CHAPTER I

INTRODUCTION

THE origin of beer, using that word in a general sense to indicate a fermented infusion of grain, is lost in the mists of antiquity. Probably the Egyptians were among the first civilized people to engage in the art of brewing, and there appears to be good reason for believing that barley wine or beer was well known in Egypt at least three thousand years before the Christian era. Herodotus, who is not always a model of trustworthiness, mentions that the Egyptians used a wine made from barley because there were no vines in their country, but this is clearly not correct since wine was well known to the ancient Egyptians, and its use is recorded as early as 4000 years B.C. It seems certain, moreover, that at that early period there were many vineyards in the Nile valley and that several kinds of wine were produced. Still it is not altogether unreasonable to suppose that in parts of the world where the grape would not grow, beer occupied the same position as wine in countries where the vine flourished. Among

the ancient Hebrews beer was well known and although the word *Schekar*, used by Moses and occurring several times in the Pentateuch, might refer merely to strong drink in general, yet there seems to be good reason for supposing that it did in reality refer to an intoxicating drink prepared from barley. It may be mentioned in this connection that there is an old Rabbinical tradition that the Jews were free from leprosy during the captivity in Babylon by reason of their drinking Sicera (Schekar) made bitter with hops. If there be any truth in this, it is of special interest as showing at what an early period hops were used for flavouring purposes. But it was among the peoples of Western and North-Western Europe that beer was most largely consumed; and among the Gauls, Germans, Scandinavians, Celts, and Saxons, it had attained in very early times to the position of a national beverage. Some uncertainty attaches to the etymology of the words *ale* and *beer*, but there is very little doubt that the former (Saxon *Ealu*, Danish *öl*) is of Scandinavian and the latter probably of Teutonic origin, both words being used indiscriminately during Anglo-Saxon times. After a time the word beer appears to have dropped out of use in this country and was not again employed until about the fifteenth century, when the use of hops became general, the word being then applied to the hopped in contradistinction to the unhopped beverage, or ale. At the

present day the two words are very largely synonymous, *beer* being used comprehensively to include all classes of malt liquor, whilst the word *ale* is applied to all beers other than stout and porter. Prior to the Roman invasion it is probable that *mead* or fermented honey was the beverage most commonly used in this country on festive occasions, and there can be little doubt that it is the most ancient of the intoxicating drinks of Western Europe. Next in point of antiquity came cider, and then with advancing civilization, beer. One of the earliest references to the use of ale in these islands is to be found in the *Senchus Mor*, which dates from the fifth century, and which shows that ale was well known in Ireland at the time of the arrival of St Patrick. In Wales too, about the same time, ale competed with mead as the drink of the wealthy. Among the Danes and Anglo-Saxons beer was certainly the favourite beverage, and its virtues are celebrated in many of their most ancient poems. It will be remembered that their conception of the highest felicity attainable by their heroes after death was to drink in the halls of Odin long draughts of ale from the skulls of their enemies slain in battle. It is not within the scope of this book to deal at any length with the history of beer, and it will suffice to say that from the fifth century onwards the popularity of beer increased to such an extent, that from being the occasional beverage of the wealthy, it had become in

the Middle Ages the general drink of all classes. The ale most commonly consumed by the poorer classes was doubtless low in strength and poor in quality, and in this connection the following lines from *Piers Plowman* are of interest. In speaking of the independence of the labouring classes consequent upon the scarcity of labour after the great plague in the fourteenth century, Piers says :—

> 'Ne non half-penny Ale In none wyse drynke.
> Bote of the Beste and the Brouneste that Brewsters sullen.'

It is clear that at this time ales of several kinds or strengths were brewed, and in old documents of the thirteenth and fourteenth centuries the words *prima*, *secunda*, and *tertia*, as applied to beer occur on several occasions. Later, in the reign of Henry VIII, the brewers were restrained from making more than two kinds of beer, the *strong* and the *double*, and the prices at which these were to be sold were fixed by Statute. This restriction seems to have been withdrawn, for later we again find that several varieties of beer were produced and sold.

The ease with which the operations involved in the production of beer from malted grain could be carried out resulted in the installation of brewing plant in the houses of vast numbers of the wealthier classes, and almost every housewife of importance may be said to have been her own brewer. During the eighteenth century this practice fell largely into

disuse, and the brewing of beer passed for all practical purposes into the hands of the public brewer.

At the beginning of the reign of King William the duty on strong beer or ale was one shilling and threepence per barrel and the price charged by the brewer to his customers (who usually fetched it themselves from the brewery) was sixteen shillings per barrel. After our wars with France the duty was increased by ninepence per barrel on strong beer, and in 1694 it amounted to four shillings and ninepence on strong, and one shilling and threepence on light beer.

