An Address

ON

SOME ALARMING SEIZURES*

BY

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In the course of medical practice we are confronted from time to time by peculiar "seizures" or "nerve storms," which lack conformity with the more familiar descriptions. Some of these seizures cause great alarm to their victims, in that they seem to threaten paralysis, speechlessness, unconsciousness, or even death itself, or because they occasion profound states of instability and prostration. The appearance and sufferings of the patients during these attacks may further alarm relatives or onlookers, and even the medical man, unless he be familiar with the true nature of the "seizures" or fully alive to the history of the case, may be taken unawares, and feel so dubious about their purport and outcome as to be unable to give a reassuring prognosis.

And yet the seizures which I have in mind are all consistent with long life and with good health at other times. Those with the more local effects may simulate or suggest organic disease of the brain; those causing serious instability may also be wrongly attributed to cerebral vascular disease or cerebral tumour; those which cause pallor, distress, disturbances of pulse rate, precordial pain or discomfort and, more rarely, loss of consciousness, are apt to be ascribed to disease of the heart. We might reasonably include in this category ordinary faints or syncope and epileptic attacks, and Gowers,¹ who did more to illumine this subject than anyone else, discussed together under the broad heading of "The Borderland of Epilepsy," syncope, vertigo, and certain other "nerve storms" to be described.

Fainting and epilepsy, as being better known, I shall not consider here. The particular seizures which I wish to review include the aphasic, hemiplegic, and vertiginous varieties of migraine; vertigo, whether due to labyrinthine disease or more transient vestibular disturbance; and the so-called vasovagal attacks of Gowers. If we except labyrinthine vertigo there is no demonstrable organic basis for any of these seizures. The physical overhaul between attacks, unless there be a coincidental pathology, gives a negative result. They are therefore placed in the category of the "paroxysmal neuroses." In the migrainous episodes temperament and heredity, sometimes with idiosyncrasy or allergy on the one hand, and transient disturbances of physiological equilibrium due to fatigue, worry, eyestrain, constipation, or mental stress on the other, may all play a determining part. To no inconsiderable extent the same influences play a part in increasing the liability to vertigo and vasovagal attacks. Anxiety of mind occasioned by the symptoms themselves, and the subsequent prostration when the storm is past, are apt to keep the patient in an unduly receptive state, and so prone to further storms.

It is my purpose to amplify a brief general account of these interesting, and by no means rare, neuroses with some case-histories illustrating their symptomatology, and justifying, as I think you will agree, their inclusion in the list of the "alarming seizures." Thereafter I shall shortly consider a few important principles in the management of cases.

* Given to the Woolwich Division of the British Medical Association.

MIGRAINE AND ITS VARIANTS

If we are to study its less frequent variants we should start with a clear image of the better-known phenomena of migraine. As commonly seen it is a disorder chiefly of the active period of adult life, affecting both sexes, depending strongly upon hereditary endowment, and showing a tendency, better marked in men than in women, to spontaneous remission after the age of 50. It is characterized by symptoms of very variable severity, and occurs in intermittent paroxysms separated by days, weeks, or months. The paroxysms come "out of the blue," and often for no apparent reason; on the previous day the patient may have felt particularly well. They commonly start on waking in the morning. The first symptom may be a hemicranial brow ache, or more generalized headache, but before this there is often a passing disturbance of vision. Fortification spectrum or teichopsia on the one hand, or a blind patch or hemianopia on the other, are the commoner forms of aura. The headache in a case of average severity becomes more intense during the day; sometimes it is completely crippling, and necessitates retirement to a quiet and darkened room. Nausea or repeated retching and bilious vomiting follow. The patient looks pale and ill, with dark rings under the eyes. Twelve hours is a usual duration for the attack, but it may be prolonged to twenty-four hours or, more rarely, through two or three days. The patient is often left with a sense of prostration, which takes another day or two to pass. Cold, fatigue, worry, eyestrain, train and motor journeys, and certain food-stuffs or beverages—notably rich or fried foods, chocolate, and eggs—are among the recognized precipitating causes. Mental workers who get little exercise are more prone to the disorder than others. The menstrual period and the menopause in women are particular times of aggravation.

