approach the anterior perforated space. Some of the eight patients who have had this complication in my hands have recovered almost completely. All but three, or perhaps four, are better off in a general way than before operation. Nevertheless, it is well to recognize that this is the most dangerous of all areas for cortical removal.

In conclusion, this whole field of surgical therapy is opening slowly. The patients who are to be admitted to it are only those whose attacks are not controlled by the best medical therapy. But there are others, too, whose abnormal behaviour seems to depend upon the medication or upon the continuous effect of subictal discharge.

This is a field of therapy for epilepsy in which medical team-work is a prerequisite to success. And I can testify to the fact that there is no other field of medicine in which the gratitude of patients is more profound when success does crown the common effort.

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EPILEPSY AS A SOCIAL PROBLEM*

BY

LORD COHEN OF BIRKENHEAD, M.D., D.Sc.
 LL.D., F.R.C.P., F.A.C.P.

*Professor of Medicine, University of Liverpool: Senior
 Physician, Royal Infirmary, Liverpool*

Recent years have witnessed dramatic advances in the diagnosis and treatment of the individual epileptic, and these have been vividly presented in the four masterly papers of this symposium. The social aspects of epilepsy are less spectacular than the clinical, and for this reason they have in the past been generally neglected, but interest in them has been initiated or reawakened and developed by the publication of the *Report of the Subcommittee on the Medical Care of Epileptics* (H.M.S.O., 1956), which discusses not only the appropriate arrangements in the National Health Service for the full diagnosis, treatment, and continued medical care of the epileptic, but also how he can play a useful and satisfying part in the community in which he lives, and what provision society now makes, and in the future should make, to enable and encourage the epileptic to lead as normal a personal, family, and social life as possible.

This presents a major problem. The incidence of epilepsy is between 2 and 4 per 1,000 of the population, so that in Great Britain there are between 100,000 and 200,000 epileptics. The label "epilepsy" embraces a wide range of disability, and covers fits varying widely in frequency, severity, and type in different patients and at different times in the same patient.

At one end of the scale is the epileptic with a history of infrequent attacks in the past, now free from attacks or with an occasional fit at long intervals, with or without treatment. In this group no special management is called for except periodic medical supervision and ensuring that the patients do not place their own or the public's lives in jeopardy if a fit occurs, so that, for example, the job of an engine-driver is barred.

At the other end of the scale we have the epileptic with (a) crippling motor disabilities, including paralysis

and involuntary movements, and/or (b) severe mental changes—dementia, depression, hallucinations, confusion, severe behaviour disorders, etc. In both these groups, although treatment must be directed to the accompanying fits, the major problems in management are likely to be those presented by the associated disorders, and in the vast majority of victims these are so severe that no social rehabilitation is possible.

There is one group of epileptics who have too often in the past been regarded as unemployable—namely, those who suffer from frequent daily major fits, often without warning, which appear to resist medical control. Experience shows that a large percentage of these benefit greatly from a full review—physical, psychological, and social, from standardization of treatment under expert supervision in a long-stay hospital, and from team-work in finding suitable employment.

The most pressing task of those who seek to ameliorate the lot of the epileptic is *educational*. The public have long cherished the belief that epilepsy is synonymous with mental deficiency and uncontrollable criminal impulses (a view fostered by some of our colleagues in criminal trials), and the epileptic is thus too often treated as a pariah. If progress is to be made these beliefs must be dispelled. They are the greatest obstacle to rehabilitation. The community must learn that 80% of epileptics (including those whose epilepsy follows a brain operation or injury) can, with appropriate care and encouragement, lead a normal life.

It is perhaps simplest to consider how this is to be achieved by discussing the problems which arise at different stages of life.

The Infant and Child Before School Age

This is the time at which the doctor (helped by the health visitor) can best explain to the parents the nature and implications of the child's attacks, and so restore a balanced outlook. It should be emphasized that not every fit in childhood means lifelong epilepsy: 75% of children who have had fits lose them in adult life. Moreover, even if the epilepsy persists it may not be of serious or crippling import, nor permanently incurable. The parents must not be over-anxious and full of the darkest forebodings, for this is certain to react on the child and make him feel different from other children. Again, parents must not be over-protective. Calculated risks must be accepted, but every precaution should be taken against avoidable accidents. For example, in the home fireguards should be used; sharp-edged and cornered furniture should so far as is possible be avoided; pans on a stove should have their handles pointing inward; teapots should be placed on the centre of the table; tablecloths should not be used or should be fixed.

