

taught the Chinese the art of husbandry, and the method of making bread from wheat, and wine from rice.

In the process of wine making, the grapes, as soon as they are picked, are carried to a suitable vessel and there pressed. The juice of the grape, called "must," together with the skins, is then placed in a large vat; and the yeasts, which are always present on the surface of ripe fruit, begin to grow, and in their growth produce alcohol and gas. This production of alcohol is called the first fermentation; and when it is nearly over, the wine passes through a strainer into a cask to undergo the second fermentation. This cask fermentation lasts for several months, and during this time flavouring substances are formed which give the aroma, or *bouquet*, to the wine. The high price of certain wines is due to the excellency of their aroma, which is largely a product of the yeast-plant.

Sometimes injurious forms of yeast get into wine, and cause wine diseases. One of the commonest is a yeast-like plant which changes the alcohol into vinegar, and gives the wine a sour, or vinegar, taste.

Cider and perry may be regarded as the wines of those districts in which the grape does not flourish. Cider is the juice of the apple fermented with yeasts that are naturally present on the surface of the fruit, and perry is the fermented juice of the pear.

Barley, yeast, and hops are used in the making of beer. The barley is allowed to germinate, or sprout, in order to change the starch of the kernel of the barley into sugar. This material, extracted by means of hot water, is the food in which the yeast plant grows and produces alcohol and carbonic acid gas.

Other substances are used to give flavor to the beer; but the essential part of the making is the changing of the sugar solution into alcohol by means of the yeast plant.

Special varieties of yeasts are used to make different kinds of beer, as ale, lager beer, etc.; and, as in the case of wine, disease-producing yeasts very often appear and produce a cloudy, or turbid, liquor, which is disliked by those who use such drinks.

From a study of the changes in bread, wine, etc., we see that the yeast plant, in order to grow, requires a proper supply of food, which should consist of a mixture of nitrogenous substances, a certain amount of carbon (usually supplied in the form of sugar), and also mineral matter. About 20 per cent. of water is also necessary, and a suitable temperature, between 60 and 90 degrees Fahrenheit. If these conditions are present, the yeast-plant is able to live, grow, and produce other yeast-plants.



Fig. 31. Full grown yeast plants greatly magnified, the natural size being only one-thousandth-part of the size shown in the figure.