Some patients escape with occasional attacks of hemianopia or teichopsia; some with slight headaches which cause little or no interruption to work; some experience the more familiar attacks at one time, and at another the aphasic, hemiplegic, or vertiginous variants which I am about to describe. There are also variants of another kind, in which abdominal symptoms predominate, whether as sickness, diarrhoea, or pain, or some combination of these with a general malaise, but always tending to a periodic or intermittent behaviour, and an equivalent duration of symptoms. Sometimes the abdominal manifestations are severe enough to suggest food poisoning or an abdominal emergency. In some cases there is a vague sense of soreness or discomfort about the liver region, and a look of sallowness almost approximating to icterus. Gall-bladders have been removed in cases of migraine misdiagnosed as cholecystitis. If a barium meal examination is made during an attack of migraine or migrainous dyspepsia the stomach is found to be inert; it may take upwards of six hours to empty, and I have seen one patient accused and another suspected of pyloric stenosis on this account.

In aphasic and hemiplegic migraine, usually on a basis of the more typical ocular and hemicranial symptoms, there is superimposed a confusion of speech, the patient knowing well what he wants to say, but being unable to say it. With this there may be a sense of weakness in the arm, or sensations of numbness or tingling in the hand and lips and face of one side. More rarely there is motor weakness or even a transient paralysis. It can well be understood how "strokes" are feared, or cerebral thromboses actually diagnosed in such cases. The symptoms, however, pass over quickly with the rest of the storm, and leave no relics behind them. Moreover, they can occur in subjects in whom it would be unreasonable, on

the score of age, history, and physical findings, to suspect vascular disease, and there is often a personal or family history of indisputable migraine.

Vestibular or vertiginous migraine is characterized by attacks of profound giddiness, instability, collapse, and vomiting, indistinguishable in the main features of the attack from Ménière's syndrome, but separable (though often with difficulty) from the recurrent vertigo of labyrinthine disease by a history of previous migraine or associated migrainous phenomena, and by the absence of any evidence of aural disease such as deafness or tinnitus.

Aphasic and Hemiplegic Migraine

Case 1.—A young married woman, aged 31, of sensitive, intelligent type, was brought to me for attacks characterized by partial loss of vision, headache, numbness in the lips and one or other arm, and loss of speech. The headache was localized over one brow, and preceded the aphasia. During the attack she knew exactly what she wanted to say, but could not say it, and was aware that she was "talking rubbish." The attacks ended with vomiting, griping epigastric pain, and diarrhoea. They lasted for four or six hours, and were followed by prostration enduring for two or three days. They had caused her and her relatives the greatest alarm and anxiety. On one occasion when the left arm was numb she had no aphasia; there was well-marked aphasia on each occasion when the right arm was numb. She had other attacks of an abdominal type, which had at first been ascribed to "food poisoning," and others with headache and giddiness. Constipation and nervous strain were particular determining factors.

Case 2.—A small, healthy-looking girl, aged 12, experienced six attacks in the course of eight months, in which she complained of a feeling of numbness and weakness "all down one side." Although she could move the arm she was quite unable to hold a cup. These symptoms would endure for about ten minutes, and were followed by visual disturbance and a headache, which persisted throughout the day. In one attack she vomited. In all of them she "went off her food," became drowsy, and for the next day or two was lacking in energy; her breath and tongue were unpleasant. Her mother had had "terrible" periodic headaches throughout her life, and at odd intervals had experienced similar feelings in the arm, and on one occasion had dropped a teapot. A younger brother of the patient had "acidosis" attacks.

The hemiplegic symptoms are usually, as in the first case, of a sensory kind, and referred to as weakness, numbness, or tingling, rather than as loss of power, but actual loss of power may occur as in the second case. Although slight paraesthesiae and transient dizziness were mentioned in other cases, I have encountered only six examples of aphasic and hemiplegic migraine, and the same number of vertiginous seizures among 213 migrainous patients. Probably the neurologists see a higher proportion of these interesting cases.

Vestibular Migraine

Case 3.—A man, aged 48, whose mother had suffered from bilious attacks, complained that since boyhood he had been liable to bilious attacks followed by extreme drowsiness. He was even at times found asleep by the roadside on the way home from his work. (Drowsiness is well recognized as an occasional manifestation of migraine.) Latterly these attacks had taken on a new form, and were characterized by severe vertigo with sickness, giving place to the old drowsiness with slight headache. These attacks would come on at any time, but especially in the morning. After them he felt completely "washed out." Cigars, a missed bowel movement, worry, and a stuffy room were recognized as determining causes. There was no evidence of ear disease.