Another unhappy outcome of the general ignorance and misrepresentation about epilepsy is the sense of guilt which it kindles in the parents, and which unless they are reassured may lead through mutual reproach to domestic strife, which reacts adversely on the child. Among the factors which may be wrongly regarded by the parents as having caused epilepsy in their child are the use of contraceptives and abortifacients, the practice of masturbation in pre-marital life, intercourse after over-indulgence in alcohol, and past venereal infection.

If at this age period there is need for medical care, this is readily available in most areas through the general practitioners and hospitals in the National Health Service. Where poverty or social embarrassment (for example, illegitimacy) renders it necessary that the child should be found a home the children's officer of local health and welfare authorities may be profitably consulted, and in this field voluntary bodies are most active and helpful—for example, the Invalid

*Read to the Section of Neurology at the Annual Meeting of the British Medical Association, Newcastle upon Tyne, 1957.

Children's Aid Association or, if the child is mentally deficient, the National Association for Mental Health.

School Age

The problems of the epileptic child at school age are of fundamental importance to his future.

The Education Act (1944), Section 8 (2) places upon every local education authority the duty of securing that provision is made for pupils suffering from any disability of mind or body by providing, either in special schools or otherwise, special educational treatment. Section 33 gave the Minister of Education the duty of making regulations defining several categories for which special provision should be made, and epilepsy was one of the categories so defined; but the regulations (1945) implied that epileptic children could not be educated in any ordinary school. This view was, however, modified by the School Health Service and Handicapped Pupils Regulation, 1953, which defined epileptic pupils as those "who by reason of epilepsy cannot be educated under the normal régime of ordinary schools without detriment to themselves or other pupils."

Experience shows that under the right conditions 80% of epileptic children can be educated in ordinary schools. For a variety of reasons which impair seriously the child's learning ability, or may impede the progress of the other pupils in the class, about 20% need special educational facilities. These reasons include mental backwardness, behaviour problems, motor disabilities, frequency of fits, incontinence of urine and faeces, and post-epileptic automatism. If there is doubt about the suitability of the epileptic child for an ordinary school education, a "trial" term might be given.

It is imperative that the child's teacher and classmates should know of the epileptic propensity and what might happen in a fit, otherwise all are alarmed and some may be terrified by the unexpected attack. Experience shows that if they are forewarned nothing untoward ensues.

There should be no restrictions on the child's work at school and he should be allowed to sit for examinations unless it be found that excitement precipitates an attack. He should certainly take part in games, otherwise he feels frustrated and may become unduly timid or apathetic. Football, tennis, lacrosse, hockey, basket-ball, bathing (under supervision), and a host of games and physical exercises can be indulged in without undue risk, but in the gymnasium any feat, such as climbing ladders or ropes, which if unconsciousness supervenes may result in a fall from a height, should be avoided. Unless there has been a long period of freedom from fits (not less than three years) cycling should be prohibited.

Most special schools for epileptics are residential and are located in epileptic colonies. This is an advantage because it provides the opportunity for continuous medical supervision. But the school should be separated from the rest of the colony and especially from the proximity of deteriorated adults, lest the parents and the more discerning child receive a misleading impression of the likely future.

University Education

It is estimated that about 10% of epileptics are intellectually above the average and that many of these could with profit to themselves read for a degree. It must, however, be remembered that in certain professions the epileptic faces serious hazards for himself and others—for example, in science and technology, where chemicals, instruments, and machinery may present great risks; in the clinical practice of medicine and nursing; and in teaching. There are, however, many suitable jobs which may be taken up after qualification—for example, administrative, domestic and social science, almoning, librarianship, etc. The difficulty lies in being selected for such a job in competition with others if the applicant is known to be an epileptic.

Employment and the Epileptic

On leaving school the epileptic should be fully assessed in respect both of his suitability for a particular job and of

jobs suitable for his particular ability and gifts. Sometimes all that is needed is simple advice about the hazards of certain occupations which must be avoided. In most cases, however, resettlement in the community demands the combined knowledge, experience, and efforts of the family doctor and specialists, local welfare and health officers, youth employment officers, disablement resettlement officers (D.R.O.), almoners, and others. The committee to which I earlier referred suggested for this purpose *hospital resettlement clinics*, where all concerned with the patient could contribute to his assessment and give advice in respect of his employment based on his intelligence and ability; on the nature, time of occurrence, frequency, and severity of the fits; on the effects of treatment on the fits, on intelligence, speed of movement, and reaction-time; on personality, and any other relevant individual factors.

The beneficial effects of a suitable occupation cannot be over-emphasized. The unemployed epileptic tends to become depressed, morose, apathetic, and sometimes aggressive. Work, especially if it brings economic security, provides not only an interest but instils a desirable sense of independence and a responsibility which favours and facilitates proper social adjustment.

