

*The Social Implications of Drug Use**

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WHEN the social implications of drug use are being discussed it is necessary to define what is meant by the term 'drug'. In the Oxford English Dictionary a drug is defined as an original simple organic or inorganic substance used in medicine. It can be described as any chemical agent which affects living protoplasm beneficially when administered in small concentrations. In order that a drug fulfills its requirements it must be an effective agent for the purpose for which it is used. Goodman (1964) has defined an effective drug as one that accomplishes what the physician wants it to accomplish, and he specifies the conditions under which it should be used, namely, in the prevention, diagnosis, or treatment of disease; the Oxford English Dictionary also includes the preservation of health. Goodman further limits his definition by insisting that the physician is not *any* physician, but can only be a *good* physician. Under these circumstances the drug produces an effect, or a constellation of effects, which bring about the desired results with the greatest possible benefit and the least possible harm, in the patient who receives it in the context of a well-defined and particular clinical situation. Drug efficacy depends upon the interactions of the physician and the patient with the drug (Figure I).

Analysis of these definitions in relation to the use of drugs as we see and know it in our society today, forces us to the conclusion that the *good* physician may employ drugs so that they fulfill their requirements in *ideal* medical practice at the present time. However, drug *use* in our society today fails to correspond for many reasons with that high standard of clinical pharmacology and therapeutics in the practice of medicine which was demanded by Goodman in an ideal society. Goodman discussed the problem of drug efficacy in relation to the prescription of an effective drug, by the good physician, to the patient in whom the factors which influence the efficacy of the drug have been completely analysed. In our society at the present time, other people than good physicians prescribe drugs; it is not known if the effect which is desired can be produced by the drug which is prescribed, and the benefits which are desired are not always associated with the presence of physical disease in the individual receiving the drugs

Some particular examples illustrate the reasons for prescription and use of drugs, the factors which influence their choice and effects, and the control of their administration. The first examples have been chosen to illustrate the control of disease by drugs.

The Control of Disease

The use of certain groups of drugs for the control of disease is illustrated in Table I. The use of a general anaesthetic during surgery provides the

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Table I

Drug Use in Modern Society—I
Control of Disease

Reasons for Prescription	Control of Administration	Drug Employed
Surgery	Doctor	General Anaesthetic
Diabetes Mellitus	Doctor and Patient	Insulin, Tolbutamide
Hay Fever	Doctor	Hyposensitization
Allergic Asthma	Patient and Doctor	Aerosols

best example of the prescription, and control of administration of a drug, by a doctor. Throughout the whole period of pharmacological activity of an anaesthetic, while it is being given, metabolised,

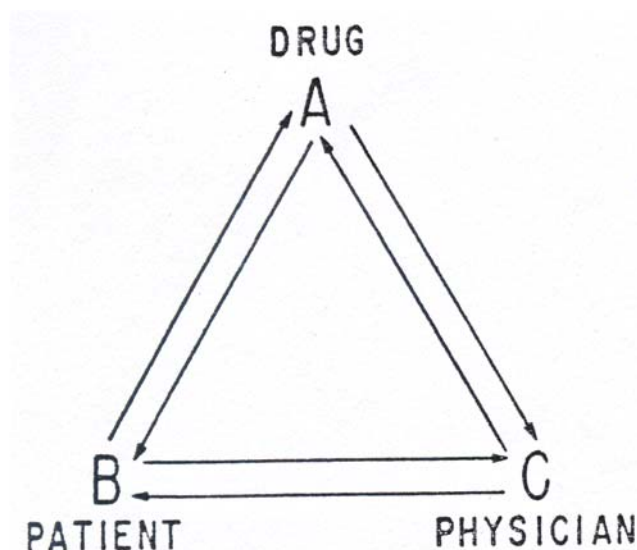


Figure 1. The ABC of drug efficacy. Each component of the triangle interacts with the other two components, as shown by the interconnecting arrows (Goodman, 1964).

and excreted, the doctor is in sole control of its choice and administration; the patient plays no part in either of these operations. When using drugs for anaesthesia the doctor dare not relax his surveillance of the patient; there is no room for him to alter the limits of dosage which must be carefully adjusted for the individual patient. In diabetes mellitus on the other hand, though it is essential that no adverse effects arise from incorrect dosage of insulin, the patient is, under normal circumstances, in control of administration of the drug and can vary its dose, although he should have been thoroughly instructed in these processes, and continue to be under periodic surveillance by the doctor.

