

THE CHEMISTRY OF RUM.

By F. I. SCARD, F.I.C.

In the article recently published on Distilling nothing was said about the chemistry of rum, and it is thought that a few words on the subject may not come amiss to the tyro in rum manufacture. The basis of rum, as with other potable spirits, consists of that class of alcohol which is derived from yeast fermentation, and is commonly known as "spirits of wine." This form of alcohol is practically flavourless, and by itself would be useless as a beverage. It would be "silent"—that is, would be without those attributes which constitute the particular form of alcoholic drink.

Alcohol is formed from sugar by the growth of the yeast plant. This organism feeds on the sugar, producing, in so doing, alcohol, and carbonic acid from the splitting up of the sugars into these constituents. Feeding, however, hardly describes the operation. The yeast plant grows and multiplies—in fact, really feeds on the nitrogenous organic matter present; but it requires the sugar to enable it to do so.

In the molasses there are, besides the organic matter essential for the growth of the yeast, compounds which favour the growth of bacteria. What might be called the beneficent bacteria of rum, which cause the distinctive flavour, are the acetic acid organism, which produces acetic acid from the alcohol, and the butyric acid organism, which gives from the presence of organic matter peculiar to sugar-cane molasses, butyric acid—the same body which gives the characteristic flavour to rancid butter. Several other bodies are produced during rum manufacture—fusel oil, propionic acid, pinpinol and aldehyde—by the action of maleficent bacteria. The last named of these bodies is formed from the destruction of the alcohol itself.

During distillation the acids mentioned above combine with the alcohol, forming what are known as "esters," or compound ether, and it is these esters which impart the flavour to rum and give it stimulating properties.

The object of adding sulphuric acid to wash is to produce a certain acidity, thus putting an obstacle in the way of the putrefactive bacteria, which feed on yeast cells, at the same time helping the development of the butyric ferment, which requires an acid condition for its development. It is the ester formed from this acid which gives the "pineapple" flavour to Jamaica rum. Its presence is essential to all rums, as without this ester the spirit ceases to be rum.

The reason why Jamaica rum contains so much of this body, and is consequently so valuable, is as follows: The yeast which provides the fermentation in sugar-cane distilleries is derived from the cane itself. The ordinary variety consists of round cellular bodies which grow by budding—that is, one cell buds out from another. This variety, unfortunately, will not flourish when the acidity gets beyond a certain point. When this point is reached—and the production of acetic acid soon brings it about if the

fermentation is slow—alcohol production ceases. But in Jamaica there is an especial yeast which will grow in a highly acid medium. Unlike the other yeast, it is rod-shaped, and multiplies by splitting up. The presence of this yeast, therefore, enables the fermentation to be prolonged, and substances such as bottoms, dunder, &c., to be used in the wash, which are favourable to the development of butyric acid.

In this connection it may be remarked that the writer on one occasion added butyric ether (ester) to a puncheon of rum in Demerara, which was reported upon in *Minceing-lane* as "resembling Jamaica."

An extremely objectionable body in rum is aldehyde. This is derived from the oxidation of alcohol, and is an intermediate stage in the formation of acetic acid. It is the cause of the "hot" flavour of new rum, and gradually disappears as rum "ages" with the formation of acetic acid and subsequently acetic ether (ester). It is more volatile than alcohol, and is found mainly in the "cold feints" of a Coffey still, and in the first portions that come over of a pot-still, the rush of venomous vapour which precedes the spirit is very largely composed of it. "Fusel oil," which is really another member of the group of bodies called alcohols, to which "vinic" alcohol—the potable and methylic alcohol used for methylation—belongs, has a lower boiling-point than vinic alcohol. It is therefore mostly found in the "hot feints" of the continuous still, and the "low wines" of the pot-still. It is an extremely objectionable body, from the points of view of physiological effect as well as flavour. It is important, therefore, in distillation that the spirit should not, with a continuous still, be run at too low a strength, or with a pot-still that the running of the high wines should be carried too far.

Furfuric and propionic acid—which also form an ester—are also extremely objectionable bodies, but do not exist in large quantities. Summing up the situation, it may be said that: (1) The distinctive flavour of rum is due to butyric ether; (2) butyric acid exists to a greater or less extent, according, primarily, to the nature of the yeast, and, secondarily, to the description of sugar products used for the wash; (3) acetic ether is an ester which gives the highly stimulating character to rum, in conjunction with butyric ether; (4) the objectionable bodies are the aldehyde, which disappears with age, and fusel oil, which can be avoided by careful distillation.

Fortunately, rum fermentation gives very little of these. A certain amount of flavour is also due to the colouring matter, when burnt sugar bodies are used for colouring; but this hardly enters into the chemistry of rum.

"Faults" in rum—that is, cloudiness on breaking down, and being allowed to stand—are due—

- (1) To resinous matter from the cask;
- (2) To too highly burnt colour;
- (3) To excessive proportion of fusel oil.