Excellent *Notes for Guidance on the Employment of Epileptics* were issued by the Ministry of Labour and National Service in July, 1953, and these should be consulted by all interested, but there are a few general points to which attention should be drawn.

Certain occupations are unduly hazardous for the epileptic; these include any associated with fire, water, vats, ladders (for example, painting, window-cleaning), machinery, motor-driving, etc. The general test should be—are serious hazards likely to be met if there is sudden loss of consciousness?

In seeking a job the epileptic should be completely frank with his potential employer and, if he is given the job, with his fellow workmen. He should conceal nothing and invite no undue solicitude, but he will usually gain the sympathy and help of his workmates. This is especially true if he is one of a gang, and the work of the group is interrupted if he has a fit. If the possibility is known it is likely to evoke a warm-hearted response.

One of the difficulties in finding suitable employment away from home is lodgings. Incontinence leading to soiled bedclothes, especially if not infrequent, may be too great a burden for any landlady. Yet no attacks may occur during the day, and the job might make all the difference between successful readjustment and relapse. Again, if the patient has been in hospital or in a colony for some time the difficulties of readjustment to a normal life may lead to a temporary worsening of the epilepsy. For these patients it should be possible to make special arrangements. During a "trial" period of employment, before full adjustment has been made to an independent life and whilst there is still need for continued medical supervision, hostel accommodation might be associated with hospital or colony. For those working in towns, hostels might be provided by local welfare authorities.

Employers may fear that epileptic employees expose them to special legal liability in the case of accidents at work, but provided the employer takes reasonable precautions there is no specific liability and the National Insurance (Industrial Injuries) Act, 1946, covers epileptics in the same way as other workers.

Superannuation schemes should not prejudice the employment of the disabled. The Civil Service and local authorities already operate their superannuation schemes so that there is no deterrent to the employment of the epileptic, and, as the Report of the Committee of Inquiry on *The Rehabilitation, Training, and Resettlement of Disabled Persons* (H.M.S.O., 1956) (Appendix H) suggests, similar arrangements should be possible in private companies.

In finding a suitable job, it is to the epileptics' advantage to register under the Disabled Persons (Employment) Act, 1944. They will then benefit from services provided by the Ministry of Labour and National Service, so long as they satisfy the conditions of eligibility laid down in the Act—

namely, that the disabled person must be capable of some form of remunerative employment (ordinary or sheltered) or work on his own account, but because of his disability is substantially handicapped in obtaining or keeping employment, or in undertaking work on his own account of a kind which, apart from his disability, would be suited to his age, experience, and qualifications. The disablement resettlement officer will help in finding him a job. He should never be defeatist, for a sympathetic approach to an employer which takes into account the individual problems and potentialities of the epileptic is so often rewarding.

In suitable cases epileptics may be given a course of vocational training at one of the industrial rehabilitation units. Within six months of leaving one of these units 84% of epileptics were gainfully employed.

There remains a small residue of epileptics who cannot be placed in the open labour market. For these the alternatives are employment in a Remploy factory or sheltered workshop, home employment, or admission to a colony.

Epileptic Colonies

The colonies were founded between 1888 and 1906. The name "colony" indicated their aim—to provide a permanent shelter or retreat for the epileptic in which each member contributed according to his ability to the needs of the colony in which he lived.

There is general agreement that this "custodial" duty, which in the past the colonies have regarded as their prime function, should be replaced by that of "rehabilitation," of helping the epileptic to return to a useful and satisfying life amongst his fellows, and to cope with employment outside the institution. Moreover, by close association with the various branches of the hospital service the colonies may well make an important contribution to the long-term standardization of the medical control of the fits.

Epilepsy and Marriage

Amongst the questions most frequently raised in regard to epilepsy are the suitability of the epileptic for marriage, the effect of marriage on epilepsy, and the risks to the offspring.

In many countries epilepsy is a statutory bar to marriage on the grounds of heredity, possible mental deterioration, economic uncertainties arising from unemployment, and the like. But for obvious reasons, in those countries, the illegality of the marriage of an epileptic has proved ineffective as a deterrent.

In this country epileptics may marry, and epilepsy is not a ground for divorce, but the Matrimonial Causes Acts, 1937 and 1950, make epilepsy a ground for *nullity*. The 1937 Act stated that "... a marriage shall be voidable on the ground ... (b) that either party to the marriage was at the time of the marriage ... subject to ... epilepsy"; the 1950 Act provided that the court shall not grant a decree unless it is satisfied: (1) that proceedings were instituted within a year from the date of marriage, (2) that the petitioner was at the time of the marriage ignorant of the facts alleged, (3) that marital intercourse with the consent of the petitioner has not taken place since the discovery by the petitioner of the grounds for a decree.

