

LIST OF WOODS SUITABLE FOR TURNERY.
Local Name. *Botanical Name.*

<p>Blood Wood or Iron Wood.</p>	<p>Hamæocharis haematoxylon, Choisy</p>
<p>Calabash</p>	<p>Crescentia Cujete, Linn.</p>
<p>Coco-nut Palm</p>	<p>Cocos nucifera, Linn.</p>
<p>Dogwood</p>	<p>Piscidia Erythrina, Linn.</p>
<p>Ebony, or Coccus Wood</p>	<p>Brya ebenus, DC.</p>
<p>Greenheart, or Break-axe</p>	<p>Sloanea jamaicensis, Hook.</p>
<p>Gru-gru Palm</p>	<p>Acrocomia lasiospatha, Mart.</p>
<p>Indian Tulip Tree</p>	<p>Thespesia populnea, Corr.</p>
<p>Jack Fruit</p>	<p>Artocarpus integrifolia, Linn.</p>
<p>Lancewood, Black</p>	<p>Bocogea virgata, B. & H.</p>
<p>Lancewood, White</p>	<p>Bocagea laurifolia, B. & H.</p>
<p>Lignum-vitæ</p>	<p>Guaiacum officinale, Linn.</p>
<p>Locust Tree</p>	<p>Hymenæa Courbaril, Linn.</p>
<p>Maiden Plum</p>	<p>Comocladia integrifolia, Jacq.</p>
<p>Maiden Plum</p>	<p>Comocladia velutina, Britton</p>
<p>Mountain Guava</p>	<p>Psidium montanum, Sw.</p>
<p>Naseberry Bullet or Bully Tree</p>	<p>Mimusops Sideroxylon, Pierre</p>
<p>Sapodilla</p>	<p>Mimusops excisa, Urb.</p>
<p>Star Apple</p>	<p>Chrysophyllum Cainito, Linn.</p>
<p>Tamarind</p>	<p>Tamarindus indica, Linn.</p>

YEASTS IN JAMAICA RUM DISTILLERIES.

By S. F. ASHBY, B.SC.

Fermentation Chemist. Sugar Experiment Station.

What is yeast, and what does it do? How many Sugar Estate Managers and Distillers could give anything approaching moderately correct answers to these two questions?—a minority probably as yet, but including those forty or more distillers who have attended the three weeks course of instruction at Hope during the last four years.

Rum presupposes yeast. With yeast absent a wash could never yield rum. Yeast is a minute colourless one-celled plant which multiplies in sweet liquors and causes them to work or ferment. It attacks the sugar and splits it mainly into two new substances,—alcohol and carbonic acid gas. The gas bubbles out of the liquor and continues to do so till all the sugar has been split up. The wash is then “dead.”

The alcohol remains in the dead wash. As a fact the wash was neither ‘alive’ nor ‘dead’, those expressions could only apply to the yeast. Indeed the yeast, while very much “alive” during the fermenting of the sugar does not die when the wash ceases to work: it settles as a layer at the bottom of the up liquor. If the dead wash is run off from it and a freshly set liquor run on the yeast will soon start to be active again. Distillery terms are therefore sometimes very misleading.

There are many genera of yeasts, a much greater number of species, and an enormous number of varieties. Most of them are of no practical value. Certain kinds are specially suited for certain purposes. There are brewery yeasts, wine yeasts, and distillery yeasts. A brewery yeast could be got to ferment a wine "must" or a distillery wash, and either of the other kinds to work in beer "wort". The products would, however, be unsatisfactory. Why? A wine yeast may ferment all the sugar out of a brewery "wort" and give as good an attenuation as a brewery yeast. The beer, however, does not clear well, possesses frequently a winy odour and does not taste like the usual thing. Equally undesirable would be the result of using brewers' yeast in a wine "must." In the first place the yeast would have to be gradually adapted to the new acid medium and even then would give a wine having a beery odour and an unusual taste.

In Europe the brewers worts and distillery washes are usually prepared from very similar starchy materials, and brewers yeast was formerly often used in distillery washes. In recent years the distillery washes are set up of high gravity and at a high temperature and require a yeast which starts very rapidly and works very strongly; brewers yeasts are unsuited to these conditions so that special distillery yeasts are now in general use.

The writer has tried European and North American brewers' yeasts, distillery yeasts, and wine yeasts in Jamaica washes. Some of them have given satisfactory results as regards yield of spirit in cane juice and in watered molasses; in fact some have worked as well in these washes as the wild yeast which is found on the rind of the cane, and which sets up fermentation spontaneously in freshly milled juice.

Were fresh cane juice or watered molasses the usual washes set up in Jamaica distilleries it would probably be found profitable to make use of a foreign distillery yeast, probably a good kind of "pressed yeast." The normal Jamaican wash of skimmings (more or less acid), dunder, molasses and frequently specially prepared "acid" and flavour, is quite unsuited to any of the foreign yeasts which the writer has experimented with. The dunder contains "fixed" acids formed by the decomposition of sugar in the boiling house which act injuriously on these foreign yeasts. The wash also contains an unusual quantity of volatile acids derived from the acid skimmings, "acid", dunder, and flavour, (when used). These volatile acids are particularly injurious to such yeasts. Even the yeast from the rind of the cane which works so well in the natural juice, performs badly in the ordinary artificial wash, and the more acid that wash is the more feeble is the fermentation caused by that yeast. As a fact, however, these washes do get effectively worked down by a peculiar kind of yeast which is abundantly present in all Jamaican distilleries. This yeast has alone made possible the employment of the kind of wash which was necessary to produce a rum of the Jamaican quality. One might hastily conclude from that statement that the yeast is responsible for the flavour of the rum.

