding water on it till dissolved—then put in and dissolve the sugar, adding more water to complete the bulk.

Caution.—Never, by any chance, put Saccharin into cold water, and boil it up to dissolve it ; as, in such a case, a partial decomposition is set up. (See p. 11).

Some makers are in the habit of making their syrups with cold water. In such cases

Put the Saccharin in the syrup vessel ; add boiling water at the rate of 1 gallon to each ounce of Saccharin ; put in the sugar, and fill up to the required bulk with cold water.

Syrups made on either of the above methods with Saccharin and sugar will, if tested with the saccharometer, show only half the weight, but will be equally as sweet as if the instrument registered double.

It must be borne in mind that one lb. of sugar, dissolved in a gallon of water, will increase the volume of syrup to 8½ pints. If,

therefore, a maker has been in the habit of dissolving, say, 1 cwt. of sugar, and, instead thereof, proposes to use 56 lbs. of sugar and the equivalent (3 oz. 88 grains) of Saccharin, he must use 56 half-pints more water than he has been accustomed to in order to obtain the same volume of syrup. The relative sweetness of Saccharin (8 lbs. equals one ton of sugar) has been calculated to meet this necessity.

It has been pointed out (page 7), that it is unnecessary to use as much acid in these syrups as in those made wholly of sugar to attain equal results. The amount of diminution must, of course, be regulated by taste and the requirements of trade; but, as a general rule, it may be put down at from 10% to 20%.

The following tables will prove useful:—

25 grains Saccharin is equal to ...	...	1 lb. sugar.
$\frac{1}{4}$ oz. „ „ „ ...	...	$4\frac{3}{8}$ lbs. „
$\frac{1}{2}$ oz. „ „ „ ...	...	$8\frac{3}{4}$ lbs. „
1 oz. „ „ „ ...	...	$17\frac{1}{2}$ lbs. „
2 oz. „ „ „ ...	...	35 lbs. „
4 oz. „ „ „ ...	...	70 lbs. „
8 oz. „ „ „ ...	...	$1\frac{1}{4}$ cwt. „
1 lb. „ „ „ ...	...	$2\frac{1}{2}$ cwt. „
8 lbs. „ „ „ ...	...	1 ton „

$\frac{3}{4}$ oz. 22 grains Saccharin is equal to ...	...	14 lbs. sugar.
$1\frac{1}{2}$ oz. 44 grains „ „ „ ...	...	28 lbs. „
3 oz. 88 grains „ „ „ ...	...	56 lbs. „
6 oz. 175 grains „ „ „ ...	...	1 cwt. „
$12\frac{3}{4}$ oz. 22 grains „ „ „ ...	...	2 cwt. „
1 lb. „ „ „ ...	...	$2\frac{1}{2}$ cwt. „
19 oz. 88 grains „ „ „ ...	...	3 cwt. „
1 lb. $9\frac{1}{2}$ oz. 45 grains „ „ „ ...	...	4 cwt. „
2 lbs. „ „ „ ...	...	5 cwt. „

For the manufacture of mixed syrups, the following Table will prove acceptable:—

Instead of melting—

560 lbs. of Sugar,	use 280 lbs. of Sugar and 1 lb. Saccharin.
420 lbs. of „	use 210 lbs. of „ and $\frac{3}{4}$ lb. „
280 lbs. of „	use 140 lbs. of „ and $\frac{1}{2}$ lb. „
140 lbs. of „	use 70 lbs. of „ and $\frac{1}{4}$ lb. „
70 lbs. of „	use 35 lbs. of „ and 2 oz. „
35 lbs. of „	use 17 $\frac{1}{2}$ lbs. of „ and 1 oz. „
17 $\frac{1}{2}$ lbs. of „	use 8 $\frac{3}{4}$ lbs. of „ and $\frac{1}{2}$ oz. „
8 $\frac{1}{2}$ lbs. of „	use 4 $\frac{1}{4}$ lbs. of „ and $\frac{1}{4}$ oz. „

TABLE OF WEIGHTS.

20 grains make	...	...	1 scruple (apothecaries').
2 scruples (40 grains) make	1 dram	(„)	
109 grains (roughly)	„	$\frac{1}{4}$ oz.	(avoirdupois).
218 grains (roughly)	„	$\frac{1}{2}$ oz.	(„).
437 $\frac{1}{2}$ grains	„	1 oz.	(„).
7,000 grains (16 oz.)	„	1 lb.	(„).

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→ RECIPES. ←

To give an absolute recipe for any article in which local taste, the cost of production, and the special requirements of a business have to be carefully considered by each individual manufacturer (conditions which vary in almost every factory), becomes a matter of considerable difficulty. For the purposes of the Brewers' Exhibition we have prepared samples of the leading kinds of Aërated Waters, Brewed Beers, Cordials (alcoholic and non-excisable), and Liqueurs; and as we anticipate general approval of these goods, we thought it possible that makers might like to know the method of their manufacture. Without laying any claim to having produced anything either novel or marvellous, or any approach to a complete list of liquors—indeed, our only object is to practically demonstrate what elegantly-flavoured beverages can be made with the help of Saccharin—we have endeavoured to arrive at preparations of the highest class, and in publishing the formulæ we trust they may be found useful and acceptable. It is with that wish and in that spirit that we offer them to our readers.

SECTION I.

DRINKS FREE FROM SUGAR.

Whatever may be the ultimate form in which a sweet drink is offered to the public, the first process in its manufacture is to prepare the Syrup or Capillaire. In the case of

AËRATED WATERS, WITH SACCHARIN ONLY AS THE SWEETENING AGENT,

the process is of the very simplest.

Dissolve in boiling water—

2 oz.	25 grains	Saccharin to make	...	5 gallons	syrup.
4 oz.	50 grains	„ „	...	10 „	„

6 oz.	75 grains	Saccharin to make	...	15	gallons	syrup.
8 oz.	100 grains	" "	...	20	" "	
10 oz.	125 grains	" "	...	25	" "	
12 oz.	150 grains	" "	...	30	" "	
14 oz.	175 grains	" "	...	35	" "	
16 oz.	200 grains	" "	...	40	" "	
18 oz.	225 grains	" "	...	45	" "	
20 oz.	250 grains	" "	...	50	" "	
24 oz.	300 grains	" "	...	60	" "	
2 lbs.	400 grains	" "	..	80	" "	
2 lbs. 9 oz.	63 grains	" "	...	100	" "	

Strain through muslin. Filtration is unnecessary.

LEMONADE.

Soluble Essence of Lemon	...	...	1 $\frac{1}{4}$ oz.
" " Limes	...	...	$\frac{3}{4}$ oz.
Citric Acid Crystals	...	...	1 $\frac{1}{2}$ oz.
Syrup (page 24)	...	...	1 gallon.