Case 4.—A woman, aged 48, always "highly strung," had been liable to sick headache at long intervals. In some of the attacks she was temporarily blind in one eye. Three months before seeing me she was overcome with giddiness one morning, "everything went black," and she saw quivering specks of

light. There was much nausea, and she did not feel really well for several days. A fortnight later she had a similar seizure, with a sensation of falling forward. Others followed, and were accompanied by severe headache, which left her scalp sore. Aggravating factors at this period of exacerbation included great domestic sorrows and anxieties, and a secondary anaemia.

We find, therefore, that the victims of what we may call "ordinary migraine" may at times experience other types of seizure, characterized by aphasia, unilateral sensory or motor disturbances in the periphery, and vertigo. A careful unravelling of the history and an analysis of the symptoms in the particular attacks which have caused alarm will, however, nearly always reveal their true nature. A family history of migraine may provide the necessary clue. The vertiginous attacks clearly suggest Ménière's disease if insufficiently analysed. We may therefore conveniently pass here to a consideration of some other cases of vertigo of varying aetiology.

VERTIGO

If we exclude intracranial disease and occasional causes such as wax or water in the ear, the pathologies underlying recurrent vertigo include: (a) the otosclerosis which occurs at or after middle-life, and accounts for the majority of cases; (b) chronic otitis media; (c) sudden accidents to the labyrinth—inflammatory or perhaps due to local haemorrhage; (d) vasomotor disturbances giving rise to abrupt fluctuations in the blood pressure, in which group we may probably include the cases seeming to follow directly upon emotional stress; (e) tobacco excess; and (f) migraine.

The usual story of a major attack of vertigo is that of a middle-aged subject who has previously noticed a slight progressive deafness and frequently tinnitus in one ear, and is seized, at any time or place, whether in the street or in his bed, with violent giddiness, in which objects seem to revolve around him or the floor appears to rise to meet him. He is compelled to hold on to the nearest railings or to lie down, but this brings no relief to the sensations, which may continue for minutes or hours. Repeated vomiting may follow, and sometimes uncontrollable diarrhoea. There is great prostration and, more rarely, a feeling of impending dissolution as real as that which is recorded by sufferers from vasovagal attacks or occasionally in association with the angina pectoris of coronary disease. As in migraine, pallor, greyness, and coldness are noted by eye-witnesses. There are usually intervals of days, weeks, or months between the major attacks. The patient is left shaken by them, lacking in confidence, depressed, unwilling to go out-of-doors, and not infrequently with a persisting sense of slight unsteadiness, which is worse in traffic, or with sudden movements of the eyes or changes of posture. When deafness in the affected ear becomes complete the vertiginous seizures may become less frequent, and sometimes depart never to return.

It is clear that the labyrinthine disease, although an essential conditioning factor, is not alone responsible for the attacks, for if this were so the vertigo would be continuous instead of transient and occasional. Of the causes predisposing to the attacks, states of general physical or psychological unfitness, such as result from the menopause, or from a too precipitate loss or gain in weight, fatigue, anaemia, and mental anxiety, are all noteworthy. The determining cause of the individual seizure is hard to trace, but an empty stomach, a sudden movement, or a strong emotion are among their number. Of perpetuating causes I believe the anxiety and apprehension engendered by the attacks themselves to be real and outstanding. After all, nothing could be better devised to provoke a nervous instability than attacks of

genuine physical instability coming on without warning and beyond all voluntary control. A conditioning physical cause is also much more likely to be operative during states of nervous tension and unrest.

Case 5.—A woman, aged 60, who had previously consulted me for other troubles of a minor kind was seized, after a period of grave family worry, with a succession of vertiginous seizures, in which she was prostrate, vomited repeatedly, and experienced much singing in the ears, especially in the left ear. She did not sleep, she was terrified by the attacks, and apparently had feared a stroke. She had lost a stone in weight since her previous visit to me a year before. The only physical finding was deafness in the left ear. The entry in my notes was "labyrinthine vertigo; aggravation by fatigue, loss of weight, constipation, and worry."

