1. GENERAL INTRODUCTION: ALCOHOL DRINKING AND THE PUBLIC HEALTH

The terms 'alcohol' and 'alcoholic beverages' tend to be used interchangeably to designate the product consumed, and the same practice has been followed in this monograph. A distinction is made, however, between alcohol or alcoholic beverages and the substance ethanol. This monograph includes only data relevant to the consumption of alcoholic beverages by humans: occupational exposures to ethanol and exposures other than by drinking were not considered by the Working Group.

Most human societies have made and used alcoholic beverages. The major exceptions, prior to contact with European cultures, were the Pacific Islanders and the indigenous populations of most of North America (Marshall, 1979). The distillation of alcoholic beverages has a long tradition on the Eurasian continent, beginning in the Far East and moving to Europe *via* Arabia about a millenium ago (Anon., 1966; Lord, 1979). Traditional alcoholic beverages are fermentation products of a wide variety of organic materials, including grain (beer, *shochu*), fruit (wine, cider), sap (palm wine, pulque) and honey (mead); even wood has been used occasionally (Treml, 1982). Since distillation was traditionally associated with pharmacy, many substances other than ethanol have often been included intentionally in distilled drinks. Thus, traditional alcoholic beverages and commercially produced beverages contain many constituents other than ethanol and water (see p. 71).

Alcoholic beverages have a wide variety of functions for humans. They quench thirst, in some parts of the world more hygienically than local water supplies; they are nutritional and, in some situations, can lead to excess caloric intake or an unbalanced diet (Balboni, 1963). It has been estimated that alcohol may provide as much as one-quarter of the caloric intake of male agricultural workers in wine production areas (Lolli *et al.*, 1958). Alcohol has also been used medicinally in many cultures and is present as a solvent in pharmaceutical preparations. It is used in many cultures as a psychoactive substance (Marshall, 1979).

Alcoholic beverages have diverse symbolic functions: alcohol is used in many religious observances; it is often associated with feasting and celebration; having or sharing a drink may be a ritual of solidarity or friendship, of sealing an agreement, of marking a rite of passage or of indicating that normal social constraints are suspended. In different cultures, various powers are attributed to drinking, and diverse behaviours are associated with drunkenness (MacAndrew & Edgerton, 1969; Marshall, 1979). In some societies, intoxication leads to and, to some extent, is used to explain disruptive or violent behaviour.

Abstaining from drinking has also often had a sociocultural meaning. For Muslims, abstention is both a religious duty and a mark of differentiation from those of other faiths.

In ancient China, abstention was expected of those holding government offices (Cherrington, 1924). In nineteenth century Britain, serious persons who wanted to better the lot of their children signed a pledge of abstinence (Harrison, 1971).

In cultures where alcohol is valued, access to it has often been the prerogative of those of higher status. This may reflect a scarcity value, an ideology that intoxication is appropriate only for those of higher status, or fear that intoxication may produce insurrection. It is notable that the access of groups of persons who have been considered to be of socially subordinate status, such as women and children, has frequently been limited (Knupfer & Room, 1964). However, abstinence among women has decreased dramatically in many countries, and, in a number of countries, young people have also increased their drinking (World Health Organization, 1980).

In traditional societies, the availability of alcoholic beverages depended mainly on agricultural abundance and climate. In a tropical climate, production of alcoholic beverages may be a simple task, whereas in preindustrial times, in regions such as Iceland, alcoholic beverages were all imported (Room, 1983). Alcohol has long been an item of trade: the abundance of amphoras from the classical world testifies to the long-standing importance of wine in Mediterranean trade patterns (Johnson, 1985). The spread of distilled beverages in the seventeenth and eighteenth centuries partly reflects their function as a form of agricultural surplus that did not spoil and was relatively transportable (Rorabaugh, 1979).

In traditional societies with no cash economy and poor transportation connections, fermented beverages were, and still are, consumed relatively quickly after their production, before spoiling. Such production is frequently seasonal — for example, at harvest time or on festive occasions — and is often associated with a culturally sanctioned drinking pattern or intermittent extreme intoxication, where all the alcoholic beverage produced for the occasion is rapidly consumed. In such circumstances, variations in agricultural supply can limit drinking (Anon., 1966).

Such traditional societies have gradually disappeared over the last few centuries as more peoples are incorporated into a global market economy (Wolf, 1982). Groups moving from a traditional into an urban cash economy often preserve their drinking patterns initially, but engage in them more frequently (Caetano *et al.*, 1983). In general, the advent of industrially produced alcoholic beverages with an indefinite shelf-life, improvements in transportation and participation in a cash economy have erased constraints on availability of alcohol. Under these circumstances, constraints on consumption depend on state controls on availability and price and, for example, on religious and social limitations.