The incidence of diabetes is fairly uniform throughout the Six Counties and the quantity of insulin used is proportional to the number of diabetic patients. However, the prescriptions of hypoglycemic agents show extraordinary geographic variations in Northern Ireland. Professor Wade attributes this to local variations in prescribing habits of doctors, and control of administration by patients, in the case of 3 drug whose limits of dosage are greater than those of insulin (Wade, 1968).

In allergic disease hyposensitization to the offending antigen is the most precise and effective method of treatment at present available. Methods of desensitization have been improved since hyposensitization to hay fever was first performed by administration of

progressively larger doses of pollen extract over a period of several months. The condition can now be controlled by administration of seven to nine doses of aluminium precipitated pollen antigen (Frankland & Noel, 1966). More recently a method has been described in which a single small dose of pollen is administered together with hyaluronidase (Wilson *et al.*, 1967). This method can cause remission of symptoms and may have some beneficial effect on the asthma which is often associated with hay fever. These methods of desensitization must be prescribed by the doctor for a specific patient, and administration of the antigen is generally performed by the doctor himself because a severe allergic reaction may occur which would require immediate energetic medical treatment. Allergic asthma can be controlled by the intra-pulmonary administration of broncho-dilating agents through aerosols. In these circumstances the doctor prescribes the aerosol and instructs the patient in its use. However, frequency and control of administration of the drug is literally in the patient's hands. The Dunlop Committee has recently drawn attention to the fact that the incidence of death has been rising among young asthmatics who use these aerosols because of the powerful effect on the heart of the β stimulating drugs which they inhale.

Adverse effects and deaths can follow administration of drugs even when doctors have given them and personally control their effects. When patients have control of their therapy under the periodic supervision of doctors, variation in dosage, and adverse effects attributable to the drugs, become more frequent. The possibility of the patient's death increases because the patient is himself controlling administration of potent pharmacological agents. When describing the factors contributed by each component of the triangle of drug efficacy, Goodman does not mention the continuous control of drug administration which is necessary for efficacy and safety. As control of administration passes from the doctor to the patient, drug efficacy tends to diminish, beneficial effects produced by the drug in a defined clinical situation become less, and adverse effects occur more often and may be more serious.

Maintenance of Desirable Normality

Dr Goodman confined his definition to drugs used for the prevention, diagnosis, and treatment of disease. One of the difficulties which at present confronts doctors in Ireland, and also large sections of the Irish culture, is the problem of what constitutes disease. The achievement and maintenance of desirable normality is a different pathological and moral condition from the control of disease, and is dictated by different customs and beliefs. The examples chosen to illustrate this are shown in Table II.

Oestrogen-progesterone mixtures are used very widely among the female population in the context of a well defined and particular clinical situation. All doctors are fully aware of the fact that the same drug combination can be used to treat menorrhagia,

Table II

Drug Use in Modern Society—II
Maintenance of Desirable Normality

Reasons for Prescription	Control of Administration	Drug Employed
Prevention of Pregnancy	Patient and Doctors	Oral Contraceptives
Relief of pain	Patient	Phenacetin, Aspirin
Prevention of colds	Individuals	Vitamin C
Prevention of debility	Individual in Society	Vitamins with Alcohol

and to control the regularity of the menstrual cycle which becomes irregular in consequence of a pathological process; on the other hand, it is fully acknowledged that minor monthly irregularities do not constitute any abnormality in the physiologically normal female cycle. The pharmacological ability of oestrogen-progesterone mixtures to prevent conception in the physiologically normal woman has been fully confirmed and accepted since the original investigations on the pill were carried out in Puerto Rico. The Pill is prescribed for this purpose by doctors at the request of women of child bearing age. The women must receive instruction about the frequency and times of administration of their tablets from the doctor, and must be warned and reassured about the side-effects which can be expected. After all, one mistake in administration will result in complete disappearance of efficacy of the drug, and result in another state of physiological normality of the woman—namely the condition of pregnancy. It has been accepted overtly or privately that the maintenance of one type of physiological normality rather than another is desirable and beneficial. Women can now take the decision to use oestrogen-progesterone mixtures, and have the responsibility for their administration under medical supervision. In fact the Pill is now taken by women under minimal, or in the complete absence of, medical supervision. Some evidence suggests that the administration of the Pill per capita is greater in Ireland than it is in the United Kingdom.