Dissolve the acid in the syrup when hot. When quite cold add the essences, filter and bottle 1 $\frac{1}{2}$ oz. to 10 oz., bottle at about 85 lbs. pressure. These instructions hold good for all recipes in this section.

GINGER BEER (AËRATED).

Soluble Essence of Ginger	...	...	2 oz.
" " Capsicine	...	...	$\frac{1}{2}$ drn.
" " Lemon	...	...	1 oz.
Citric Acid Crystals	...	...	1 $\frac{1}{4}$ oz.
Syrup (page 24)	...	...	1 gallon.

KOLA CHAMPAGNE.

Soluble Essence of Kola	...	...	...	3 oz.
„ „ Raspberry (fruit)	...	...	...	3 drms.
Claret Colouring	...	...	...	4 drms.
Citric Acid	...	...	...	1 $\frac{1}{4}$ oz.
Syrup (page 24)	...	...	...	1 gallon.

Kola is usually coloured in this way in Scotland, but in England it is more frequently tinged with caramel. The above is, however, both prettier and more uncommon.

CHAMPAGNE CYDER.

Soluble Essence of Pear	...	...	...	1 $\frac{1}{2}$ drm.
„ „ Pine	...	...	...	1 $\frac{1}{2}$ drm.
Liquid Saffron	...	...	...	2 drms.
Orange Colour	...	...	...	2 drms.
French Cream	...	...	...	4 drms.
Citric Acid	...	...	...	1 $\frac{1}{2}$ oz.
Syrup (page 24)	...	...	...	1 gallon.

TANGERINE ORANGE.

Soluble Essence of Tangerine	...	...	...	3 oz.
* Orange Flower Water	...	...	...	2 oz.
French Cream	...	...	...	2 drms.
Orange Colour	...	...	...	6 drms.
Citric Acid	...	...	...	1 $\frac{1}{4}$ oz.
Syrup (page 24)	...	...	...	1 gallon.

* Or Soluble Essence of Neroli, $\frac{1}{4}$ drm.

RASPBERRY.

Soluble Essence of Raspberry	...	...	...	4 oz.
Raspberry Colour	...	...	...	1 oz.
French Cream	...	...	...	2 drms.
Citric Acid	...	...	...	1 $\frac{1}{4}$ oz.
Syrup (page 24)	...	...	...	1 gallon.

GINGER ALE.

Soluble Essence of Ginger...	...	...	4 oz.
" " Capsicine	...	...	2 drms.
" " Orange	...	...	2 oz.
" " Tangerine	...	...	2 oz.
" " Lemon	...	...	1 oz.
" " Roses ...	...	...	1 drm.
" " Neroli ...	...	...	1 drm.
Citric Acid ...	...	...	1 $\frac{1}{4}$ oz.
Lemon Colouring ...	...	...	2 drms.
Raspberry Colouring	...	...	1 drm.
Liquid Saffron	...	...	1 drm.
Syrup (page 24)	...	...	1 gallon.

If a slight aromatic spicy flavour be desired, add Soluble Essence Pimento, 6 drms.

SECTION II.

AËRATED WATERS FROM SACCHARIN AND SUGAR.

TO MAKE THE SYRUP.

For 5 gallon batch.	For 10 gallon batch.	For 30 gallon batch.
Saccharin, 375 grains.	Saccharin, 1 $\frac{1}{2}$ oz. 95 grs.	Saccharin, 5 oz. 57 grs.
Sugar Crystals, 15 lbs.	Sugar Crystals, 30 lbs.	Sugar Crystals, 90 lbs.
Water, 2 $\frac{1}{2}$ gallons.	Water, 7 gallons.	Water, 22 gallons.

6 oz. Saccharin and 105 lbs. sugar will make 35 gallons of syrup equal to 47° Twaddle; or the same quantities will make 38 gallons of syrup equal to 43° Twaddle.

Dissolve the sugar in water as directed on page 21, and then

stir in the Saccharin. If insufficient water is prescribed, more must be added to bring it up to the requisite volume.

If possible, the acid should be dissolved in the syrup whilst hot, as in this way the syrup is not diluted by the addition of an acid solution, but remains at the proper strength.

All the following recipes are calculated on the basis of $1\frac{1}{2}$ oz. syrup to the bottle, which should be filled at about 85 lbs. pressure.

LEMONADE A.

Soluble Essence of Lemon	...	...	2 oz.
Citric Acid ...	...	...	2 oz.
Syrup (page 27)	...	...	1 gallon.

LEMONADE B.

Soluble Essence of Lemon...	...	...	$1\frac{1}{2}$ oz.
„ „ Limes ...	...	...	$\frac{1}{2}$ oz.
Citric Acid ...	...	...	$1\frac{3}{4}$ oz.
Syrup (page 27)	...	...	1 gallon.

LEMONADE C.

Soluble Essence of Lemon	...	...	1 oz.
„ „ Orange	...	...	1 oz.
Citric Acid ...	...	...	$1\frac{1}{2}$ oz.
Syrup (page 27)	...	...	1 gallon.

The above three Lemonades are quite different in character. A is a good sharp lemon ; B is equally sharp, but a little rougher ; most men would prefer this ; whilst C is a ladies' sweet drink, and for this purpose may be improved by the addition of $\frac{1}{4}$ drm. Soluble Essence of Neroli in *every* 10 gallons of syrup.

The preceding Lemonades may be made from Essential Oils, as follows :—

A¹.

Oil of Lemon	...	...	...	...	6 drms.
Citric Acid ...	...	...	...	...	2 oz.
Syrup (page 27)	...	...	...	...	1 gallon.

B¹.

Oil of Lemon	...	...	...	...	4 drms.
Oil of Limes	...	...	...	...	2 drms.
Citric Acid	...	...	...	...	1 $\frac{3}{4}$ oz.
Syrup (p 27)	...	...	...	...	1 gallon.

C¹.

Oil of Lemon	...	...	...	...	3 drms.
Oil of Orange	...	...	...	...	3 drms.
Citric Acid...	...	..	...	...	1 $\frac{1}{2}$ oz.
Syrup (page 27)	...	...	...	...	1 gallon.

The most complete method of breaking up oils is to rub them in a mortar with carbonate of magnesia, or powdered pumice stone, working them into the consistency of a cream with a little of the syrup. Filter through a finely-woven linen bag till perfectly bright, and then, *and not till then*, add the acid.