Case 6.—A man, aged 54, stated that he was well until three years previously, when something suddenly "popped" in his left ear, and he had a severe attack of vertigo. He remained liable to attacks of giddiness thereafter, in which he had to grasp neighbouring objects for support. The attacks were steadily diminishing in severity. His blood pressure was 230/140. I have never convinced myself that hyperpiesia itself (apart from a vascular lesion) could cause true vertigo. In a long series of cases of vertigo a normal or low blood pressure was found to be more common than a high one. In this case, however, I surmise that the high blood pressure may have been indirectly responsible by causing a local vascular accident.

Case 7.—A young man, who had undergone a great deal of domestic strain for a number of years, lost his mother suddenly. On the day before the funeral, and again on the morning of the funeral, he awoke with nausea and intense giddiness, the fireplace appearing to revolve to the right. There were no physical signs of disease, and in this case no deafness or tinnitus, and there was no history of migraine or tobacco excess. He had always been able to make his right Eustachian tube "click." Here the evidence for an aural contribution was minimal, and I concluded that emotional stress was the predominant factor.

Case 8.—A professional man, aged 54, who had been under my care four years previously for a duodenal ulcer, came to see me much exercised about symptoms of quite another kind. For six months he had noticed increasing deafness in the right ear. One day he suddenly collapsed with intense giddiness and violent vomiting, and thought that he might die in the attack. He had to be carried home, and remained ill all day. Four other attacks followed in the next few weeks. He was greatly relieved in his mind by the reassurance given. Three months later he reported that deafness had become complete in the affected ear, and that he no longer had any giddiness.

I could recount the histories of many other cases of vertigo in which anxiety and apprehension were much in evidence, leading in some to a bed-ridden invalidism. Whatever other contributory measures of treatment are employed, I have again and again been impressed with the value of a simple explanation and a full reassurance. Disabuse your patient of all ideas of "strokes" or of cerebral or heart disease, and you will have given him a valuable helping hand. There is no specific medical treatment of the ear disease, and the cases suitable for treatment by the neurological surgeon must remain in a minority and be selected with the most exclusive care. There is the more reason, therefore, to concern ourselves with the associated factors in the management of these cases.

VASOVAGAL ATTACKS (GOWERS'S SYNDROME)

I have mentioned the sense of impending death as an occasional symptom of vertigo. In vasovagal attacks (Gowers's syndrome) it is one of the most constant and quite the most urgent and dreaded of symptoms. These attacks affect adults of either sex and any age; they are more frequent in women than in men. In my experience the victims, almost without exception, have been affected simultaneously by a minor cause of general physical ill-

health, and by some anxiety or mental stress. As with vertigo and fainting, but for an even more imperative reason, the anxiety engendered by the attacks themselves is a strong perpetuating factor. The attacks "come out of the blue," and may last minutes, or half an hour, or for longer periods. They leave a sense of prostration afterwards. A visceral disturbance, such as vomiting or diarrhoea, a bowel wash-out, or an oesophageal or intestinal spasm have sometimes precipitated the seizure, but no such disturbance can be traced in the majority of cases.

The chief complaint is of "a sense of dying"—not a fear of death, which is sometimes even desired, so intolerable is the distress of the attacks. I have sat by the bedside and been assured by a patient that this time the end had come. In other cases of a minor kind a sense of "something dreadful about to happen," of "fading away," of "floating in space," or a peculiar "sense of unreality" are described. There is a complaint of profound malaise, of coldness, sometimes of shivering or trembling, and of heaviness, immobility, or powerlessness in the limbs, and, in these circumstances, patients have told me that even if a cup of restorative were within reach they would be unable to lift a hand to take it to their lips. This immobility is strongly reminiscent of the frozen powerlessness observed in the rabbit "fascinated" by the stoat or snake, and one patient, who had seen an animal in this state, was forcibly reminded of the incident by her own symptoms. Precordial or substernal discomfort, or genuine pain spreading into the left side of the neck and down the left arm, or a sense of constriction in the chest is common, and tingling in the finger-tips and sometimes true tetanic spasms are also described. To observers the patient looks very ill and pale, and may be cold to the touch. Even medical men have been deceived, and thought that death was imminent. The pulse may be rapid or very slow. In one case of mine it fell on occasion to 60 and once even to 19 to the minute. Sometimes the general symptoms, sometimes the cardiac symptoms, predominate, but the "angor animi" is rarely absent. These attacks are often diagnosed erroneously as "heart attacks." Some of them do, indeed, closely simulate angina pectoris. Many of the so-called pseudo-anginas in women and younger subjects are examples of Gowers's syndrome. As a rule consciousness is retained, but occasionally it is lost, and when this occurs it is for much longer periods than in the case of an ordinary faint.

