

colour. The late Chief Analyst, Mr. T. MacFarlane, wrote as follows in 1906 (Bulletin 129, page 3) 'I have inclined to the opinion that those samples in the manufacture of which a dye has been used are adulterated according to the Act. This judgment would not be based upon the injurious nature of the dye but because its use is prohibited by the Adulteration Act, Sec. 3 (h) of the latter provides that food shall be deemed to be adulterated, within the meaning of this Act, if it is so coloured or coated or polished or powdered that damage is concealed, or if it is made to appear better, or of greater value than it really is. According to information obtained from manufacturers, the use of a dye is unnecessary when the Catsup is made from fresh tomatoes. It is when the fruit is out of season, and the pulp has to be kept in stock for a considerable time that the colour suffers, and the use of a dye becomes necessary. In such case it might be reasonably inferred that they have been coloured to conceal damage, or that the dye has been used to make the article appear of greater value than it really is, and consequently that the word adulterated should be applied.'

I am inclined to hold that the above ruling is correct, in the main; but in the absence of direct evidence of the inferior character of the stock used, I think it scarcely justifiable to assert that such stock must necessarily have been of inferior quality because of the presence of a dye in the finished product.

Tomato Ketchup should be prepared only from sound, fresh and ripe tomatoes. There is too much reason to believe that some makers of the article have, at times used fruit which could not find a market except under a disguise; employing antiseptics to arrest decay, and dyes to give a desirable colour. This conclusion is justified by such facts as, that the federal government of the United States obtained judgments against nineteen interstate shipments of Ketchup between May, 1912, and March, 1913, on the ground that these consisted in part of a decomposed and putrid vegetable substance. All these samples contained benzoate of soda, and it goes without saying that this preservative had been added to an already decomposed or decayed material in order to attest further decay.

Decomposition and putridity in vegetable material of the kind in question is indicated, (1) by the percentage of microscopic fields which show mould filaments, (2) by the number of yeasts and spores found in $\frac{1}{60}$ of a cubic millimeter, (3) by the number of bacteria found in 1 cubic centimeter.

It has been shown conclusively (Circular No. 68, Bureau of Chemistry, Washington) that under good factory conditions, the maximum percentage of fields showing moulds need never exceed 25; that the number of yeasts and spores in $\frac{1}{60}$ cubic millimeter need never exceed 25; and that the number of bacteria per cubic centimeter need never exceed 25,000,000. The maxima quoted are very liberal, and it will be seen by a study of this report that very few of the samples examined show numbers approaching them. All the nineteen samples condemned by United States Courts, and referred to above, gave numbers greatly in excess of these, moulds being found in 32 to 84 per cent of the fields examined; yeasts and spores varying from 65 to 225 per $\frac{1}{60}$ cubic millimeter, and bacteria per cubic centimeter running from 60,000,000 to 480,000,000.

None of the samples herein reported give such results as would justify their being condemned; but great variation exists among them; and the careful reader will find much to think about, if he studies the appended tables closely.