Other methods of breaking up oils are

- (1) In spirit.
- (2) By soaking it on the sugar, and then pouring boiling water on it. The objection to this plan is that most of the aroma is volatilized by the heat, and that the oil is not all dissolved, but rises to the top of the syrup and gets wasted. The method has only the merit of simplicity.
- (3) Put the oil in a bottle with some syrup, dissolve a couple of tablespoonfuls of carbonate of soda in it, and then

add an equal bulk of citric acid powdered. Well stir during effervescence, and pour into the syrup at once. This method is effective, but hardly safe, as citrate of soda is formed, which does not improve the drinks.

A few fresh lemons, cut in half, and placed in the syrup-pan, will increase the flavour considerably.

GINGER BEER (AËRATED).

Soluble Essence Ginger	...	...	...	2 oz.
" " Capsicine	...	...	...	$\frac{1}{2}$ dr.
" " Lemon	...	...	...	1 oz.
Citric Acid	...	...	...	$1\frac{1}{2}$ oz.
Syrup (page 27)	...	...	...	1 gallon.

CHAMPAGNE CYDER.

Soluble Essence of Jargonelle Pear	...	...	...	$1\frac{1}{2}$ dr.
" " Pine Apple	...	...	...	$1\frac{1}{2}$ dr.
Orange Colour	...	...	...	2 drms.
Liquid Saffron	...	...	...	2 drms.
French Cream	..	...	...	2 drms.
Citric Acid	...	...	...	$1\frac{3}{4}$ oz.
Syrup (page 27)	...	...	...	1 gallon.

KOLA CHAMPAGNE.

Soluble Essence Kola	...	...	...	3 oz.
" " Raspberry (fruit)	...	...	...	3 drms.
Claret Colouring	...	...	...	6 drms.
Citric Acid	...	...	...	$1\frac{1}{2}$ oz.
Syrup (page 27)	...	...	...	1 gallon.

RASPBERRY.

Soluble Essence of Raspberry	...	...	...	4 oz.
Raspberry Colour	...	...	...	1 oz.
French Cream	...	...	...	2 drms.
Citric Acid	...	...	...	$1\frac{1}{2}$ oz.
Syrup (page 27)	...	...	...	1 gallon.

TANGERINE CHAMPAGNE.

Soluble Essence Tangerine	...	...	...	2 oz.
* Orange Flower Water	...	...	...	2 oz.
Orange Colour	...	...	...	6 drms.
French Cream	...	...	...	1 drm.
Citric Acid	...	...	...	1½ oz.
Syrup (page 27)	...	...	...	1 gallon.

* Or Soluble Essence of Neroli, ¼ drm.

SARSAPARILLA.

Decoc. Sarsæ Comp.	...	...	...	4 oz.
Sarsaparilla Colouring	...	...	...	2 oz.
Liquid Carmine	...	...	...	2 drms.
French Cream	...	...	...	½ oz.
Citric Acid	...	...	...	2½ oz.
Syrup (page 27)	...	...	...	1 gallon.

GINGER ALE.

Soluble Essence of Ginger	...	...	...	4 oz.
„ „ Capsicine	...	...	...	2 drms.
„ „ Orange	...	..	...	2 oz.
„ „ Tangerine	...	...	...	2 oz.
„ „ Lemon	...	...	...	1 oz.
„ „ Roses	...	...	...	1 drm.
„ „ Neroli	...	...	...	1 drm.
Citric Acid	...	...	...	1½ oz.
Lemon Colouring	...	...	...	2 drms.
Raspberry Colouring	...	...	...	1 drm.
Liquid Saffron	...	...	...	1 drm.
Syrup (page 27)	...	...	...	1 gallon.

If a slight aromatic spicy flavour be desired, add Soluble
Essence of Pimento, 6 drms.

SECTION III.
FRUIT SYRUPS.
SIMPLE SYRUP.

For 5 gallon batch.	For 10 gallon batch.	For 25 gallon batch.
Saccharin, $2\frac{1}{4}$ oz. 18 grs.	Saccharin, $4\frac{1}{2}$ oz. 36 grs.	Saccharin, $11\frac{1}{4}$ oz. 90 grs.
Sugar Crystals, 20 lbs.	Sugar Crystals, 40 lbs.	Sugar Crystals, 100 lbs.
Water, 3 gallons.	Water, 7 gallons.	Water, 18 gallons.

4 oz. Saccharin and 70 lbs. Sugar will make $17\frac{1}{2}$ gallons
of Syrup.

Dissolve the Saccharin in boiling water, then stir in the sugar, as directed, page 21; and whilst hot, dissolve the citric acid.

If the prescribed quantity of water be insufficient, more must be added to make up the required bulk.

This syrup is as sweet as one of 63° T.

ORANGE SYRUP.

Essence of Orange	...	...	...	...	$2\frac{1}{2}$ oz.
Orange Colouring	...	...	...	...	$1\frac{1}{2}$ drm.
Citric Acid	...	...	...	...	2 oz.
Syrup (page 32)	...	...	...	...	1 gallon.

BLACKBERRY SYRUP.

Essence of Blackberry	...	...	...	...	4 oz.
Claret Colouring	...	...	...	...	2 drms
Citric Acid	...	...	...	...	2 oz.
Syrup (page 32)	...	...	...	...	1 gallon.

LEMON SYRUP.

Essence of Lemon	...	...	...	...	2 oz.
Liquid Saffron...	...	...	...	...	6 drops.
Citric Acid	...	...	...	...	2 oz.
Syrup (page 32)	...	...	...	...	1 gallon.

RASPBERRY SYRUP.

Essence of Raspberry Fruit, Concent.	...	...	...	3 oz.
Raspberry Colouring	...	...	...	4 drms.
Citric Acid	...	...	...	1½ oz.
Syrup (page 32)	...	...	...	1 gallon.

CHERRY SYRUP.

Essence Morella Cherries	...	...	...	2½ oz.
Claret Colouring	...	...	...	2 drms.
Liquid Carmine	...	...	...	2 drms.
Spirit Colouring	...	...	...	1 drm.
Citric Acid	...	...	...	1½ oz.
Syrup (page 32)	...	...	...	1 gallon.

RED CURRANT SYRUP.

Essence of Red Currant	...	...	...	2 oz.
Raspberry Colouring	...	...	...	1 drm.
Liquid Saffron...	...	...	...	12 drops.
Citric Acid	...	...	...	2 oz.
Syrup (page 32)	...	...	...	1 gallon.

BLACK CURRANT SYRUP.

Essence of Black Currants...	...	...	...	3 oz.
Raspberry Colouring	..	...	...	2 drms.
Claret Colouring	...	...	...	4 drms.
Caramel	...	...	...	1 drm.
Citric Acid	...	...	...	2 oz.
Syrup (page 32)	...	...	...	1 gallon.

VANILLA SYRUP.