It is of interest to compare the use by the public of another potent pharmacological agent, aspirin, with that of the contraceptive pill. From the point of view of the public, the main difference between the two drugs is that the Pill requires a medical prescription before it can be obtained. Aspirin and phenacetin are widely advertised to the medical profession, and to the public, for the relief of pain and for a variety of other symptoms. Individuals

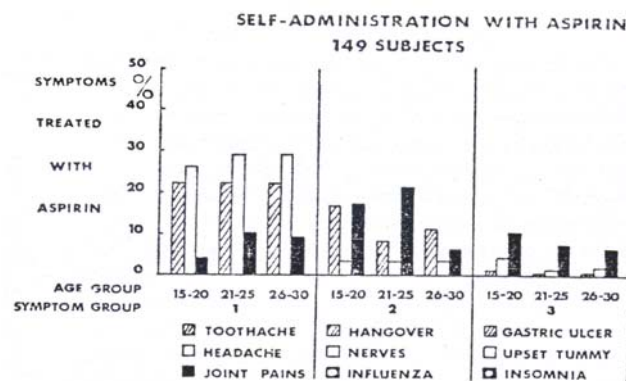


Figure 2. The reasons for self-medication with aspirin. The percentages of symptoms selected for treatment by the different age groups are indicated.

in our society can buy these substances without restriction, and administer them to themselves, their relatives, and friends *ad libitum*. When individuals in our culture prescribe and administer these analgesics to themselves, what evidence is there that they are substituting themselves for the good physician described by Goodman? Do the drugs which they are using bring about the desired results with the greatest possible benefit, and the least possible harm, to themselves in the context of a well-defined and particular clinical situation? The aspirin consumption of a sample of the lay population was investigated in Liverpool in 1963 by means of a questionnaire. Only 13 per cent of the sample did not take aspirin. Only 10 per cent of the subjects, who took aspirin, obtained them through a doctor's prescription. 45 per cent of the sample was aged 30 years or less—the reasons stated for self-administration of aspirin by these subjects is shown in Figure 2. The highest percentage of symptoms for which aspirin was taken was in symptom—group 1 which was associated with pain. In symptom groups 2 and 3 aspirin has minimal or no beneficial pharmacological actions. The youngest age group used aspirin to the smallest extent to treat symptoms for which it is pharmacologically most effective (Symptom group 1). However, this age group used aspirin

predominantly for treatment of symptoms for which it was pharmacologically ineffective or contra-indicated.

There is abundant and fully confirmed evidence that the incidence of gastric damage, chronic renal failure, aspirin and phenacetin dependence, and suicide from these drugs, has been progressively increasing during the past years. The evidence therefore suggests that when the lay public prescribes and administers an analgesic drug of the aspirin variety to itself, the drug is being used effectively for treatment of only 55 per cent of the symptoms for which it is taken. On the other hand, the results

[Figure 3 is not reproduced here due to error in transcribing]

Figure 3. The effect of metronidazole on the burning and sweet taste thresholds for percentage alcohol solutions diluted in water. The control values are shown on the left. The times after administration of the last dose of metronidazole are shown on the ordinate.

obtained from this investigation show that any beneficial action which is attributed to aspirin arises from a placebo effect in 45 per cent of the symptoms for which the public prescribes the drug to itself. In these circumstances an active drug is frequently being used ineffectively from a pharmacological point of view; the physiological state of the individual which is being affected by administration of aspirin may not be abnormal prior to the medication, and may be impaired in consequence of it.

It is assumed that unless a patient has a defined pathological condition, all the individuals in our society are physiologically normal. They have the benefits of full employment so that they have the income to obtain an adequate diet, and a dwelling adequate to provide a reasonable standard of domestic comfort. If this is the case it is of interest to enquire why a proportion of individuals in our culture consider it is desirable to take supplementary Vitamin C. They maintain that this medication prevents them from developing the common cold. Their self-administration of Vitamin C is encouraged by advertisements about its beneficial effects.

Vitamin C is at present being used in two different ways to maintain a desirable state of physiological normality by controlling the common cold. In the general population, colds develop in a random fashion, and a variety of factors may influence their incidence and cause. Among these factors the consumption of large doses of ascorbic acid in the very early stages of a cold is popularly believed to have a *therapeutic effect* in suppressing symptoms. Other individuals believe that the daily administration of ascorbic acid throughout the winter maintains a physiological state of normality by preventing the occurrence of colds. This can be defined as the *prophylactic effect* of ascorbic acid.

