

which covering and not the individual insects is conspicuous. Upon examination the mass is found to consist of many soft-bodied, wingless insects, about one-fifth of an inch in length. These insects are the adult females, and the eggs are deposited in the mealy covering. The male mealy bugs are winged, very small, and not usually observed by the planter; they appear only at intervals. The mealy bug feeds upon the juice of the cane stalk and leaves by means of piercing jaws, with which it punctures the epidermis of the plant and sucks therefrom the liquid food. It removes from the cane an amount of juice in excess of its actual needs. The surplus is secreted from its body as a form of honey dew, which proves an attraction for flies and ants, and is, furthermore, the medium for the development of certain kinds of fungi, known as "smut," and forming the dark sooty covering common on the stalks and leaves where the mealy bug is abundant. Apart from the direct injury to the cane from the mealy bug, it is indirectly responsible for the development of certain diseases, which gain entrance to the tissues through the wounds of punctures made by the insect in feeding, the disease being carried to the plant by the various species of insects attracted to the plant by the honey dew.

Mr. J. B. Garrett, Entomologist of the Louisiana Experiment Station, is preparing a report on the history and habits of the mealy bug, which, it is hoped, will be published at an early date for the benefit of planters.

THE CHEMICAL EXAMINATION OF VARIOUS RUMS.

By KARL MICKO.

In a previous article (this *Journal*, 1909, 225, 410, and 446) we have dealt with the examination of rum, and have attributed the great difference between Jamaica and artificial rums to the presence of a typical aromatic constituent in the former. We have now extended our studies to other kinds of rum, especially Cuba and Demerara rums, and to different arracks. The special object in view was to determine whether Cuba and Demerara rums contain the same typical aromatic constituent, and to find out in what way these two kinds differ from one another.

Our previous work has shown (*loc. cit.*) that the typical aromatic constituents of Jamaica rum is more resistant towards alkali than the esters; for whilst the esters are completely saponified by an alcoholic N/10 caustic soda solution in 24 hours at ordinary room temperature the typical aromatic odour persists to finally give place to another more resinous smell.

It was inferred that by carefully saponifying the esters it would be possible to separate the peculiar aromatic constituent, and this was found to be actually so. First the ester content of a portion of distillate was determined using an excess of alkali, then to a second portion of distillate less alkali was added than sufficed for the

saponification of the esters. The amount of caustic soda added was less than that actually necessary to effect saponification on account of the fact that the aldehydes readily decompose in alkaline solution forming acid products. In the case of this happening the odour would be affected; but our main object in working with as small amount of alkali as possible was to avoid attacking the non-ester constituent.

The distillate thus treated was alkaline, but the excess of alkali was slight as the esters were almost completely saponified. It was then acidified with tartaric acid, and submitted to fractional distillation.

Working in this way we examined not only the above-mentioned tropical spirits but also some European products; and our conclusions may be summarized as follows:—

All the spirits examined possess a peculiar aromatic constituent which does not belong to the esters. It is possible by means of the above-described method to readily differentiate between artificial spirits flavoured with esters, etherial oils, and other substances and the genuine product. This peculiar aromatic constituent is of great value in judging the purity of spirits, and is in this connection of greater significance than the esters. It imparts most of the specific aroma to the spirit. It is a general criterion, and has not been imitated up to the present time. It can be separated by carefully saponifying the esters, and has an extremely delicate fruity odour.

The tropical spirits which were examined, Cuba, Demerara, and Jamaica rums, and Batavia arracks, contain in addition to other flavouring constituents the same, or a very similar aromatic constituent, as the one we obtained from Jamaica rum (this *J.*, 1910, 225, *et seq.*), but in Jamaica rum it is present in very much greater amount.

In Jamaica rum it can be detected by fractional distillation of the original rum, or even by strongly breaking down; whilst in the other spirits, since it occurs in much smaller amount and in admixture with other specific aromatic bodies and esters, it can only be recognised by carefully saponifying the esters and fractionating the ester-free liquid thus obtained.

Besides the fragrant-smelling bodies another body of a characteristic odour which generally appeared in the last fractions of the fractional distillation was found in the tropical spirits.

As to the origin of the typical aromatic constituent, it may either be formed during fermentation, or may be present as such in the primary material. In the case of Jamaica rum the first supposition is probably true. Perhaps there are present in the sugar cane certain bodies which during fermentation give rise to the aromatic substances; or again possibly the aldehydes, ketones, &c., react during the production of the spirit with the formation of the aromatic bodies.

The results of our analytical examination of the various rums are given in the following table:—

CUBA RUMS.

Description.	Colour.	Sp. gr. at 15° C.	Alcohol.	Extract.	Ash.	Total Acidity.	Volatic Acidity.	Esters, as Ethyl Acetate.
						As Acetic Acid.		
Soledad Cuba..	yellowish ..	0·8706	61·7	0·036	0·002	0·065	0·033	0·057
Los Canos B. Cuba..	brown.....	0·8794	59·1	0·134	0·004	0·067	0·039	0·057
Los Canos Cuba..	yellowish ..	0·8812	58·5	0·070	0·004	0·091	0·046	0·119

DEMERRARA RUMS.

Z. Demerara R.	brown.....	0·8742	62·1	1·868	0·040	0·115	0·023	0·062
P. M. Demerara R.	brown.....	0·8747	61·7	1·044	0·024	0·106	0·029	0·101

JAMAICA RUMS.

Jamaica rum S. P. . . .	brown	0·8773	59·1	0·314	0·008	0·070	0·033	0·229
Jamaica rum M. N. F. . .	brown	0·8775	59·7	0·476	0·008	0·079	0·039	0·220
Jamaica rum Anas. . . .	brown	0·8765	60·7	0·856	0·004	0·132	0·093	0·590
Jamaica rum C.	brown	0·8745	60·7	0·576	0·008	0·110	0·062	0·739
Jamaica rum L. F. . . .	brown	0·8781	59·7	0·602	0·010	0·108	0·060	0·831
Concentrated Jamaica Rum.	light brown	0·8678	62·4	0·300	0·010	0·670	0·426	2·390

BATAVIA ARRACKS.

Batavia Arracks O. G. L.	yellowish ..	0·9138	47·6	0·063	0·007	0·137	0·087	0·194
Batavia Arracks K. W.	yellowish ..	0·9134	47·7	0·072	0·006	0·142	0·093	0·251

ARTIFICIAL RUMS.

"Genuine Cuba rum"	brown	0·9312	41·2	—	—	0·019	0·006	0·135
"Finest rum of Trinidad de Cuba"	brown	0·9137	47·6	—	—	0·010	0·002	0·040

(Abridged from *Zeitsch. Untersuch. Nahr. Genussm.*)