

## The Brewing Process Demonstrated

Real ale is made by taking raw ingredients from the fields, the finest malting barley and hops, along with pure water from natural springs or the public supply, and carefully cultivated strains of brewers' yeast; in this exploded drawing by Trevor Hatchett of a classic British ale brewery, it is possible to follow the process that begins with raw grain and finishes with natural, living cask beer.

**1** On the top floor, in the roof, are the tanks where pure water - called liquor by brewers - is stored. Soft water is not suited to ale brewing, and brewers will add such salts as gypsum and magnesium to replicate the hard, flinty waters of Burton-on-Trent, home of pale ale.

**2** In the malt store, grain is weighed and kept until needed. The malt drops down a floor to the mills, which grind it into a coarse powder suitable for brewing. From the mills, the ground malt or grist is poured into the mash tuns along with heated liquor. During the mashing period, natural enzymes in the malt convert starches into fermentable malt sugars.

**3** On the same floor as the conditioning tanks are the coppers, where after mashing, the wort is boiled with hops, which add aroma, flavour and bitterness.

**4** At the end of the boil, the hopped wort is clarified in a vessel called the hop back on the ground floor. The clarified wort is pumped back to the malt store level where it is passed through a heat exchange unit. See 5.

**5** The heat exchange unit cools the hopped wort prior to fermentation.

**6** The fermenters are on the same floor as the mash tuns. The house yeast is blended or pitched with the wort. Yeast converts the malt sugars in the wort into alcohol and carbon dioxide. Excess yeast is skimmed off by funnels called parachutes.

**7** Fermentation lasts for a week and the 'green' beer is then stored for a few days in conditioning tanks.

**8** Finally, the fresh beer is run into casks on the ground floor, where additional hops for aroma and sugar to encourage a secondary fermentation may be added. The casks then leave for pubs, where the beer reaches maturity in the cellars.