Case 9.—A young man, aged 21, of outstanding energy and conspicuous fearlessness in the pursuit of sport, a motorcyclist, a member of the Auxiliary Air Force, and a keen rider to hounds, consulted me on account of attacks in which he suddenly had a feeling of impending death. These attacks had "scared him terribly." Associated symptoms included an uncomfortable feeling about the heart, an appearance of objects being "blacked out," and a "wobbly" sensation at the knees. The attacks would last from half to one hour. Three years previously he had sustained a concussion and a fractured leg in a motor accident, and had been given anti-tetanic serum. Two months previously he had sustained further injuries in another accident, and was again given serum. Serum sickness with urticaria and fever followed, and a little later he developed mumps. It was during the serum sickness that he had his first vasovagal attack. He was an excessive smoker. His father had experienced identical attacks at the age of 27, and had outgrown them. I have another example of vasovagal attacks occurring in a mother and a daughter.

Case 10.—A young woman, previously healthy and placid, underwent an operation for appendicitis. During convalescence she developed almost every morning a pain across the abdomen, followed by a bowel action. On ten or twelve occasions this was succeeded by tachycardia, feelings of deadness or numbness in both arms, especially in the left, generalized tremor, and a most acute sense of dying. She then

recalled that she had twice experienced something similar before the appendicectomy. With reassurance and general treatment she quickly outgrew the attacks.

Case 11.—A medical man, aged 38, who was recently convalescent from a gastric haemorrhage and had experienced the sensations accompanying ordinary faintness, took a rather large dinner of eggs and spinach. This was followed by feelings of fullness. He then became faint, but in spite of lying flat on the ground the feelings grew worse. The attack lasted fully half an hour. There was no loss of consciousness. The patient thought he was dying, and so did his wife. "He looked ghastly," and it was not unnaturally assumed that he had had a further haemorrhage. At the end of half an hour there was a shivering attack. I saw him a few minutes later, when he was warm again, but still very pale. His pulse rate was 72 to 80; there was no haemorrhage.

In this case there was no precordial distress. To the patient and medical friends who were present the episode was something different from an ordinary faint, a state in which *angor animi* is not described, and the symptoms are generally of short duration or quickly followed by loss of consciousness.

Case 12.—A woman, aged 51, of nervous temperament, and of the anaemic, flabby type, sent for her doctor urgently one night on account of epigastric and substernal pain. She thought she was going to die. She looked "ashy" white, and had a very slow pulse; she recovered slowly, the whole episode lasting about one hour. She gave a confused account of previous attacks, some of which sounded dyspeptic, while in some she experienced precordial and left arm pain as a result of effort or during a game of bridge. In these attacks she had a "feeling in the throat and difficulty in drawing her breath." She had a sharp aortic second sound. Her blood pressure was 160/100. Many members of her family, including a sister, were reported to have died suddenly. The decision as between true angina pectoris and Gowers's syndrome was here a difficult one. Later she was re-examined, and on two occasions a normal electrocardiogram was obtained. She remained fairly well during the next year, except for "indigestion," and experienced no pain or dyspnoea on walking. She was then seized with a severe attack of stomach pain while driving in a car, and was taken to a chemist's shop, but becoming worse was moved to a doctor's house. Here the doctor, seeing her for the first time, made a confident diagnosis of angina. I saw her shortly afterwards, and was much more in favour of Gowers's syndrome than before, and considered anaemia and anxiety again as underlying causes. Her blood pressure was now 140/95. A little later her own doctor was called, on more than one occasion, to see her in attacks in which the sense of impending death was predominant, and pain quite a secondary symptom. There was now an additional complaint of "stiffness in the hands and feet." These attacks occurred at rest in bed, and were so unlike true angina that the alternative opinion was finally adopted, and treatment modified accordingly.

It is noteworthy that the same sense of constriction in the chest and *angor animi* which these patients describe can occur in anaphylactic shock, and that they may also be evoked by too large a dose of adrenaline given hypodermically. In either case it seems reasonable to suggest that an abrupt fluctuation in the blood pressure is an operative cause. In some cases vasovagal attacks, like migraine, occur at intervals throughout a long life, and although patients come to realize that they will always survive, the sense of dying or *angor animi* is not one whit diminished at the time. I have seen the fear and misery engendered by the attacks in women of frail constitution or hysterical type lead to bed-ridden invalidism, but most patients continue to go about their affairs, and many, presumably, outgrow the attacks altogether, or experience them in diminishing degree.