For control trials to afford valid conclusions the common cold must be defined in the clinical situation, and it is necessary to state whether the prophylactic or the therapeutic effect of the medication is being examined. To investigate the effect of Vitamin C on the symptoms associated with the common cold, a double blind trial should be designed in which the effect of dummy tablets is compared with that of Vitamin C tablets. Populations in which the trials are carried out should be absolutely comparable with regard to age, sex, nutritional status, environment and other factors. Also in trials carried out under clinical conditions, it is desirable that the number of subjects included, and the duration of the trial, should be such that a reasonable statistical analysis of the results can be performed.

The trials which have been carried out on the effect of Vitamin C on the common cold have not conformed with these specifications. They have been discussed in a leading article in *Nutrition Reviews* (1967). Here it was indicated there is no conclusive evidence that, in the
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absence of severe ascorbic acid depletion, ascorbic acid has any effect on the incidence, course or duration of the common cold. However, hardly any of the trials which were described attempted to evaluate more than the incidence of colds; the common cold was not defined, and the effect of Vitamin C which was being investigated was not specified. The most recently published evidence about the therapeutic effect of Vitamin C (Walker *et al.*, 1967) suggested that Vitamin C does not have any beneficial effect, but the interpretation of these results is open to question (Wilson, 1967). The original evidence, published by the British Medical Research Council, about the beneficial effect of Vitamin C in deficient states, indicates that it may have some beneficial prophylactic effect against the common cold (Barley *et al.*, 1963). Ritzel (1961) carried out a double blind prophylactic trial in skiers in which cold symptoms were evaluated separately. He found that a dose of mg. of ascorbic acid daily caused a reduction in the duration, and an alteration in the quality of the symptoms. In double blind prophylactic trials carried out during the past three years in Dublin the common cold has been defined, and symptoms have been evaluated separately. It has been found that the incidence, duration, severity and type of symptoms, associated with the common cold differ in the two sexes. Not surprisingly therefore, it has been found that Vitamin C affects the symptoms in the sexes differently. Objective evidence confirming these findings is provided by the fact that white cell ascorbic acid levels are higher in females than in males (Spathis and Hallpike, 1961; Griffiths *et al.*, 1967), and this has been confirmed in the subjects in the Dublin study.

Investigations on the effect of Vitamin C on the common cold in deficiency states, and those in which it has been used therapeutically, have failed to provide scientifically acceptable evidence either way about the efficacy of Vitamin C for alleviating the symptoms, because of failure to define the clinical condition under examination, or because of defects in design of the trials. The values for the optimum intake of Vitamin C vary from 25-75 mg. daily in the B.P. to 75 mg. daily in the USP and 125 mg. in the Russian Pharmacopoeia. It can therefore be surmised that the dose necessary for maintenance of physiological normality in countries accepting the figures recommended by the B.P. may be open to doubt. Goldsmith has discussed this and suggests that daily doses of 60-100 mg. are necessary in adults. It is reported that ascorbic acid does have a beneficial effect in maintaining health in the mucous membrane of the mouth and tonsils (Glazebrook and Thompson, 1942; Rolf and Glazebrook, 1939) and it is suggested it could be of therapeutic and prophylactic value in patients with peptic ulcer (Williamson, Goldberg and Moore, 1967; Cohen and Duncan, 1967). In consequence the simple clinical observations that Vitamin C may have a prophylactic effect against the symptoms of the common cold seem to have circumstantial supporting evidence. Direct evidence is available from the results obtained from one small double blind prophylactic trial (Ritzel, 1961) and the preliminary results from the Dublin trials. In these circumstances the attempt to achieve physiological normality in our society by self-administration of supplementary Vitamin C has not been demonstrated to be unjustified, and may have some clinical and nutritional vindication.

The achievement of a desirable state of physiological normality by an individual, with, or without, the prescriptions and guidance of the medical profession is acceptable with the use of oral contraceptives and aspirins. It may be queried pharmacologically, but cannot be stopped in the case of Vitamin C, because Vitamin C can be defined as a drug, or as an article of diet. When a multivitamin mixture is combined with alcohol and the resulting mixture is recommended for prevention of debility, it may fairly be asked whether the mixture is designed to maintain the individual in a physiologically normal condition, or whether it promotes a state of supernormality by affecting the cerebral cortex, and reducing central inhibitions.