It should be noted that the marriage is "voidable"; it is not void until the non-epileptic partner has taken successful legal action. The children of such a marriage, despite a nullity decree, are legitimate.

Marriage and its physical accompaniments do not aggravate epilepsy; it is often followed by improvement, but no support should be given to the view that marriage *per se* may be a cure for epilepsy. Only occasionally does pregnancy increase the frequency and severity of the fits, and epilepsy should not be accepted, except after consideration of all the features of an individual case, as an indication for abortion or sterilization.

Available figures suggest that the chances of non-epileptic parents having an epileptic child are about 1 in 200, whereas if one parent is epileptic the risk increases to 1 in 40. These

general rates of incidence are of little value and may indeed be misleading when one attempts a prognosis in the individual case. They are derived from epileptic groups in which the severity, frequency, cause, and accompanying complications of the epilepsy are very variable, and it may well be that the E.E.G. would reveal in some of the clinically non-epileptic parents a record consistent with "subclinical" epilepsy. If a more accurate assessment is to be made of the chances in any particular case of an epileptic parent having an epileptic child more extensive studies must be undertaken. At present the most helpful advice on the problems of marriage and parenthood for the epileptic will be given by those who have had an extensive experience of epilepsy and associated nervous disorders.

Driving a Motor Vehicle

One of the questions most frequently posed by the epileptic is whether he may drive a motor-car. Besides affording pleasure this may be necessary for certain types of employment. Under the Road Traffic Act, 1930, the applicant for a driving licence must state whether he suffers from epilepsy, and the Motor Vehicles (Driving Licences) Regulations, 1950, No. 333, precludes anyone suffering from epilepsy from claiming a driving test. But what of the epileptic whose fits have been arrested for some time? Some doctors permit the patient to drive his own car (he must never be employed as a driver on *public transport*) after three years' freedom on treatment or two years without any drug therapy. This is a calculated risk, and if it were to the patient alone it might be justified. But the risk is to others also—passengers and pedestrians—and in my view should not in most cases be taken. There are, however, exceptions, and each case must be individually assessed. For example, in the man of 20 who had a few fits between the ages of 3 and 5 years but has since been free the risk is negligible.

Summary

The medical services provided for the epileptic by the National Health Service should ensure, when fully organized, that all the necessary measures for diagnosis and treatment are available for every epileptic. The social services have the responsibility of providing for the epileptic, wherever possible, the conditions for an ample, satisfying, contented, and useful life amongst his fellow-citizens.

Most of the available social agencies are *statutory* and include: (1) the school health service, which can also be used for educational purposes; (2) the welfare services of local authorities in relation to employment, accommodation, etc.; (3) the education service of the local education authority; (4) the youth employment service; and (5) the disablement resettlement officer service of the Ministry of Labour and National Service, and Remploy factories. There are in addition many *voluntary* agencies which play an indispensable (and often more personal) part in helping to solve the social problems of the epileptic. The colonies still remain outside the National Health Service. The British Epilepsy Association (and its Scottish counterpart) are doing invaluable work in fostering, through clubs and other means, a sense of self-reliance and confidence in the epileptic and in providing the opportunity for training in leadership. The work of the boy scouts and girl guides (who make special provision for the epileptic youth), of the Red Cross and W.V.S., of the National Association for Mental Health, and of several other voluntary bodies must also be warmly commended.

Many of those who are called upon to help in the management of the epileptic are still unaware, or fail to take advantage of, the social agencies which are available, partly because many still tend to overlook the

social aspects of their patient's problem. But it is gratifying that in recent years there is an increasing awareness that the queries which epilepsy raises are not concerned solely with accurate diagnosis of the cause and with instituting the best treatment of the fits, but also with ensuring that the epileptic is given the fullest opportunities to take his place as a full and active member of the community in which he lives.

TREATMENT OF CERTAIN SIDE-EFFECTS OF MORPHINE

BY

G. CHRISTIE, M.D., B.S., F.R.A.C.S.

S. GERSHON, M.B., B.S., D.P.M.

R. GRAY, M.B., B.S., D.A.

F. H. SHAW, M.Sc., Ph.D.

I. McCANCE, B.Sc.

AND

D. W. BRUCE, M.A.

*From the Departments of Pathology and Pharmacology,
University of Melbourne, the Alfred Hospital and
the Nicholas Institute, Sherbrooke*

The disadvantageous side-effects following the administration of morphine may be as follows: respiratory depression, nausea, vomiting, and central nervous system depression (narcosis).