The vasovagal attacks of Gowers are by no means as rare as they are sometimes supposed to be. I have collected 82 cases in the course of private practice, as compared with 72 of labyrinthine vertigo, and 213 of migraine (all types). They are commonly labelled as "heart attacks," "pseudo-angina," "nerves," and "anxiety attacks," but they are so true to type, in

respect of both their subjective and their objective phenomena, that these varied and looser nomenclatures should not, in my belief, be sanctioned. They are at least as deserving of separate classification as fainting, epilepsy, migraine, and vertigo, with which they also bear definite relationships.

SUMMARY

We find, then, that all of these seizures tend to occur in persons of particular type or temperament; they are paroxysmal and intermittent, "coming out of the blue"; they are of limited duration; they are associated with, and leave in their train, no structural nervous or visceral damage; they tend to create grave anxiety and apprehension; they are more likely to develop at times of general unfitness, whether of a physical or a mental kind; and, in no small degree, they seem to merge with one another and to possess common clinical features and aetiological characters. Just as migraine has relationships with epilepsy and may occasionally be replaced by an epileptic seizure, so also it may take on a vertiginous character and remind us of, or be mistaken for, labyrinthine vertigo. Labyrinthine vertigo in turn may be accompanied by the collapse and feeling of impending death which we have seen to be leading symptoms of the vasovagal attack. I have several case-histories of patients who were afflicted both with migraine and with vasovagal attacks. Bad bouts of migraine, vertigo, and vasovagal distress are all liable to be followed by feelings of prostration enduring for a day or more, and the two first are sometimes followed by a profound sleep. The vasomotor phenomena of fainting—namely, coldness and pallor—are common to all three, and in all three loss of consciousness may very occasionally occur. Whatever the nature of the neuronc cyclone we find grounds for arguing that these various manifestations represent disturbances of a similar kind, but varying in degree and occurring at different levels in the sensorium.

Wilks² long ago remarked: "It is undoubtedly true that there is not a single organic disease of the nervous system which may not be simulated by a functional and curable one." Hemiplegic migraine has its counterpart in organic hemiplegia. The vertiginous episodes have their counterparts in cerebral and cerebellar disease. I have elsewhere given reasons for supposing that vasovagal attacks are expressive of a medullary storm, and the sense of impending death may actually occur with organic lesions which involve or embarrass the medulla oblongata.^{3,4}

In the handling of cases in which fear and apprehension are an inevitable accompaniment, it is clearly a grave error to suggest a diagnosis of organic disease, and yet, their true nature having passed unrecognized, it is by no means rare for vertigo and the stranger variants of migraine to be ascribed to cerebral disease and for vasovagal attacks to be called "cardiac." A general regulation of the patient's way of life, the discovery, and, so far as possible, the elimination of adverse physical or psychological influences, and the judicious employment of sedatives such as bromides and luminal to "damp down" native irritability, play a reasonable part in treatment.

In migraine a strict exclusion of eggs, chocolate, and fats from the dietary is often rewarded. More exercise and a moderation of mental activities commonly help. But whatever measures we employ it is of the first importance to examine carefully, to explain simply, and to reassure fully, and so to remove, so far as may be, the crippling element of doubt or dread. In dealing with these cases we are repeatedly reminded that the study of the patient as a whole, and of his environment and his family history, by completing our diagnosis or "thorough knowledge" of his malady, gives us the surest guidance in our choice of measures for relief, whether these be of a physical or of a psychological kind. Even when ultimate pathologies

remain obscure it is a matter for comfort that it lies within our power to recognize that some of the more alarming episodes of medical practice need not, in fact, occasion any fear of an unhappy ending.

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THE MENACE OF HEREDITARY BLINDNESS

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The total world figures relating to blindness must be of staggering dimensions. In China one disease (trachoma) has been estimated to have blinded one million in both eyes, three to four millions in one eye, and to have gravely injured twenty millions—this out of a population of, say, 400 millions. In the United Kingdom the registered blind were reported as follows:

TABLE I.