Essence of Vanilla	...	...	..	2½ oz.
Caramel	...	...	...	½ drm.
Citric Acid	...	...	...	2 oz.
Syrup (page 32)	...	...	...	1 gallon.

GINGER SYRUP.

Essence Ginger, Fort.	...	...	...	4 oz.
Caramel	...	...	...	4 drms.
Citric Acid	...	...	...	1½ oz.
Syrup (page 32)	...	...	...	1 gallon.

PINE APPLE SYRUP.

Essence of Pine Apple (fruit)	...	...	4 drms.
Caramel	...	...	½ drms.
Liquid Saffron	...	...	1½ drms.
Citric Acid	...	...	1½ oz.
Syrup (page 32)	...	...	1 gallon.

STRAWBERRY SYRUP.

Essence of Strawberry (fruit)	...	...	2¼ oz.
Liquid Saffron	...	...	1 drms.
Claret Colouring	...	...	3 drms.
Caramel	...	...	3 drms.
Citric Acid	...	...	2 oz.
Syrup (page 32)	...	...	1 gallon.

ELDERBERRY.

Essence of Elderberries	...	...	2¾ oz.
„ Pimento	...	...	3 drms.
Claret Colouring	...	...	1 drms.
Caramel	...	...	1 drms.
Citric Acid	...	...	2 oz.
Syrup (page 32)	...	...	1 gallon.

All the above syrups should be filtered through paper pulp
before bottling.

RASPBERRY VINEGAR.

Take 8 lbs. of sound fresh raspberries, and pour over them 1 gallon of white wine vinegar, and allow it to remain for 48 hours. Strain through a jelly bag, pour the liquor into a saucepan, and bring to the boil, when 200 grains of Saccharin should be added. Filter through paper pulp, and bottle.

SECTION IV.

CORDIALS AND LIQUEURS.

SYRUP.

For 5 gallon batch.	For 10 gallon batch.	For 50 gallon batch.
Saccharin, $1\frac{3}{4}$ oz.	Saccharin, $3\frac{1}{2}$ oz.	Saccharin, $17\frac{1}{2}$ oz.
Liquid Glucose, 10 lbs.	Liquid Glucose, 20 lbs.	Liquid Glucose, 100 lbs.
Sugar Crystals, 20 lbs.	Sugar Crystals, 40 lbs.	Sugar Crystals, 200 lbs.
Water, 2 gallons.	Water, 4 gallons.	Water, 20 gallons.


Dissolve the sugar and glucose in hot water, and when they have perfectly disappeared add the Saccharin, taking care that the syrup is scalding hot; well stir and filter through paper pulp till as bright and clear as crystal.

CORDIALS (NON-EXCISABLE).

LIME JUICE.

Crude Lime Juice	$2\frac{1}{2}$ pints.
Water	$2\frac{3}{4}$ pints.
Syrup (page 35)	$2\frac{3}{4}$ pints.
Liquid Saffron	$\frac{1}{4}$ drm.

The lime juice must be filtered through a felt bag before mixing with the syrup. When well mixed the whole must be again filtered through paper pulp.

 The extreme fermenting power of lime and lemon juice renders the use of a little salicylic acid imperative. Sufficient saccharin to check fermentation cannot be used, or the cordial would be too sweet. About a $\frac{1}{4}$ oz. of salicylic acid to 5 gallons of cordial should be used.

LEMON SQUASH.

Crude Lemon Juice	...	...	...	2¼ pints.
Water	...	...	...	2½ pints.
Syrup (page 35)	...	...	...	¾ pints.

Strain the juice through muslin, but do not filter. The cloudiness will, when mixed with soda water, give the drink all the appearance of a "squash" made from a fresh lemon.

N.B.—See note to Lime Juice Cordial as to the use of salicylic acid.

CLOVES.

Syrup (page 35)	...	...	...	1 gallon.
Liquid Saffron	...	...	...	10 drms.
Caramel	...	...	...	6 drms.
Claret Colouring	...	...	...	4 drms.
Citric Acid	...	...	...	1 oz.
Oil of Cloves	...	...	...	4 drms.

Rub the oil of cloves up with a handful of carbonate of magnesia in a mortar, adding a portion of the syrup (previously coloured) until a creamy consistence is obtained; add the contents of the mortar to the rest of the syrup, and filter through a finely-woven linen bag. When perfectly bright add the acid, *but on no account must the acid be added until the magnesia is got rid of by filtration.*

PEPPERMINT.

Syrup (page 35)	...	...	...	1 gallon.
Oil of Peppermint	...	...	...	3 drms.

Rub the Oil of Peppermint in a mortar with a handful of Carbonate of Magnesia, adding a little Syrup, till a creamy consistency is obtained. Filter till perfectly bright through a closely-woven linen bag.

SHRUB.

Soluble Essence of Shrub	...	...	...	3½ oz.
Caramel	...	...	...	¾ oz.
Liquid Saffron	...	...	...	3 drms.
Syrup (page 35)	...	...	...	1 gallon.
Filter through paper pulp till perfectly bright.				

LIQUEURS (ALCOHOLIC).*CHERRY BRANDY.*

Good Brandy	...	...	...	1 pint.
Spirit 60 ^{O.P.}	...	...	...	2 pints.
Water	...	...	...	3 pints.
Syrup (page 35)	...	...	...	3 pints.
Claret Colouring	...	...	...	2 drms.
Essence of Morella Cherry	...	...	...	1¾ oz.
Essence of Cherry Brandy	..	...	...	2 drms.

Mix the syrup, water, and colouring together ; then add the spirit, brandy, and finally the essences ; and either allow to fine, by leaving it to stand for a few days, or by filtering through paper pulp.

ORANGE BITTERS.

Tincture Gentian Root	...	...	...	4 oz.
Tincture Seville Orange Peel	...	...	...	1 oz.
Tincture Lemon Peel	...	...	...	1 oz.
Tincture Calamus Root	...	...	...	1 oz.
Tincture Coriander Seed	...	...	...	½ oz.
Tincture Cardamoms	...	...	...	½ oz.
Best Jamaica Rum	...	...	...	1 pint.
Spirit 60 ^{O.P.}	...	...	...	1 pint.
Syrup (page 35)	...	...	...	1 pint.
Water	...	...	...	5 pints.
Liquid Saffron	...	...	...	2 drms.
Orange Colouring	..	...	...	2 drms.
Caramel	...	...	...	4 drms.

Instructions for mixing as above.

GINGER BRANDY.

Spirit 60 ^{O.P.}	...	...	...	...	2 pints.
Syrup (page 35)	...	...	...	...	3 pints.
Water	...	...	...	...	3 pints.
Caramel	...	...	...	...	3 drms.
Soluble Essence Ginger	...	...	...	...	4 oz.
Soluble Essence Orange	...	...	...	...	3 oz.

