

## Occasional historical review

# St Paul and temporal lobe epilepsy

D LANDSBOROUGH

Formerly of Chang-hua Christian Hospital, Taiwan

**SUMMARY** Evidence is offered to suggest a neurological origin for Paul's ecstatic visions. Paul's physical state at the time of his conversion is discussed and related to these ecstatic experiences. It is postulated that both were manifestations of temporal lobe epilepsy.

Neurological disease is recorded in the Bible. Examples are grand mal seizures (Luke 9:37-42), aphasia (Luke 1:21-23, 62-65) and concussion (Acts 20:9-12). A tentative diagnosis may be made in the case of subarachnoid haemorrhage (2 Kings 4:17-37), paraplegia (Mark 2:3-12), poliomyelitis (Luke 6:6-11), cerebral palsy (Acts 3:1-8) and hysterical paralysis (Acts 9:33-35). The terrifying aspects of the psychoses (Luke 8:26-39) and of epilepsy were interpreted as manifestations of demoniacal possession. Some of the above conditions are portrayed in stained glass windows on the first floor of the National Hospital, Queen Square, London.

St Paul (Paul of Tarsus), in a letter to the Church in Corinth, describes an ecstatic personal experience in which he felt "caught up to paradise", and mentions other "visions". In relation to these he writes of a "thorn in the flesh", a metaphor for an unpleasant infirmity which periodically racked him. It is postulated that Paul was subject to episodes of temporal lobe epilepsy (TLE) or complex partial seizures, some of which progressed to generalised convulsions. Much has been written about the nature of Paul's illness,<sup>1-10</sup> and many theories propounded. The evidence upon which a diagnosis can be made is meagre, yet the description of his ecstatic experience is perhaps the most important index.

### Material

In his second letter to the church in Corinth about AD 56<sup>11</sup> Paul wrote (The Moffatt Translation of the Bible):—

Address for reprint requests: Dr D Landsborough, 64 Cordrey Gardens, Coulsdon, Surrey CR3 2SQ, UK.

Received 26 November 1985 and in revised form 18 August 1986.  
Accepted 30 August 1986.

*I will go on to visions and revelations ... I know a man ... who fourteen years ago was caught up to the third heaven. In the body or out of the body? That I do not know ... I simply know that in the body or out of the body (God knows which) this man was caught up to paradise and heard sacred secrets which no human lips can repeat. Of an experience like that I am prepared to boast ...*

*My wealth of visions might have puffed me up, so I was given a thorn in the flesh, an angel of Satan to rack me and keep me from being puffed up; three times over I prayed the Lord to relieve me of it, but he told me, "It is enough for you to have my grace: it is in weakness that my power is fully felt". (2 Corinthians 12: 1-9)*

The first paragraph of this extract is written in part in the third person, but Paul is writing about himself.<sup>4,5</sup> It might be concluded that he was writing about a wholly spiritual experience, but the account bears a close resemblance to the psychic and perceptual experience of a temporal lobe seizure, albeit of spiritual significance for Paul. We do not know whether Paul showed any abnormal physical signs. If this was TLE it is very unlikely that there were—"the story is all".<sup>12</sup>

Nothing is known about Paul's past health and family history. He was a Jew, born at the beginning of the first century in Tarsus in the Roman province of Cilicia, and he inherited Roman citizenship. He had his higher education in Jerusalem, was a person of intellectual distinction and became the "first man of letters of the early church".<sup>13</sup> Paul's personality has been variously described. Caird<sup>14</sup> writes "He was a man of immense vitality and determination. At everything he must excel ... The personal sections of his letters reveal a vast capacity for friendship ... He could also be a relentless opponent, and much of his teaching was hammered out in the heat of controversy ... he was able also on occasion to rise above argument and explanation to the region of poetry, content at the limits of human understanding to bow before the mysteries of God". Rieu's assessment:<sup>15</sup> "He was ... a whirlwind of passions. Hate, anger, depression jostle with tenderness, love and hope, and all in extremes".

Supplementary evidence bearing on Paul's health is found

in three places in a letter he wrote to Christians in Galatia, a Roman Province, about AD 53.<sup>11</sup>

*Although it was because of an illness . . . that I preached the gospel to you on my former visit, and although my flesh was a trial to you, you did not scoff at me nor spurn me, you welcomed me like an angel of God . . . (Galatians 4:13–14)*

Paul acknowledges the magnanimity of the Galatians for not rejecting him on account of some humiliating disease which he exhibited on a former visit. To “spurn” or “reject” is the translation of a verb in the original which literally means “to spit out at”, hence “you did not spit out at me”. Epilepsy was sometimes called morbus qui sputatur.<sup>4</sup> Spitting was the superstitious reaction of a witness to an attack of epilepsy—though it was not necessarily specific to that disease.