Achievement of Desirable Supernormality

At young people's parties it is relatively easy to appreciate how to use drugs, reduce central inhibitions, become educated to appreciate the pleasure of escape from reality and intellectual stress which their pharmacological action produces, and

Table III

Drug Use in Modern Society—III
Achievement of Desirable Supernormality

Reasons for Prescription	Control of Administration	Drug Employed
To get drunk	Social individual	Alcohol
To be blocked	Unstable Adolescent	Amphetamines
To be stoned	The unstable experimenting Adolescent	Marijuana
To take a trip		LSD
High and Hooked	The Junky	Morphine and Heroin

so to achieve a desired supernormal state (Table III). The difference between the therapeutic use of a drug and its use to produce desirable supernormality is important. National drug safety committees have been appointed to supervise the former type of use in Great Britain and in Ireland, and in the United Kingdom the Standing Committee on Drugs of Dependence was appointed in 1967 to supervise and control the latter form of use.

To get drunk, to be 'blocked', to be 'stoned', to 'take a trip', or to be 'high' and 'hooked', describe states of supernormality which can be achieved through self-administration of drugs by individuals singly or in cultural groups without medical supervision. In our society, the only drug which it is legally admissible to administer to oneself in order to achieve desirable supernormality is alcohol.

The number of individuals who drink alcohol in Ireland with or without reason is difficult to estimate. Walsh (1968) has compared the comparative rates for hospital admission of alcoholics in Scotland, England and Wales, and Dublin (Table IV). His figures show that the rate for first admission in Ireland is twice as great as in Scotland and twelve times as great as in England. Phillipson's figures for Britain and Viney's figures for Ireland confirm the findings of Walsh.

Table IV

Alcoholism and Alcoholic psychoses in comparative rates for Scotland, England and Wales and Dublin per 100,000 total population

	First Admission Rates		Re-Admission Rates	
	Male	Female	Male	Female
Scotland	20.6	3.3	26.1	3.6
England and Wales	3.6	1.0	3.7	1.0
Dublin	40.2	7.8	77.6	10.2

Is it then the case that the Irish have a specific genetic or cultural predisposition for alcohol? American-Irish studies suggest that this may be so (Knupler and Room, 1967), and it would be clearly desirable to carry out a well-planned and large-scale investigation in which native Irish, and American-Irish, drinking patterns were compared on a scientific basis. The

Americans have indicated that they would welcome such an investigation. In Ireland we must show that we have the scientific expertise and planning ability to collaborate. A social survey of the drinking patterns in comparable areas in the U.S.A. and Ireland would be of considerable value, but it, would not show objectively that 'a taste for drink was an Irish characteristic.

During the past three years we have been carrying out investigations in Trinity College in order to find out whether a taste for drink can be defined objectively, or altered pharmacologically. We have established a method for measuring the taste threshold for alcohol in which we have shown that the taste of alcohol consists of two parts—an initial sweet taste, which is succeeded at higher concentrations, by a burning taste. We have found that the taste threshold to the sweet taste of alcohol can be altered significantly by administration of the trichomonocidal agent, metronidazole. Administration of four doses of metronidazole in doses of 200 mg. six-hourly, causes a subject to become significantly less sensitive to the sweet taste of alcohol during a period of 48 hours (Figure 3). We have established that this is due to a local effect of metronidazole on the tongue. We observed that the taste threshold to alcohol is also raised by testing solutions of alcohol made up in metronidazole. When alcohol is made up in a weak solution of metronidazole the taste threshold to alcohol is slightly raised (Figure 4). When the concentration of metronidazole is again increased the taste threshold to alcohol reached a plateau. Finally at the highest concentration of metronidazole the taste threshold is again raised. In consequence people lose the taste for alcohol.

If the taste for drink is a characteristic of the Irish it may be that these results can form the basis of a scientific test for measuring it, and may demonstrate how drugs can be used to control it. If alcohol is regarded as a food it is interesting to compare the effects of cheese and tranlycypromine with metronidazole and alcohol. In the former case the food affects the action of the drug; in the latter case the drug affects the appreciation of the food. On the other hand if alcohol is defined as a drug, metronidazole could conceivably be used to inhibit drinking by removing the pleasure of a taste for drink in the same way as pentazocine can be used to remove the euphoric pleasure of heroin-like drugs. Whether alcohol be regarded as a food or a