Year	England and Wales	Scotland	Total
1919	25,840	—	—
1929	52,727	—	—
1930	56,853	8,516	65,369
1932	62,488	? 10,000	? 72,727
War blind	—	—	2,000

About 8,000 of these blind are also mentally defective, and many are deaf.

There has been an increase, therefore, of 35,000-odd in the registered blind in the last twelve years, while in the year 1929-30 the increase was 4,126, or over eleven a day. The total figure, however, is by no means a true indication of our blind population, for the following groups of persons are largely excluded, and may increase it to 250,000 blind persons.

1. Almost all blind persons of the well-to-do classes.
2. Infants below school age (many die blind).
3. Those who become blind after leaving school at 14 or later, and are not registered until reaching blind pension age at 50. Many of these refuse to be certified, regarding it as rather a disgrace.
4. Those who become blind after 65 and are not registered. They obtain the old-age pension, which is the same in amount as the blind pension—namely, 10s. weekly. This is a very large group, and is likely to grow as the average length of life increases.

5. Those blind persons who are eligible for the blind pension—that is, they are between the ages of 50 and 65—but who do not apply for it because they have never heard about it.

On one random afternoon at hospital recently I saw ten persons who, although blind, were not registered, or not likely to be registered, as matters stand to-day.

The certification of the blind, however, is done in a very haphazard way in this country, and the real causation of blindness is not truly shown, so that the figures in Table II are only approximate. A child, I should explain, is considered blind if it cannot read school books with safety to the eyes; while the criterion for an adult is the capacity to do work for which eyesight is necessary.

TABLE II.—Rough Figures of Causation of Blindness in the United Kingdom*

Cause	Per cent.	Largely avoidable per cent.
Trachoma	2	2
Purulent conjunctivitis	2	1
Ophthalmia neonatorum	5	5
Accident	5	2
Congenital defects	6	6
Senile degeneration	10	—
Glaucoma	10	1
Myopia	14	14
Syphilis	15	10
Senile cataract	15	1
Others... ..	16	2
	100	44

The 44 per cent. in column 2 may represent 70 per cent. of blind years lived. Those blind in one eye may number about one million.

Under 1 Year of Age*

Cause	Per cent.	Category
Accident	2	Neglect
Syphilis	5	Heredity
Purulent conjunctivitis	8	Dirt
Congenital defects... ..	30	Heredity
Ophthalmia neonatorum	50	Dirt
Others	5	—
	100	

(21 per cent. of the blind are blinded in the first year of life.)

A glance at Table II will show that blindness in the more active years of life is very largely avoidable, while much of it is due either to definitely dysgenic births or to the unrestricted production of children in poor or bad circumstances. In this table I have given the groups of the blind and the percentage in each group which could, in my opinion, be greatly reduced by certain preventive measures, since for practical purposes bad genes and certain types of bad environment may be included together as causes of blindness.

Trachoma (2 per cent.).—This disease does not occur in clean households (see China, Egypt, etc.).

Purulent Conjunctivitis (2 per cent.).—This condition rarely occurs in clean households, and in my opinion 1 per cent. is entirely avoidable (only one child in five is born into a clean home in England).

Ophthalmia Neonatorum (5 per cent.).—This disease, due to gonococcal infection at birth, could and should be entirely wiped out by the prevention of unsuitable births.

Accidents (5 per cent.).—A fair number of these occur to infants, a fact which has considerable relevance to the limitation of births. A woman explained in a South London court, for instance, that she was the only person alive and responsible for sixty-eight children (three marriages). There was recently reported a family in Buckinghamshire of thirty-nine children, and one woman, newly married, had nine children in two and a half years (three sets of triplets). How can she manage with a husband earning £3 a week?

Syphilis (15 per cent.).—It is probable that 10 of the 15 per cent. syphilitic blind owe their condition to congenital syphilis, which might be called a "pseudo-heredity" since it never goes beyond the second generation, and which could be entirely eliminated by preventing syphilitic women from having children. Naturally, if a woman has been shown (by the Kahn, Wassermann tests, etc.) to be syphilitic, she should avoid conception at all costs, unless, and until, she has been completely cured. If, however, her condition is not discovered until after conception, the problem becomes more difficult; but treatment during pregnancy will always obtain a non-syphilitic child if the treatment is thorough and commenced about the fourth month. If treatment cannot be thorough the choice is between the birth of a congenital syphilitic and inducing an abortion, and I, for my part—

* Column 1 is modified from Harman, and the other figures are my own estimates.