*I can bear witness that you would have torn out your very eyes, if you could, and given me them. (Galatians 4:15)*

Paul’s statement that the Galatians would have torn out their eyes for him has given rise to the theory that he suffered from severe eye disease.<sup>4</sup> That it is hyperbole, emphasising the sincerity of their charity is more probable.<sup>9</sup>

*See what big letters I make, when I write to you in my own hand! (Galatians 6:11)*

These words may indicate that he had poor visual acuity. Paul employed an amanuensis for most of his letters. Alternatively, he may have so written for the sake of emphasis,<sup>9</sup> and to introduce a personal note into the letter.

A further note on Paul’s physical condition is found in his letter to the Corinthians (2 Corinthians 10:10) where he quotes his opponents’ criticism of him, “Paul’s letters are weighty and strong, but his bodily presence is weak and his speech contemptible” (Barclay<sup>5</sup>). This suggests his physical appearance was unimpressive and he may perhaps have had a speech defect of some kind.

## Discussion

Paul writes, in the first paragraph of the Corinthian extract, of an experience 14 years earlier in which he was “caught up to the third heaven; in the body or out of the body that I do not know” and, again, that he was “caught up to paradise and heard sacred secrets which no lips can repeat”. Tasker agrees with earlier writers that the expression “to the third heaven” is a metaphor conveying the idea of the most sublime condition conceivable.<sup>4</sup> Paul thus describes (a) ecstasy, which he prized and about which he was prepared to boast; (b) a sense of unreality in relation to his body in space; (c) a dreamy state allied to auditory hallucinations which are imperfectly recollected. He does not specify a visual hallucination but it is assumed there was a pervading visual impression, since he introduces the subject by writing of “visions and revelations”.

In this connection Gowers<sup>16</sup> reported a patient with a psychic aura of “the idea of being in heaven”. Williams<sup>17</sup> studied 100 patients who felt an emotion as part of an epileptic experience. There were nine in

whom the aura was pleasurable. Only the more intelligent and educated patients were able to give adequate descriptions of their experience. A woman, aged 41 years, described a sudden feeling of being lifted up, of elation, with satisfaction, a most pleasant feeling, “I am just about to find out knowledge no-one else shares—something to do with the line between life and death”. A man, aged 32 years, said, “I have a sudden feeling of extreme well-being involving all my senses . . . The room assumes vast proportions and I feel as if in another world”. In both examples generalised convulsions supervened. Earl and Trimble<sup>18</sup> treated a patient with clinical and EEG features of TLE with occasional grand mal seizures. Some attacks began with a flash of light seen in both eyes, followed by a psychic state in which the predominant force was one of intense religious experience, of resounding elation in which he would feel compelled to proclaim the glories of God.

Paul’s words “in the body or out of the body—that I do not know” suggest an aura of depersonalisation as described by Williams:<sup>19</sup> the subject “may feel unsubstantial, not there, or dis-embodied. He may say he sees himself outside himself, with a disturbance of the relationship of himself to his environment . . . Paul also “heard sacred secrets which no lips can repeat” suggesting an intensely esoteric, rapturous state associated with an elaborate auditory sensation whose details cannot be recollected. Gowers<sup>20</sup> writes “these psychological auras are often scarcely separable from the higher special sense warnings. The distinct idea of a sentence and perception of its sound may be almost identical in significance”.

In the second paragraph of the extract from Paul’s Corinthian letter he writes of his “wealth of visions”. This might refer to the variety and richness of the one experience, but it seems more likely that he is writing of a number of experiences similar to the one he has already described, experiences so delectable and ecstatic that he was prone to become over-elated and conceited (“puffed-up”). But in close relation to these he describes a disagreeable sequel, a fearful set-back, which he calls a “thorn in the flesh”. The original for “thorn” can also be translated “stake”.<sup>5</sup> This racked him (“buffeted him” in the Authorised Version) suggesting a recurring unpleasant motor disturbance. Much attention has been paid to the question of Paul’s “thorn in the flesh”, rather less to his ecstatic visions. The latter may help to explain the nature of the former. If Paul’s ecstatic visions represented the auras of TLE then it is suggested that his “stake in the flesh” was the supervention (in some instances) of a grand mal seizure. The expression “an angel of Satan to rack me”, qualifying the thorn, is used to denote an agent of physical illness. It is used elsewhere in the Bible (Job 2:7, Luke 13:16). Paul prays many times to

be relieved of his infirmity, but his request is not granted. Paul accepts his infirmity ("weakness"): his spiritual resources make him strong.

The diagnosis of TLE in Paul's case is suggested on the basis of his recorded subjective experience of a single attack (vide supra). Were this an isolated event without recurrences it would be difficult to sustain the diagnosis. But Paul experienced other "visions". His historian Luke writes that in one vision he saw a Macedonian standing before him appealing to him to cross over from Troy to Macedonia to help (Acts 16:9); in another, Jesus speaks words of encouragement to him (Acts 18:9); in another, while praying in Jerusalem, he fell into a trance (Greek: ekstasia) and saw Jesus (Acts 22:17–21). In other writings Paul does not provide details of his "visions and revelations", but it is suggested that some were ictal in origin, and that the one detailed description he gives was not of an isolated event. Others were mental images of his spiritual convictions. Both kinds were of equal spiritual significance for Paul.