Apart from the question of yeast used in producing a high-flavoured rum, there are others which operate. The nature of the materials used is an

important factor. Rum is alcohol+special attributes, in the same way that whisky is alcohol+those bodies which cause it to be whisky. While, as stated above, the characteristic flavour of rum is caused by butyric and acetic ethers in conjunction, these bodies do not exist in the same proportion. Jamaica rums vary among themselves in flavour due to the varying proportion of butyric to acetic ether. This is due to the different material used. The cane-juice itself is an important factor. Different kinds of canes give a different quality of rum, due, partly, to the cane itself and partly to variations in chemical treatment necessitated thereby in the sugar manufacture. Even the different conditions of the same variety of cane will affect the flavour of the rum. On one occasion some Demerara rum made from very rank Bourbon canes were reported upon as being "green and stinky." There is therefore outside the ethers specified some bodies present in excessive proportions which come down from the cane itself.

Speaking generally, however, the less the juice is limed and boiled the more favourable are the conditions for flavourable rum making. That is to say, the more the natural "bouquet" of the juice is preserved in manufacture, the better will be the rum, and the more, if the cane-juice goes into the distilling, a similar result will be produced.

With a continuous still the rum has to run at a constant strength, and that a high one. With a pot-still, however, the "high wines" follow a curve of strength, and thus include more "other" bodies than continuous still spirit. But, whatever be the nature of the materials used, whatever be the kind of yeast and the nature of the fermentation, it is impossible to have a high-flavoured spirit without the presence of a certain proportion of "esters," and for the proportion of butyric ether in them to be comparatively high. Another agent in flavour is the nature of the still.

THE SUGAR "CORNER."

West Indians Exonerated.

The Food Controller has made the *amende honorable*. In a letter to a firm of West Indian merchants who protested against his charges of endeavouring to make a corner in sugar which he levied against producers generally, his Secretary wrote:—

"Mr. Roberts desires me to say that both he and the Sugar Commission much regret to learn that you and some other British Guiana and West Indian producers have been subjected to unfair criticism as a result of the Press notice, which, in general terms, referred to the concerted action on the part of producers to take advantage of the present sugar situation by raising their prices for early deliveries. Mr. Roberts wishes me to explain that the reference to the producers in that Press notice was not intended to apply to those of the British Guiana and West Indian producers, who sold the whole crops of their estates at a reasonable price mutually agreed upon. This action was much appreciated by the Sugar Commission at the time, and will also be appreciated by the public."

MR. HERBERT G. DE LISSER, C.M.G. An Appreciation.

By SIR SYDNEY OLIVIER, K.C.M.G., C.B.

The award of the honour of the C.M.G. to Mr. Herbert G. de Lisser is well deserved, and is welcome not only as a recognition of Mr. de Lisser's personal abilities, character, and public services, but as reflecting honour on West Indian journalism, well merited by the *Gleaner* newspaper. So far as I am aware this is an unprecedented testimonial to the status of the Press in these colonies, and if there is any West Indian paper that has earned such a testimonial better than the *Gleaner* I am not acquainted with it.

Mr. de Lisser has in my knowledge of him always been associated primarily with the Jamaica Press. He was a pupil of the late Mr. William Morrison, a Scotsman of fervid genius, a fine influence in Jamaica, first as a schoolmaster and later as the Editor of the *Daily Telegraph*. Soon after I went to Jamaica as Colonial Secretary, being struck with the ability and apparently more than local enlightenment of some reports of lectures in the *Telegraph*, I wrote to Mr. Morrison to congratulate him on their excellence. He told me they were written by a young man on his staff who had all his education on the island.

At that time Mr. de Lisser was one of a number of young journalists, born and educated in Jamaica, whose daily achievement in producing the bulk of the matter of two daily papers filled me with continuous astonishment and admiration. Considering the disadvantages under which West Indian Editors labour, both on account of the limitation of the educational opportunities of their staffs and of the severe physical difficulties of filling and producing daily newspapers of considerable bulk in the conditions in which they work, I have always considered that the Kingston Press, and especially the management of the *Gleaner*, continuously maintained a very remarkable achievement. Mr. de Lisser was the ablest and most active-minded of the young journalists on whom this work depended. His range of interests and reading was very wide and his critical judgments notably enlightened. His industry was enormous, and he neglected no opportunity that came to him for travel and information. He became Literary Editor of the *Gleaner* under the Editorship of the late Mr. R. C. Guy—a much narrower-minded man—and is now Editor-in-Chief: his ability, literary capacity, and passionate devotion to the interests of the people of his native land forming a very fortunate combination with the temperate and high-toned traditions of the management of the *Gleaner*.

As an author—as distinct from journalist—he began to make his mark with short sketches of island life. *Twentieth Century Jamaica* was, I think, his first publication in book form. Since then he has published three exceedingly clever stories of island life—*James's Career*, *Susan Proudleigh*, and *Triumphant Squalitone*—the last, though not such attractive reading, in some respects the most penetrating of the three. A serial story of the "Jamaica Rebellion," which appeared later in the *Gleaner*, is, I understand, to appear in revised form.

For several years past Mr. de Lisser has added to his journalistic and literary work a great deal of energetic public service as secretary of the Jamaica Imperial Association, and the honour conferred upon him is doubtless in part a recognition of this activity.

MRS. ARCHIBALD PILE, widow of the late Speaker of the House of Assembly of Barbados, met with a serious accident at her residence in Kensington Hall Gardens a few days before Christmas, but is, as her many friends will be glad to learn, very much better.