Instructions for mixing as in Cherry Brandy, which see page 37.

CRÈME DE CITRON.

Spirit 60 ^{O.P.}	...	...	...	...	2½ pints.
Syrup (page 35)	...	...	...	...	3 pints.
Water	...	...	...	...	2½ pints.
Liquid Saffron	...	...	...	...	1 drm.
Caramel	...	...	...	...	½ drm.
Orange-flower Water	...	...	...	...	4 oz.
Soluble Essence Lemon	...	...	...	...	4 oz.
Citric Acid	...	...	...	...	1 drm.

Dissolve the acid in the water, add the syrup and colouring matters. Then add the spirit, and finally the flavourings. Leave to fine for a few days, or filter bright through paper pulp.

CRÈME D'ORANGE.

Spirit 60 ^{O.P.}	...	...	...	...	2½ pints.
Water	...	...	...	...	2 pints.
Syrup (page 35)	...	...	...	...	4 pints.
Liquid Saffron	...	...	...	...	3 drms.
„ Carmine	...	...	...	...	60 drops.
Orange Flower Water	...	...	...	...	6 oz.
Soluble Essence Tangerine Orange	...	...	...	...	3 oz.

Proceed as directed under Crème de Citron, which see above.

Other fruit flavours may be substituted for Lemon or Orange, and coloured accordingly, as for example :—

Pine Apple	called	Crème d'ananas.
Black Currant	„	Crème de cassis.
Vanilla	„	Crème de vanille.
Peach	„	Crème de pêches.
Peppermint	„	Crème de menthe.

WHITE CURAÇOA._g

Spirit 60 ^{O.P.}	...	...	...	...	2½ pints.
Water	...	...	...	...	2 pints.
Syrup (page 35)	...	...	...	...	3½ pints.
Soluble Essence White Curaçoa	...	...	...	...	2 oz.
„ „ Vanilla	...	...	...	...	3 drms.
„ „ Orange	...	...	...	...	½ oz.
„ „ Pimento	...	...	...	...	6 drms.

Proceed as directed under Crème de Citron, which see.

CURAÇOA DE HOLLANDE._g

Spirit 60 ^{O.P.}	...	...	...	...	2½ pints.
Water	...	...	...	...	1½ pint.
Syrup (page 35)	...	...	...	...	4 pints.
Caramel	...	...	...	...	8 drms.
Liquid Saffron	...	...	...	...	2 drms.
Essence Red Curaçoa	...	...	...	...	4 oz.
Decoc. Sarsæ Comp.	...	...	...	...	2 drms.
Soluble Essence Tangerine...	...	...	...	...	4 drms.

Proceed as directed under Crème de Citron, which see.

KÜMMEL.

Spirit 60 ^{O.P.}	...	...	...	...	3½ pints.
Water	...	...	...	...	3½ pints.
Syrup (page 35)	...	...	...	...	1 pint.
Essence of Kümmel...	...	...	...	...	5 drms.
Soluble Essence of Carraway	...	...	...	...	4 drms.

Mix well together ; thoroughly stir up a small handful of carbonate of magnesia ; and filter through a closely-woven linen bag.

KIRSCH-WASSER.

Spirit 60 ^{O.P.}	...	...	...	...	3 pints.
Water	...	...	...	...	4 pints.
Syrup (page 35)	...	...	...	...	1 pint.
Essence Kirsch-Wasser	...	...	...	...	3 oz.

Proceed as directed under Kümmel. When filtered, add Tartaric Acid, 1 drm.

ABSINTHE.

Essence Absinthe	...	...	...	...	2 oz.
Spirit 60 ^{O.P.}	...	...	...	...	5½ pints.
Water	...	...	...	...	1½ pint.
Syrup (page 35)	...	...	...	...	1 pint.
Horehound Green	...	...	...	...	1 drm.

Filter through paper pulp.

N.B.—In preparing Alcoholic Beverages, care must be taken never to leave them exposed to the air ; otherwise the strength of the spirit will be lost. The longer they are kept the better they will be.

SECTION V.

BREWED NON-ALCOHOLIC BEERS.

This class of beverage is gaining on the public taste every year, the principal reason being that the objectionable "cloy," hitherto inseparable from aërated waters, is absent. As the name implies, they are the products obtained by the partial alcoholic fermentation of sugar (see "Fermentation," page 17). This alcoholic fermentation is capable of being produced by the action

on sugar of some ferment, such as yeast, at a temperature of between 60° and 84° Fahrenheit. The question of temperature is of the greatest possible importance; the lower the temperature the better the keeping qualities of the beers, but as the lower the temperature the longer they take to ferment, it becomes a question for each individual maker to consider his own particular requirements, in the determination of the amount of heat to be applied. As here roughly sketched this is the true process of fermentation. There are, however, numerous brewers who simply boil their flavouring agent (ginger, hops, horehound, dandelion, &c.), so as to obtain a decoction thereof, run this on to sugar, and make up the bulk with boiling water, adding a little crushed Quillaia bark to obtain a froth on opening or drawing from the cask, and leave the fermentation to take place in the bottle. Beers so prepared lack both the flavour and keeping qualities of those fermented carefully with yeast, but the process is of course very useful where a rapid production is necessary, and a quick consumption is assured.

STONE GINGER BEER.

To make 100 gallon batch (120 dozen), take of best crushed Jamaica ginger 7 lbs. Macerate this in 30 to 40 gallons of boiling water for a few hours. Add 1 lb. citric acid, and $\frac{1}{2}$ lb. cream of tartar.

In the fermenting vat below place $2\frac{1}{4}$ oz. 68 grains Saccharin, and dissolve in 2 gallons boiling water. Then add 42 lbs. sugar, and let the ginger liquor pour on it through a strainer so as to keep back the fibrous matter.

Make up the bulk to 100 gallons, either with hot or cold water, as may be necessary to bring the temperature to 70°. Well rouse in 1 lb. of yeast, and allow the beer to ferment for 24 hours; then rack off into bottles or casks, which should be stored cork or bung upwards for about 10 days. If the bottle be

not shaken up this beer will pour out as clear as crystal with an excellent head. If preferred cloudy it should be shaken before opening.

HOP BITTERS.