Such is not the case. It was pointed out that some yeasts are capable of giving a certain subtle aroma or bouquet to a liquor namely :—"beery," "winey," "cidery" odours. These are of importance when the liquor is used for direct consumption. When, however, the fermented wash is distilled these flavours become scarcely perceptible and have no influence in determining the value of the spirits. The writer has proved this statement by experimenting with various yeasts in Jamaican liquors including the yeasts which ferment the ordinary washes. The flavour of rum is mainly due to "ethers", formed by the chemical union of alcohol produced by the yeast with certain volatile acids produced by bacteria.

The yeasts which effectively work down the ordinary washes are called "fission" yeasts because they multiply by dividing across the middle of the cell. They differ therefore entirely from the great majority of yeasts (including the yeast from the cane rind) which multiply by forming buds on the surface of the cell; these buds increase in size and finally drop off. Such yeasts are accordingly known as "budding" yeasts. How the fission yeasts get into the distillery still remains a mystery, but they can always be found in washes soon after "crop" commences gradually replacing the cane rind yeast in the acid liquor and finally carrying through the fermentation alone. They have the valuable properties of being very resistant to acids, both fixed and volatile, and of enduring and working well at high temperatures. To get a good fermentation in the normal rum wash as soon after crop commences as possible it is necessary that these fission yeasts be already established in the distillery. As this only occurs gradually in the natural way of leaving it to chance it is a decided gain to make certain of their active presence as early as possible. This can be readily managed by bringing them directly into the wash. With this end in view, cultures of two types of fission yeasts prepared at the Sugar Experiment Station were sent out to some estates last year. This crop, a large number of estates have applied for these yeasts and several have already got them working.

Two yeasts are being sent to each distillery; the one works in and at the bottom of the liquor, the gas bubbles at the surface being glassy clear; this is a bottom yeast. The other kind is a "top" yeast which throws up a creamy or fatty head consisting of yeast, at the surface of the wash.

The bottom yeast works more actively causing the wash to "die" in from 1-3 days less time than the "top" yeast. Distillers will find out which kind suits their conditions the better. Plate 1 is a microphotograph of the bottom fission yeast magnified 350 times. Plate 2 shows the top yeast similarly magnified. It will be noticed that while the bottom yeast cells are single or in pairs, the top yeast cells are always in chains; these appearances are characteristic of the two varieties. More detailed information about these yeasts will be found in the Second Report of the Sugar Experiment Station, 1908.

It must be repeated that these yeasts do not alone produce flavour in rum and consequently when cultures are used to start washes, there need be no fear that the quality of the rum will be affected thereby. There are, however, exceptions to every rule, and this is true also of yeasts.

The writer has obtained from molasses a budding yeast which is capable of giving a very strong flavour to washes, and to the rum distilled from them. This yeast produces both alcohol and volatile acid, and without any chemical intervention combines them to form ethers.

A rum has been obtained by simple distillation of a wash fermented by this yeast which contained nearly 50,000 ethers, and on many other occasions from 20,000 to 40,000 ethers. The ether is mostly, if not entirely, acetic ether and the product is consequently very light in body. A little of this rum could, however, be made to go a long way in raising the ether content of low ether rums to a good standard. The yeast forms on the wash a white dry wrinkled and very friable skin and at the same time begins to ferment slowly. It is injuriously affected by the acids in dunder, and works best in cane juice and in watered molasses especially if a little sulphate of ammonia be added. It ferments well with an initial gravity of 13-15 Brix, and with about 10-12 per cent. of sugar present.

The fermentation is slow, lasting for from 18 days to three weeks, but the sugar is almost entirely worked out, and the yield of rum is moderate owing to the great amount of ether formation. Owing to its slow multiplication and weak fermenting power it is easily crowded out by the other more active yeasts. It can therefore only work down a wash in which the other yeasts have been previously killed. They are readily killed by bringing the liquor to the boil most conveniently by means of pressure steam. This yeast has not been tried on a practical scale as yet.

Reference may finally be made to another "budding" yeast which the writer has separated from molasses. It ferments even the highest gravity molasses and is the cause of "foaming." (See S.E.S. Report, 1908.)

THE YALLAHS SMELL.

By S. F. ASHBY, B.Sc.,

Bacteriologist, Government Laboratory.

Preliminary.

The frequent wafting of an offensive odour over Kingston and district during and since October of the present year (1908) has attracted general attention and has given rise to some speculation as to its origin. A similar smell affecting the same district during the autumn of 1904 led to investigations, and reports were made to the Government regarding its source and cause. The reports were at one in attributing the odour to the Yallahs Salt