Nalorphine (N-allylnormorphine) (Unna, 1943) has been introduced to overcome respiratory depression. There is also some evidence that succinic acid may be of benefit (Trautner, Trethewie, and Gershon, 1953). It will be shown below that amiphenazole ("daptazole") does not control the nausea and vomiting induced when morphine is given to healthy volunteers, although McKeogh and Shaw (1956) have found that scarcely any vomiting occurred when amiphenazole and morphine (in large doses) were given to 127 patients for the treatment of intractable pain in terminal carcinoma. The series has now been extended to about 400 cases over a period of three years. Holmes (1956) did not report any emesis when amiphenazole (15 mg.) and morphine (30 mg.) were administered during childbirth. A similar lack was described by Hügin (1956) when the two drugs were used to control post-operative pain. There is some evidence that the mental depression or narcosis induced by morphine is counteracted by amiphenazole (McKeogh and Shaw, 1956; Gershon, Bruce, and Shaw, unpublished).

It would thus appear that to control the side-effects of morphine completely three drugs are necessary—namely, N-allylnormorphine for respiratory depression, amiphenazole for narcosis, and a third for nausea and vomiting.

In another paper (Gershon and Shaw, 1958) it has been suggested that some of these side-actions may be due to the release of histamine by morphine. Other toxic effects which may have a similar origin are giddiness, headache, and pruritus.

It is the purpose of this paper to show that the incidence of vomiting following the use of morphine is higher and more severe than is generally thought and that this distressing symptom can be controlled by cyclizine hydrochloride ("marzine"). Definite evidence is

presented to show that amiphenazole counteracts the central nervous system depressive action of morphine. The psychological part of this work has been carried out by D. W. Bruce.

Clinical Material

The conclusions to be drawn from this investigation are based on three separate experimental series and some special case histories, the work being designed so that the major therapeutic exhibitions of morphine would be covered—namely: (a) Sufferers from incurable painful diseases, where some degree of habituation is soon established and the incidence and severity of side-effects fall off. (b) Pre- and post-operative patients. This group is not a homogeneous one, but comprises a wide range in respect of age and physical conditions. The group, especially the post-operative section, is a particularly important one, as nausea, dry retching, and vomiting can cause serious surgical sequelae. The complications may range from simple interference with wound union to lesions and extension thereof, and also may be an important factor in the production of haematomas in the region of the wound, with resultant secondary infection. (c) The third major use of morphine is as an emergency analgesic for accident casualties and war-wounded, and where relatively high doses are required.

It therefore seemed desirable at the outset to establish the incidence and severity of the side-effects of doses of the order of 15–30 mg. Morphine was given by injection throughout the tests, usually intramuscularly but occasionally intravenously.

First Series: Trial on Army Volunteers

Forty-six volunteers were available. On the first day a test dose of morphine, 1/6 gr. (10 mg.), was injected. Three subjects were considered unduly sensitive because of nausea, light-headedness, or drowsiness, and were excluded from the main tests. Another volunteer was discharged because of the onset of an asthmatic attack some hours after the test dose. Clinically it was slight, but it was thought better not to proceed with this person.

The remainder were divided at random into six groups of seven men. Five schedules of medication were used throughout: (1) morphine, 30 mg., and cyclizine, 50 mg.; (2) morphine, 30 mg., cyclizine, 50 mg., and amiphenazole, 40 mg.; (3) cyclizine, 50 mg.; (4) amiphenazole, 40 mg.; (5) distilled water, 1 ml. Each group of volunteers received each of these schedules once, and the rotation was such that no group received morphine on two consecutive days. All subjects had three injections of morphine over a six-day period, in addition to the initial test dose of 10 mg. (6) This schedule consisted of morphine, 30 mg., on one occasion; morphine, 20 mg., on two occasions; morphine, 20 mg., and amiphenazole, 40 mg., on two occasions.

An anaesthetist was in attendance with the necessary resuscitative apparatus, but his services were not needed.

An analysis of the reaction to the five-dosage schemes which included morphine is presented in Table I. Amiphenazole alone produced negligible symptoms. Some soreness of the arm lasting up to two hours was observed by 40% of subjects, and 20% mentioned a slight degree of drowsiness. A similar degree of drowsiness was noticed in the controls (distilled water). With cyclizine alone 40% of the subjects noticed drowsiness and 10% experienced slight headache.

Effects of Morphine

It would have been experimentally desirable to submit a larger number to morphine (30 mg.), but after the first day's experiences repetition of the experiment on other groups was not considered morally justifiable. As the degree of illness and vomiting experienced was more than the