With time, home-made and locally produced alcoholic beverages tend to be replaced by industrially produced alcohol (World Health Organization, 1980). In the USA and the UK, industrially brewed beer replaced cider in the nineteenth century (Anon., 1966). Today, the process continues in countries such as Zambia and Mexico, as lager-style beer replaces opaque beer and pulque. The attractiveness of industrially produced alcoholic beverages is enhanced by the cosmopolitan, high-status connotations given to them by advertisers (Moser, 1985; Rosovsky, 1986). Governments also have a fiscal interest in the industrialization of production, since it facilitates the collection of revenues based on drinking. Although the epidemiological evidence reviewed in this monograph is based primarily on

commercially produced alcoholic beverages, it should be kept in mind that much of the world's alcohol consumption is of noncommercially produced alcoholic beverages (Walsh & Grant, 1985).

Even in Europe, the current level of availability of alcoholic beverages is a relatively recent historical phenomenon. In the seventeenth and eighteenth centuries, spirits shifted from a pharmaceutical status to an item of everyday consumption, as industrial production methods flooded the market. Technological innovations transformed beer production, starting in the latter part of the nineteenth century, from a craft producing beverages for local and immediate consumption to an integrated industry producing a beverage that could be transported worldwide and stored almost indefinitely (Anon., 1966). Improvements in agricultural methods and the development of disease-resistant vines have allowed greatly increased wine production and consumption. Thus, wine consumption in France quadrupled in the last decades of the nineteenth century (Johnson, 1985).

Effects of drinking

Alcohol consumption is associated with many health problems, which can be divided into three main types: chronic physical problems, casualty and disability problems, and mental problems.

Physical health problems include, notably, cirrhosis of the liver (discussed on pp. 146-147), cancers at various sites (discussed in section 5, p. 153), effects on the developing embryo and fetus (discussed on pp. 148-151), and other diseases affecting the gastrointestinal, cardiovascular, respiratory, nervous and reproductive systems (World Health Organization, 1980). The relationship between alcohol intake and the occurrence of cardiovascular disease appears to be J-shaped, with the risk for abstainers being slightly higher than that in moderate drinkers (i.e., those consuming fewer than two or three drinks per day) and substantially lower than that for heavy drinkers (Marmot, 1984). The reduced incidence of coronary heart disease may explain the lower total mortality among moderate drinkers which has often been found in relation to alcohol intake. Possible confounding effects of socioeconomic variables cannot be excluded in the light of their correlation with past alcohol consumption, and data with regard to women are limited (Marmot, 1984; Friedman & Kimball, 1986).

Alcohol is causally implicated in many types of casualty, including road-traffic deaths, drownings, burns, falls, suicides and acute poisoning. Mental problems associated with drinking include a wide range of neurological consequences of prolonged heavy consumption, depression and other mental disorders. A prominent adverse consequence of drinking is the alcohol dependence syndrome (World Health Organization, 1980), a term which encompasses both physical and psychological aspects of addiction to alcohol (Edwards *et al.*, 1977; Walsh & Grant, 1985). The pharmacological basis of alcohol dependence has been reviewed (Edwards *et al.*, 1977).

Although, at an individual level, alcohol consumption can be associated with domestic violence and neglect, and criminal behaviour, and, at a collective level, can result in loss of production due to absenteeism and reduced efficiency (World Health Organization, 1980),

the drinking of alcoholic beverages is a source of pleasure and of solace to many people and facilitates human contacts in many societies.

In studying potential causal relations between alcohol consumption and health or social problems, it is important to consider and investigate the aspect of alcohol consumption that may be involved — total volume of ethanol consumption, frequency of bouts of drunkenness or length of time spent with the amount of blood-alcohol above a given level. Questions of exposure measurement in epidemiological studies are discussed in detail in section 5.1 (p. 153).

Responding to alcohol-related problems

Efforts by society to reduce the toll of alcohol-related problems are cited in the earliest written records of mankind. Societies and ethnic groups in which there are now few alcohol-related problems reacted in different ways: for example, during several Chinese dynasties severe controls were enacted on drinking, while Israelite prophets preached against drunkenness and its consequences. The prohibitions on drinking in the Koran were proclaimed in response to a situation in Middle Eastern societies during the sixth century.