To make 100 gallons, take $\frac{1}{2}$ lb. best Jamaica ginger, well bruised, and 4 lbs. best Kentish Goldings hops, and well boil them in 98 gallons of water, with 30 lbs. best cane sugar, for four hours. Then, whilst still on the boil, add $1\frac{1}{4}$ oz. of Saccharin, and run the liquor through a fine sieve or muslin strainer into the fermenting vat, where it must be allowed to cool down to 75° to 80° Fahrenheit. According to the state of the weather, 6 lbs. to 8 lbs. of brewer's yeast must be thoroughly roused in, and left to ferment for 24 hours. In hot weather 6 lbs. of yeast will suffice, whilst in colder weather the larger quantity must be used. After fermentation the "Hop Bitters" should be racked off into casks, and left for a week or so, and then "fined" with about 1 gallon of isinglass finings, left for another 24 days, and then bottled off, and kept for a week or so before using.

Both the above recipes for Ginger Beer and Hop Bitters will make excellent drinks, but it must be carefully borne in mind that it is not the recipe which makes the good beer, but the care exercised in "working" it, which only experience will teach.

BOTANIC OR HERB BEERS.

These vary so much, and are of such infinite kinds, that we have not attempted to offer any formulæ for them.

Our work, however, would be incomplete if we failed to point out that Saccharin may with advantage be used in conjunction with sugar in their preparation, both on the score of economy and to check excessive and objectionable fermentations.

Make the herb decoction in the ordinary way, but, instead of pouring it upon sugar, dissolve the necessary quantity of Saccharin in boiling water (see tables, pages 22 and 23,) and let the herb liquor run upon this. Then add the proper proportion of sugar, and proceed to ferment as usual.

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No. **TESTIMONIALS.**

Few prefatory remarks are necessary to emphasize the important character of the appended letters, **respecting the use of Saccharin in Mineral Water manufacture.**

It will, by common consent, be conceded that they constitute **the most remarkable testimonial ever given by the Trade,** and, in no small degree, reflect credit upon those whose sense of candour and of appreciative regard for this, the greatest of modern discoveries, have induced them to speak, not only with the courage of their convictions, but with a certainty and unanimity which cut the ground from prejudice and doubt.

The testimonials possess an element of even greater importance, for they prove that the Mineral Water Trade of Great Britain is eager to place itself in the van of scientific progress, and to extend the hand of encouragement to those who work for its improvement and its benefit.

These letters, together with confidential communications received from many who desired to avoid publication, **justify us in all that we have ever claimed for Saccharin.**

Saccharin is upon many thousands of breakfast tables in this country, and annually sweetens millions of cups of tea and coffee. It is used for this purpose, because it never creates acidity or heartburn, and is, in these respects, far healthier than sugar. It has been officially recognized by the medical faculty as being absolutely harmless.

The Mineral Water Trade, having taken Saccharin by the hand, its future in that direction is assured; but we shall, nevertheless, continue as heretofore, to send properly qualified instructors to those who desire to learn how to use it to the best advantage, or we will gladly place them in possession, by correspondence, of all the information we possess upon the subject.

We trust the satisfactory character of our testimonials, coming as they do, from co-makers, who are necessarily quite unbiased and impartial, will weigh with our readers sufficiently to induce them to **try Saccharin for themselves**. In such an event, they will endorse all that is contained in the appended letters.

BURROUGHS, WELLCOME & CO.

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No.

To Messrs. WILSON, SALAMON & Co., Limited,
165, Queen Victoria Street, London, E.C.

DEAR SIRs,

We, the undersigned Mineral Water Makers of Sheffield and District, having had a lengthened experience of SACCHARIN, both in Aërated and Fermented Beverages, extending in many cases over three years, have much pleasure in assuring you that we are able to fully endorse all that you claim in its favour. The quality of the drinks is fully maintained, and compares favourably with those made wholly of sugar, but with the great advantage of considerable economy of money, acid, time and labour. It also fully bears out the character you give it as an antiseptic and preservative.

Signed { GEORGE TAYLOR,
B. CHAPMAN,
WALTER OXLEY,
W. EVANS & SONS,
GILLOTT & SON,
J. T. SHARDLOW,
J. J. CLAYTON,
CHARLES HAGUE,
B. J. ARTHUR.

DEAR SIRs,

After a prolonged use of SACCHARIN in the manufacture of Aërated Waters and Fermented Botanic Beers, it affords us, the following members of the Northumberland and Durham Mineral Water Association, great pleasure in expressing our entire satisfaction with that substance. We find it produces a clean, palatable, full-bodied beverage, quite comparable with those made wholly of sugar, whilst we find your assertions as to its economy and preservative effects fully borne out. We trust this expression of our opinion may lead to a well-deserved increase in its consumption.

Signed { JAMES KERSHAW. J. W. HOPE.
DOWSON BROTHERS. G. H. STEEL.
WILSON BROTHERS. W. ROOME.
JOHN BAKER. EDW. LONGSTAFF.
SHADRACH WELLS. RALPH HULL.

DEAR SIRs,

Having been amongst the very first firms who tried SACCHARIN for the purposes of the Mineral Water Trade, as far back as 1889, and having been steady and consistent consumers of it ever since, it will interest you to know that we, the undermentioned members of the Portsmouth Mineral Water Trades Association, feel we can, with that

authority which is derived from mature and experienced judgment, join the Sheffield and Newcastle makers in recommending this wonderful substance to the notice of the Trade. Like your other friends, we also have found SACCHARIN financially more economical, easier to melt, handier to handle, and less prone to fermentation, than sugar; whilst at the same time it makes an equally sweet, "full" drink, clean on the palate, sharp and clear as crystal.

<i>Signed</i>	{	OLDFIELD BROTHERS.
		WEBB & SALMON.
		PORTSMOUTH MINERAL WATER CO.
		W. PASSINGHAM.
		DANCE & SMITH.
		A. WYATT.
		SOUTH HANTS MINERAL WATER CO.
		A. M. CHIGNELL.

From Mr. R. FOOTE, Liverpool.

I have used your SACCHARIN in the manufacture of Mineral Waters for upwards of eighteen months, with the greatest success, and must bear my testimony to the superior waters made by its use.

From Messrs. H. H. MARTINDALE & Co., Limited, Liverpool.

We were amongst the first firms of Mineral Water Manufacturers to give your SACCHARIN a trial, and our manufacturer, Mr. J. Earl, who is a thoroughly practical man, speaks very highly of it. He states there is a saving of 25 per cent. in acid; that it is more economical and less labour to use than sugar; that it prevents fermentation, adds more brilliancy to the manufactured article than sugar, and is cleaner to the palate. This latter quality we think is a strong recommendation to those who may hesitate to give it a trial.

From Mr. EDWARD FORREST, Liverpool.

I have been using SACCHARIN for about twelve months, and I find *its use means a great saving in money, trouble and time*; also a great improvement in the *flavour, brilliancy and keeping qualities* of the Aërated Waters.

From Mr. WALTER BRAMLEY, Liverpool.

