

ARSENIC IN BEER.

REPORT OF THE COMMISSION TO THE MANCHESTER BREWERS' CENTRAL
ASSOCIATION.

GENTLEMEN,

The Commission have now examined the sugars and all the other materials used in brewing in Manchester (with the exception of the malt), and they consider that it is clearly established that the arsenic found in deleterious quantities in the beer has been solely due to the contamination by arsenic of the sugars supplied by Messrs. Bostock and Company, Limited, of Liverpool. The arsenic in these sugars was undoubtedly derived from the impure sulphuric acid used in their manufacture.

The measures recommended by the Commission a few days ago have, they learn, been effectively carried out. The whole of the beer in the manufacture of which any Bostock sugar was used has been destroyed, and there is no further danger from this source.

All the other brewing sugars on the English market have been analysed, and have been found to be quite free from arsenic.

In view of the importance of the matter, the Commission have instituted inquiries as to the manufacture of brewing sugars in the United Kingdom, and in this they have been assisted by the whole of the manufacturers of such sugars, in a body, voluntarily offering them the opportunity of examining into the mode in which they conduct the manufacture. These manufacturers have stated collectively that it is, and always has been, their custom to use only acid free from arsenic, and they have requested the Commission to examine their invoices, works, etc., in order to verify these statements. Lack of time has prevented this being done by personal examination up to the present, but the fact that all the specimens of brewing sugars, as well as of glucose used for other purposes, on the market have been found to be free from arsenic, and the absence of any previous cases in which arsenic has been in such products leave in the mind of the Commission no doubt that this statement, when examined into, will be found to be correct.

The Commission are quite unable to explain how Messrs. Bostock and Co., Limited, came to employ an acid of the character actually used by them. The absolute necessity of using an acid free from arsenic in the manufacture of an article for human consumption must have been evident to everybody technically connected with the manufacture, and such acid is a common article of commerce. The price

of the sugars in question was as high as any in the market, and, apart from this, the quantity of acid used in the manufacture of the sugars is so small that the difference in cost of the best and the worst would only make a difference of a fraction of a penny per hundredweight of sugar. So that it is not a case of an attempt to cheapen production by the use of lower priced materials. The Commission believe that it is this inexplicability which has rendered the matter so serious, and that the extent to which the mischief spread before it was detected was mainly due to the fact that the use of an acid containing arsenic in the manufacture of sugars was a contingency so improbable that it never occurred to those purchasing the sugars that it was possible that any danger could arise from that quarter.

The Commission have been unable to detect the presence of arsenic in brewing materials other than sugar supplied by Messrs. Bostock and Company, Limited; but they are aware that it has been asserted that traces of arsenic have been found in various samples of malt and hops. If such traces exist, they have probably been introduced in the operation of kilning, and the Commission propose to examine more fully into the matter. None of the specimens of hops have as yet yielded any traces. In any case, the amount so introduced would appear to be exceedingly minute, and not sufficient to have any deleterious effect.

The most important matter for the moment is to secure the adequate testing of beer, in order that the public may be protected from all further mischief. Arsenic is a substance which can be detected in the most infinitesimal quantities by those who are practised in the test; but these tests are so delicate that they are apt to mislead those who have not had experience in their application, and this is more particularly the case when the test is to be applied to a complex substance such as beer. Accordingly, the Commission have thought it necessary to investigate, and determine what is the most suitable method of testing beers for arsenic.

TEST.

The Commission recommend that the Reinsch test should be used in preference to all others at present known, because their investigations have satisfied them that it is the best and most reliable test for arsenic in beer. The mode of performing it is as follows:

Take 200 c.c. of the beer in a porcelain evaporating dish. Raise the liquid to the boiling-point, and then add 30 c.c. of pure concentrated hydrochloric acid. Insert a piece of pure bright copper foil, about $\frac{1}{4}$ inch by $\frac{1}{2}$ inch in size, and keep the solution gently boiling for forty-five minutes. If at the end of that time the copper remains bright and red, the beer is free from arsenic.

If a deposit is obtained on the copper, the foil is to be washed successively with water, alcohol, and ether (care being taken that these are pure), dried at a temperature not exceeding 100° C., and subjected to slow sublimation in a thin reduction-tube of small section, and not less than 2 inches long, the upper portion of which should be warmed before the sublimation begins. For the purpose of the sublimation, a small spirit-lamp flame should be used. If any sublimate is obtained, it must be examined

under a magnifying power of about 200 diameters. Any sublimate which does not show well-defined octahedral or tetrahedral crystals is not to be considered arsenical.

N.B.—It must be borne in mind that the blackening of the copper or a deposit thereon from the preliminary operation does not demonstrate the presence of arsenic in beer. Abundant blackening and deposit may be obtained from the purest beer.

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