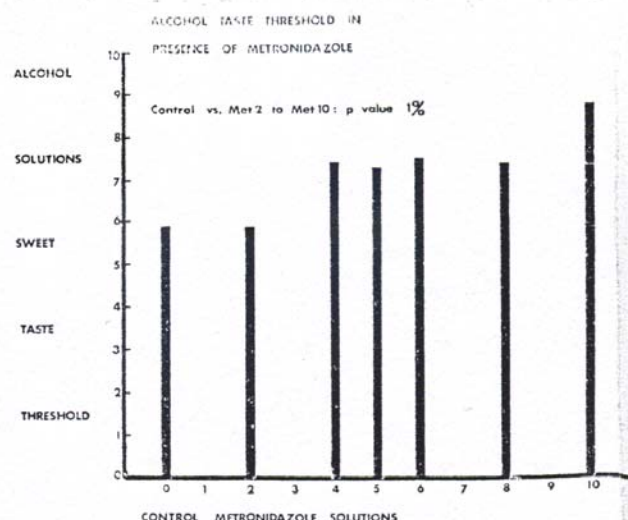


Figure 4. The effect of adding various concentrations of metronidazole to the solutions of alcohol used for measuring the sweet taste threshold to alcohol. Increasing the concentration of metronidazole in the alcohol solutions significantly raises the taste threshold to alcohol.

drug, Irish culture has now reached the stage when it demands that the degree of, and damage caused by, alcohol self-administration is evaluated, and steps are taken to control it. It seems that the time has come to combine the scientific, clinical and sociological expertise in the country to find out if it is the Irish culture which causes the Irishman to drink, or if it is the Irishman's genes which causes the American to get drunk.

It has now been brought to public notice that the desire to achieve supernormality by self-administration of drugs is a characteristic of Irish adolescent population just as it is of the adolescent population elsewhere in the world. The activity of the Gardai and the evidence appearing in the Press and on Television have confirmed the evidence produced at the meeting of the Irish Pharmaceutical Society eighteen months ago (Wilson, 1967). It is clear that adolescents are becoming 'blocked' on amphetamines, 'stoned' with marijuana, 'taking a trip' with LSD and becoming 'high' and 'hooked' with heroin in Ireland. They are even completely up-to-date with the culture which takes methedrine intravenously which has been fashionable in London only for about twelve months. The social implications of such self-administration were observed in Britain for nine years before any official action was taken at a national level to deal with the social and economic consequences, to tighten the security precautions, to enact legal amendments to the existing defective laws, and to institute a functioning and effective watch committee and system. We can only hope that developments will not become more serious in Ireland than they became in Britain in 1967 when the Standing Committee on Drug Dependence was set up and Treatment Centres were started.

[Figure 5 is not reproduced here due to an error in transcribing]

Figure 5. The social implications of drug selection, administration and action. The factors in the diagram interact with and influence one another as shown by the linking arrows.

Conclusions

When considering the social implications of drug use many more factors come into play than the physician, the drug and the patient. The social factors which influence the selection and prescription of drugs, and the effects which the actions of the drugs have on the culture, the society and the national administration must be analysed. Still however, these components interact with each other (Figure 5). Drug administration and drug action take the places of the physician and the drug in Goodman's triangle. The effect of the action of the drug on the individual who received it, sets in motion a series of events which interact and have repercussions, until ultimately national organizations and the national administration may be affected. Removal of prejudices, resolution of emotional blocks, formation of new attitudes, and enactment of new legislation can follow. The enactment of registration to control the introduction of new drugs following the thalidomide incident, and the setting up of the Standing Committee on Drug Dependence in the United Kingdom, provide examples of how the implications of the social use of drugs may have national repercussions. The doctors who prescribe the drugs are influenced, and react in their choice of prescriptions and mode of administration of drugs. Social pressure groups and local cultures obtain information about the drugs, react to them, discuss them, and demand the availability or curtailment of supply of new drugs. The advertisement in the Times (1967) shows how a vociferous section of the adolescent culture could demand that the law controlling the use of cannabis should be amended. It provides an example of how a cultural pressure group can attempt to influence the social use of a particular drug for its own selfish benefit, irrespective of whether the drugs are used effectively and safely.

The use of a drug has many social implications. Study of such use among the individuals in our society can be described as Social Pharmacology. Drug production is the

object of our pharmaceutical industry. The achievement of drug efficacy is the goal of our medical scientists. Drug use is a characteristic of our modern society. Drug administration is a prerogative of our social culture. The development of iatrogenic disease is the price which is being paid in our hospitals and pathology departments. What is the place and function of drugs in our social structure today, and what do we want it to be in the future?

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