I have now used your SACCHARIN for a considerable time for all Aërated Beverages, and have much pleasure in assuring you that I am able to fully endorse all that you claim in its favour. It makes a *cleaner and pleasanter* drink than all sugar, and *shows a considerable economy of money, acid, time and labour*.

From Messrs. HILLS, CHAPMAN & Co., Old Kent Road.

From practical experience, extending over the last two seasons, we have no hesitation in saying that SACCHARIN, used with sugar in the proportions recommended by you, *answers its purpose admirably*. We use it for all Syrups and Brewed Beers, *and have never had the slightest trouble in any way*.

From THE RICHMOND BOTTLING Co. (Dincs & Williamson), Ltd.
Richmond, S.W.

We have been using SACCHARIN for the past two years with great success. We have found it a source of economy in every way. We are greatly pleased with the results obtained, and if we could single one drink out from the others in which (independent of the saving effected by its use) it has seemed more successful than in others, we should name Brewed Ginger Beer, both for cask and stone bottles. This, no doubt, is principally owing to its excellent preservative properties, in consequence of which we have ceased the use of Salicylic Acid.

From THE BRISTOL AND SOUTH WALES AËRATED WATER Co.,
Bristol.

Having used SACCHARIN since October last for all our Aërated Waters, we have much pleasure in testifying that it has *undoubtedly been a great advantage to us in many ways*: firstly, from an economical point of view, it has saved us a deal of expense, and has reduced the quantity of acid used, thereby lessening the cost of manufacture; secondly, it saves a deal of labour and trouble in mixing syrups, as such a large amount of strength is embodied in so small a weight. Again, it has proved itself *beneficial in keeping our drinks* from fermentation and other modes of deterioration, which formerly proved a great inconvenience to us, but *this has not once occurred since our first using Saccharin*. We have also found it to greatly improve the quality of our beverages, which have now a full flavour and body, and are remarkably clear and free from stickiness in the mouth. We are pleased to have the privilege of recommending all who wish to make their Aërated Waters pleasant and popular to give Saccharin a fair trial, from which we are sure they will experience every satisfaction.

From Messrs. DALGLIESH, WILLIAMS & Co., Nottingham.

Our opinion of SACCHARIN is that *no mineral water maker should be without it*; its purity and brilliancy are grand, and even more appreciable than the undoubted saving of time and labour effected in melting sugar, while much less storage room is required. All goods, both fermented and aërated, made according to your instructions, are much better in flavour and cleaner on the palate than those made of all sugar; in fact, they are greatly improved in every way, whilst we see a great decrease in our acid bill.

From Messrs. J. WOODS & Co., Aldershot.

We have used SACCHARIN for a long time, and have much pleasure in stating that it has given every satisfaction. *For Fruit Syrups, Aërated goods, also, our patent non-intoxicating ales, and brewed ginger beer, we find it all we can desire. In the first place, we save £6 a ton on sugar, independent of carriage, storage and labour; secondly, all our goods are quite equal to, if not better, than those we used to make wholly from sugar; and thirdly, its clearness and anti-ferment properties are first-class. We have much pleasure in recommending it to other firms.*

From Messrs. TAYLOR BROTHERS, Rochdale.

We like SACCHARIN very well, as our constant repeat orders must have testified before this. We believe a batch of syrup can be made much cheaper by its aid than with sugar alone; and not only that, but there is a saving of $\frac{3}{4}$ -oz. of acid in each two gallons, which mounts up to a lot at the end of a year. It also saves a great deal of labour and time, as we can make syrups by the cold process (first dissolving the SACCHARIN in boiling water) all ready for bottling in fifteen minutes, *which will keep good any necessary time.* In our opinion it makes a nicer flavoured, brighter, and cleaner beverage than where sugar alone is employed. We make all our Stone Ginger Beer, Horehound Beers, and Hop Bitters with it, and they are just splendid.

From Mr. DAVID NICHOLL, Dundee.

Finding my original contract for SACCHARIN insufficient for my requirements, I beg to hand you herewith supplementary contract for another hundredweight.

I find it *all that is required in every way* for the Mineral Water Trade, and I would not be without it on any account.

From Messrs. W. E. LINE & Co., Reading.

Re SACCHARIN. We can truthfully say that we are thoroughly well satisfied with it in every way, no greater proof being needed than our having already exceeded the quantity contracted for at commencement of season. We find the beverages keep well and remain perfectly bright and clear. The flavour is more pronounced, and the body of the beverage all that can be desired, and then there is such a large saving in time, labour, and hard cash. Even at the present moderate price of granulated sugars, we save the equivalent of £3 per ton in favour of Saccharin. We may add that this is the second season we have used it, and have never had a case of fermentation in our works, or a single bottle of goods returned to us from our customers. Moreover, we are glad to say our turnover steadily increases, which evidently shows that the public also appreciate Saccharinated Beverages.

From Mr. C. GROVE, Tipton.

I beg to say that after several months careful trial of SACCHARIN, I have come to the conclusion that if used as per your instructions, a distinct saving, both of money, acid, time and labour will be the result. The difference in the cost of carriage to this part of the country is a very considerable item.

There is also a very great advantage to the Mineral Water Maker in the small space required to stock the same as compared with sugar, and I am very pleased to say that as far as my experience goes, the *quality of the goods is in every way maintained*, being fully equal to those produced from sugar only. You are at liberty to make what use you like of this.

From Mr. L. W. DAY, North Tawton, Devon.

As a *Manufacturer* of Aërated Waters for over a quarter of a century, and a man not easily wedded to a lot of new ideas, I can, after a twelve months use of SACCHARIN, offer an experienced opinion on its merits. The *saving in cost I find comes out at about 20%*, whilst the *saving of work is just one half*, and I find that *Saccharinated drinks quench thirst much better than* those made wholly of Sugar, and there is *an absence of that cloying taste in the mouth*, whilst the *flavour and body are excellent*.

From Mr. R. B. STRAKER, Hull.

I find that SACCHARIN in Aërated Waters is all you claim for it, but as the majority of my trade is Botanic and other fermented Beers, I have the greatest experience in that direction. I can only say that, whilst making an equally appreciated Beer, I have not now the slightest fear of being "dropped on" by the Excise, whereas I was always anxious on the subject before.

From Mr. F. C. BATCHELOR, Alresford and Alton.

I have now been using SACCHARIN nearly two years, and have great pleasure in stating that it has *given me every satisfaction*. I find *less trouble in making Syrups with it*, and I can use a much cheaper Sugar by using a combination of Sugar and Saccharin than I could when using nothing but Sugar.

From Messrs. LASCELLES, TICKNER & Co., Limited, Guildford.

We are still using your SACCHARIN in combination with Sugar in the Manufacture of Aërated Waters, and we have no fault to find with it.