In the reign of Queen Anne the excise duty on malt, which had been originally imposed during the reign of Charles I but subsequently repealed, was re-imposed, and a tax on hops was levied, which remained in force until 1862. Towards the end of the seventeenth and at the beginning of the eighteenth centuries, the beer chiefly consumed in London was a mixture of heavy sweet ale with a lighter bitter beer, and a still weaker or small beer. About the year 1722 a beer was introduced which had the flavour and general qualities of a mixture of the three, and as its chief patrons were the labouring classes and porters, it became known by the name of *porter*. This beverage made rapid headway and in the early part of the nineteenth century it constituted the great bulk of the beer drunk in London. Thus during the

year ending July 5th, 1812, no less than 1,318,037 barrels of porter were brewed in London by the twelve principal firms then in existence, whilst during the same period only about 105,000 barrels of ale were produced. In 1880 there was a complete revision of the mode of taxation to which brewers were subjected, the most important change being the replacement of the duty on malt by a duty on the finished beer, which was fixed at six shillings and threepence for each barrel of 36 gallons at a standard original gravity of 1057° less an allowance of 6 per cent. for unavoidable waste in the manufacturing operations. During succeeding years this duty was subject to many changes, and at the time of writing it amounts to seven shillings and ninepence per barrel of an original gravity of 1055°, with an allowance of 6 per cent. for waste. By original gravity is meant the specific gravity of the wort prior to fermentation and it is on this that the brewer is taxed, the calculation being always made to a standard specific gravity of 1055°. At the present time many different kinds of beer are brewed in this country, of which the more important are mild ale, porter, pale ale, bitter ale, and stout. In addition to these, which are sold both in cask and in bottle, there are less important varieties, peculiar to certain localities, as well as lager beers produced by the decoction system of brewing which is so widely adopted on the Continent and in America.

The great bulk of the beer made in this country is consumed by the working classes whose staple beverages are the so-called mild ale and porter. The mild ale is a lightly hopped beer of medium gravity and of full sweet flavour which in London is usually drunk when quite new, but which in the country is occasionally kept on draught for one or two months. Porter is a dark-coloured beer usually of about the same original gravity as the mild ale, and which is devoid of any pronounced hop flavour. Stout is a black beer of higher gravity than porter which it resembles in being somewhat lightly hopped. Its flavour varies greatly according to the locality in which it is sold, being sometimes (as in London) sweet and luscious, and at others (as in Ireland) devoid of any pronounced sweetness or *dry*. Bitter beers, as the name implies, are characterised by a marked flavour of the hop, and are brewed of several strengths. Pale ale, which includes ale intended for export and for storage, is the name usually given to beers of the highest quality. In original gravity the beers of this class vary very greatly, but they are always pale in colour and are almost invariably brewed from the finest materials, and represent in a sense, the highest product of the brewer's art. In connection with the above general descriptions, it should be pointed out that no sharp lines of demarcation can be drawn between any of the varieties mentioned.

These overlap very considerably, and in different parts of the country the same name is often applied to beers of very different characters.

The history of a beverage which in its various forms has played such an important part in our national and social life for so many centuries, is in the highest degree fascinating, and to those who are interested, I commend any or all of the historical works, the titles of which are given in the list on pages 127, 128.

CHAPTER II

MATERIALS USED IN BREWING

THE two essential chemical processes involved in the manufacture of beer are first, the conversion of starch by means of diastase into certain soluble substances, one of which is a fermentable sugar, and secondly the decomposition of this sugar by means of the yeast organism into alcohol and carbon dioxide gas. It is clear from this that the main raw material must be one containing starch, and that it should if possible contain the necessary converting agent, diastase. Both these conditions are satisfied in the case of certain germinating seeds, and although many have at various times been tried, long experience has shown that germinated barley possesses

in the fullest degree the various properties necessary for the brewing of beer. Among other cereals which are occasionally employed are maize, rice, oats, and wheat, but these are always used, when used at all, in conjunction with a large proportion of germinated barley, or to give it its technical name, *malt*. Further reference will be made to these cereals later, and for the present I will confine myself to the consideration of barley malt which is the brewer's chief raw material. Although it is not within the scope of this book to deal at any length with the process of converting barley into malt, some reference to the subject is necessary to ensure a proper understanding of the mashing process, which is one of the most important parts of the whole brewing procedure. The process of malting may be said briefly to consist in artificially inducing the germination of the grain, and when sufficient growth has taken place, in stopping it by the application of heat. Simple as this bare statement may appear, the chemical and physiological changes occurring during the conversion of barley into malt are highly complex, and notwithstanding the vast amount of study devoted to their elucidation, are even now very far from being fully understood. Thanks, however, to the labours of Brown and Morris and others, the general character of these changes is tolerably clear. If a few corns of barley are bitten between the teeth they will be found to

be very hard, whilst malt corns, tested similarly, will be found to be mealy and friable and to break down readily. Again, if a handful of barley be ground up and treated with a little warm water, no apparent change will occur, and even at the end of some hours the addition of a little iodine solution will give the blue colour characteristic of starch. If on the other hand some ground malt be treated in the same way, it will soon be evident that some chemical change is taking place, for the mixture, if fairly thick to commence with, will rapidly become more liquid, and the solution obtained after straining off the solid matter will be found to have a pleasant sweet flavour, and on adding a little iodine solution, there will be no blue coloration, showing that the starch has disappeared. It is clear then that some very marked changes have attended the transformation of the barley into malt, and these are of the utmost importance to the brewer. The above simple experiment shows that the malt differs from the barley from which it was made chiefly in containing an active substance which is capable under appropriate conditions of converting the starch of the grain into soluble, sweet-tasting products, and one object of the malting process is to produce these substances. But there is another and very important difference between the two. As has been pointed out above, the barley is hard and vitreous whilst the resulting