Until the late nineteenth century, governmental actions to reduce alcohol-related problems rarely took account of public health issues (Walsh & Grant, 1985); authorities were more concerned with social disorder, destitution, vagrancy and vices, which were seen as being due to drinking. The role of drinking casualties did not become a matter of policy concern until the age of railways and automobiles, and the involvement of drinking in such specific disorders as cirrhosis and delirium tremens was clarified only in the nineteenth century. Although small groups of physicians actively pressed for temperance policies in a number of countries, the consequences of drinking usually played a small part in policy decisions during this period (Bruun, 1985). As a reaction to prohibitionist claims, there was a tendency in the medical literature of the 1940s and 1950s in some countries to discount any chronic biological consequences of drinking; in the 1940s, a review of findings on the biological effects of drinking disclaimed any connection between drinking and cancer, and even questioned a direct relationship with cirrhosis (Haggard & Jellinek, 1942).

Since the Second World War, public health considerations have taken priority in actions to combat alcohol-related problems. Responding to the high prevalence of alcohol-related medical problems among their patients, French doctors led the way to some extent, with the concept of the 'alcoholization' of society (Jellinek, 1954). In other countries in the 1950s, actions to reduce the role of alcohol-related traffic casualties had been instituted (Moore & Gerstein, 1981; Mäkelä *et al.*, 1981). Otherwise, the responsibility of public health officials in the management of alcohol-related problems was limited to the provision of treatment for relatively marginalized populations of 'alcoholics', without regard to the general population of 'normal drinkers' (Room, 1984). Arguments for instituting preventive activities orientated towards the long-term biological consequences of drinking are a relatively new phenomenon in many countries, although they have become widespread in recent years (see, for example, Bruun *et al.*, 1975; World Health Organization, 1980).

Increased interest in the chronic biological effects of drinking also reflects objective conditions: in most industrialized societies, alcohol consumption levels, after having reached a low in the 1930s, rose steeply in the period after the Second World War, resulting

in substantial increases in mortality from cirrhosis and in other indicators of biological effects (Mäkelä *et al.*, 1981). In many countries, alcohol consumption levels have now stabilized, but at much higher levels than earlier in the century. In the meantime, the number of known chronic biological effects of alcohol has grown considerably, although dose-response curves are not well established. In particular, the importance of the pattern of drinking, as distinct from the overall volume of drinking, is not well understood for many conditions.

Societies have adopted a number of strategies to diminish alcohol-related problems (Moore & Gerstein, 1981). Some measures aim at reducing the consequences without necessarily affecting drinking patterns themselves; others aim at structuring drinking and associated behaviour in order to minimize harmful effects; and a third type aims at reducing the level of consumption, particularly heavy drinking (Bruun *et al.*, 1975). While the first two types of measure are important elements of an overall plan to tackle social and casualty problems, the third type is the most important with regard to chronic biological consequences.

In most societies, there is some form of control to restrict the availability of alcohol. The state may monopolize the sale or production of alcohol, or may license others to sell or produce on condition that they comply with licence requirements. Commonly, some limits are placed on the hours and conditions of sale. Investigation of the effectiveness of such actions suggests that it is limited unless the restrictions are very stringent. Price control, normally through excise taxes, has been used for a long time but is often motivated more by fiscal interest than by concern for the public health. Recently, there has been renewed interest in, and evidence of the effectiveness of, taxes as a constraint on consumption levels (Grant, 1985). Other controls that have proved effective include rationing the supply available to any one individual and setting minimum age levels below which drinking is not permitted. Control measures are most likely to be effective in the long term when popular support is substantial. Major reductions in the consumption level in a society tend to occur either in situations of social crisis, such as war, or in response to large-scale popular movements and shifts in consciousness concerning drinking (Moser, 1985).

Education and public persuasion campaigns have been a popular strategy for prevention in all societies concerned about the level of alcohol-related problems. Such campaigns are unlikely to be strongly effective if they are pursued in isolation from other strategies (World Health Organization, 1980; Moser, 1985).As with cigarette smoking, education and persuasion efforts are likely to be potentiated in periods of shift in popular sentiments concerning drinking. In the period after the Second World War, many industrial societies built up extensive alcoholism treatment systems, partly with the aim of reducing the rate of alcohol-related problems in the population (Mäkelä *et al.*, 1981). While such treatment is crucial, studies have shown that there is a substantial relapse rate after any type of treatment, suggesting that the provision of treatment and early case finding is only moderately effective in preventing future alcohol problems (Miller & Hester, 1986). It is in this context and because of growing popular opinion to reduce alcohol consumption in many countries that broader approaches to alcohol problems have come to the fore (World Health Organization, 1980; Walsh & Grant, 1985).