From Messrs. C. & H. GILBERT, Brentford.

We have much pleasure in adding our testimony to the value of SACCHARIN in the manufacture of Aërated Waters. We can certify to the truth of your assertions as to its economy in all ways, whilst the beverages are *decidedly superior* to those made wholly of sugar, and we can safely say Saccharin gives us *entire satisfaction* in every particular.

From Mr. J. O. LATUS, Hull.

I find SACCHARIN in every way satisfactory, and all you represent it.

From Mr. JAMES LINGARD, Manchester.

My experience in the use of SACCHARIN during the past summer as an anti-ferment alone, without taking into account the advantage in a monetary point of view, is sufficient to decide my mind to continue its use. It has answered all my expectations. You will forward the balance of my contract at the times stated.

From Messrs. R. BOARDMAN & Co., Ashton-under-Lyne.

Having used SACCHARIN for considerably over two years, we have great pleasure in bearing testimony to the highly satisfactory results we have obtained, and we can fully bear out your statements with respect to it. It makes clean, pure, sweet, full-bodied drinks, less liable to fermentation than those made wholly of sugar. *Under no circumstances should we care to go back to the old system of syrup making.*

From Messrs. FURBER & Co., Herne Bay.

Having used SACCHARIN for two years, we are glad to say that it has given us satisfaction in every way. We find that we *save at least 25 % in money* and acid; that a great deal of time, trouble and labour is saved; that our articles keep better than when all sugar was used, and *their quality is now far superior*. It makes a clean drink, bringing out the flavour of the essences used, at the same time imparting just as much "body" as an all-sugar syrup.

From Mr. A. F. VENABLES, Torquay.

I find SACCHARIN a most useful adjunct in the manufacture of Aërated Waters—it saves time, money, labour and carriage. It is very easy to work, and the character of the drinks is fully maintained. I shall certainly continue its use.

From Mr. W. SPENDIFF, Dartford.

I have used SACCHARIN for the last two seasons, and should be very *sorry to be without it*, as I find it a great saving in money, acid, labour and time—very great considerations in a busy season. The quality of drinks sweetened with half sugar and half Saccharin I consider much *superior to those made wholly from sugar*. With Brewed Beers, my experience is, that it takes rather longer to ferment them properly; but, once carefully brewed, they *taste and keep better* than when made wholly from sugar.

From THE ASTON GROUNDS COMPANY, Limited, Birmingham.

Having used SACCHARIN in the manufacture of our Botanic Beers during the last six months, we have pleasure in relating that we have found it to be a means of economizing labour, a slight saving of acid, and a *good anti-ferment*.

From Mr. GEORGE HILL, Wombwell, near Barnsley.

I have found SACCHARIN superior to sugar in many ways. In the first place, there is a great saving of acid, and much more cleanliness in the use of it. I also find that, whereas before using Saccharin in the manufacture of beverages I had great difficulty in keeping them sound for any length of time, now they will keep as long as they are wanted.

From Mr. W. H. MERRICK, Smethwick.

I have used your SACCHARIN with great success for a considerable time in the manufacture of Aërated Waters, and *have turned out better quality goods through the use of it.*

From THE BIRMINGHAM AËRATED WATER COMPANY, Limited.

We have much pleasure in testifying to the *excellent results* obtained from the use of SACCHARIN in the production of Aërated Waters. We find the sweetening powers fully developed, and the *quality of the goods produced* highly satisfactory.

From THE BIRMINGHAM COFFEE HOUSE COMPANY, Limited.

We have used your SACCHARIN in our Aërated Water Factory for some time past, and are quite satisfied with the results obtained from it.

From Messrs. M. ELLIS & Co., Brighton.

I have great pleasure in testifying to the value of SACCHARIN for making Lemonade, Ginger Beer, and kindred drinks. I find it effects a great saving in acid, and gives a sweeter taste to all the goods, which are also much cleaner on the palate. I have used it for about six months, and *should not like to be without it, as it economizes time and saves money.*

From Mr. J. H. FERGUSON, Plymouth.

I find the following advantages are derived from the use of SACCHARIN:—1st, it is *far cheaper than Sugar*. 2nd, the *economy of labour saves much valuable time* in the busy season. 3rd, the finished beverage is *cleaner to the palate* than those made wholly from sugar.

From Messrs. W. HILL & Co., Great Grimsby.

We have found a very great benefit from the use of SACCHARIN, as it not only saves labour, but we find that it acts as a preservative as well.

From Mr. F. WHEELER, Guildford.

In reference to the use of SACCHARIN in the manufacture of Mineral Waters, I beg to say that the use of it is a decided gain from an economical point of view, being a saving of cost of syrup, carriage, and gas, or steam firing. The syrup can be made double strength and diluted as wanted, this being a considerable factor where space is an object, practically doubling the plant for syrup storing purposes. The made syrup is clean, bright, and equal in sweetening power to syrup made entirely of sugar. I cannot speak as to its keeping, or anti-ferment properties, as the goods are so soon disposed of after being manufactured during the season; but this I can say, that I have not received a single complaint on the above heads since using Saccharin.

From THE HULL PUBLICANS' AËRATED WATER Co., Ltd., Hull.

We may say that we have used SACCHARIN with very favourable results, and can with confidence recommend it to all Aërated Water Manufacturers.

From Mr. W. DUROSE, Wisbech.

I have now used 20 lbs. of your SACCHARIN and find it everything that you claim for it; a great saving of labour and time, and the goods made from it in combination with sugar are much brighter, more palatable, and keep better than when using all sugar.

From Messrs. HINDS & Co., Coventry.

We beg to give our opinion on the use of SACCHARIN in the manufacture of Aërated Waters. The result has been very satisfactory, effecting a great economy in labour, trouble and time, and, as the price is much less than sugar, the saving, too, is considerable. It is, as you claim, an anti-ferment, and the finished beverage is equal in every respect to that made entirely from cane sugar.

From Messrs. S. BIRCH & Co., Belfast.

We have much pleasure in informing you that your SACCHARIN has all the merits you say it has, and we have used it to advantage for some considerable time.

From THE CITY OF YORK BOTTLING Co., York.

The SACCHARIN we have had from you, we may say we find in every respect satisfactory; a great saving in sugar, labour, &c., and *causing a very highly finished flavour* in the manufacture of Mineral Waters.

From Mr. A. HACKER, Birmingham.

I have had two years' experience in the use of SACCHARIN for Aërated Waters, and am therefore fairly qualified to speak of it. I have saved a considerable sum of money through the difference of the price of sugar, and the saving of acid, amounting to somewhere between £60 and £70 per year: but I find it so convenient to use, that, if the price were the same as sugar, I should still use it.

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