If Paul suffered from TLE other questions arise:—

### 1 Length of history

After his conversion, about AD 34,<sup>11</sup> Paul returned to live in Tarsus for the "hidden years" of AD 37–46. Taking the ecstatic vision described above as his first epileptic episode, this would place it 14 years before the writing of his letter that is, about AD 42, when he was 30 or 40 years old. His early history is not available such as whether there was birth injury which might have resulted in Ammon's horn sclerosis (mesial temporal sclerosis) or whether he had febrile convulsions.

### 2 Frequency of attacks

The grand mal component of his epilepsy must have been an infrequent happening. Frequent attacks would have militated against his following a very active life. Tasker<sup>4</sup> writes, "The general impression of Paul ... is of a man with exceptionally strong constitution and remarkable powers of physical endurance. This is not really compatible with the view that he was the constant victim of a severe physical ailment".

### 3 Inter-ictal state

Paul shows no inter-ictal personality disorder such as is sometimes associated with frequent seizures: However, the nature of his personality (vide supra) is consonant with TLE.

Geschwind<sup>21 22</sup> identifies an inter-ictal personality pattern in patients with TLE which, while not abnormal, occurs with a higher frequency in TLE than in other neurological conditions and the general population. This personality structure includes increased concern with philosophical, moral and religious is-

ues; increased and extensive writing on religious or philosophical themes, lengthy letters, diaries, poetry; diminution of sexual activity; aggressiveness.

Paul's personality would seem to bear some resemblance to this description. His epistles are lengthy and detailed. Caird<sup>14</sup> writes, "They are genuine correspondence, written to deal with specific problems in particular churches ... Everything he experienced, everything he taught, was measured against his fundamental belief in God". He had a dynamic, determined personality and was always on the move, always planning.

### 4 Paul's conversion

This took place about AD 34,<sup>11</sup> while he was still using his Hebrew name Saul. While this event on the road to Damascus was of cataclysmic significance to him and profoundly changed the course of his life and of world history, a question arises as to whether there was an ictal component in this experience. Any answer to this question is tentative. The three accounts (Acts 9:1–19, 22:6–13, 26:9–16), written by Luke, though a physician and a close companion of Paul after his conversion, are second hand. There are several discrepancies between them, "as indeed one would expect in an oftentold tale, especially one told to different audiences" (Rieu<sup>15</sup>).

*As he neared Damascus in the course of his journey, suddenly a light from heaven flashed round him; he dropped to the ground and heard a voice saying to him "Saul, Saul, why do you persecute me?" "Who are you?" he asked. "I am Jesus" he said "and you persecute me. Get up and go into the city; there you will be told what you are to do ..."*

*Saul got up from the ground, but though his eyes were open he could see nothing; so they took his hand and led him to Damascus. For three days he remained sightless, and he neither ate nor drank. (Acts 9:3–6, 8, 9)*

After three days he was visited by Ananias, a Damascus Christian, who laid his hands on him and welcomed him:

*In a moment something like scales fell from his eyes, he re-gained his sight, got up and was baptised. Then he took some food and felt strong again. (Acts 9:18, 19)*

The essential points in this story are: (a) Paul was travelling by road to Damascus in order to arrest Christians and bring them to Jerusalem for trial; (b) a sudden bright light flashed around him; (c) he fell to the ground; (d) he heard a voice, the voice of Jesus challenging him and instructing him; he answered; (e) he rose from the ground, completely blind; (f) he remained blind in Damascus for three days, and was unable to eat or drink. The expression "something

like scales fell from his eyes" is probably a metaphor describing a rapid return of vision. Can Paul's first epileptic episode be antedated from the Tarsus period of AD 37–46 to the Damascus road event? Visual hallucination and falling to the ground (albeit with no mention of loss of consciousness) can be accepted as ictal, but the conversation, as recorded, with sequential sentences between Paul and Jesus is too elaborate for TLE. Yet the conversation with Jesus may represent an intensely vivid psychic aura, the nature of which was engendered by Paul's thoughts and growing spiritual conviction during the preceding days. Epileptic experiences can be patterned by pre-existing events, especially emotional ones.<sup>23</sup> (Paul was brought up a devout Pharisee and had become a relentless persecutor of the early Christians. He had watched and taken some responsibility for the murder of Stephen, the first Christian martyr (Acts 7:58–60). He had probably thought deeply, privately, about the faith of the early Christians for some time before starting his journey from Jerusalem to Damascus. Rieu<sup>15</sup> points out that Paul's conversion was not as sudden as is usually supposed.)

Dewhurst and Beard<sup>24</sup> reviewed the literature on the religiosity of the epileptic. ("Religiosity" is an imprecise term: a distinction may be made between normal religious belief and excessive and inappropriate religious expression.) They describe six cases of religious conversion which followed forthwith upon ecstatic religious auras of TLE. Conversion was followed in two cases by paranoid delusions, in one by a schizophreniform state. One patient experienced counter-conversion following a second seizure. Two were converted in the usual sense in which there was a permanent change in their belief and way of life albeit with preoccupation with religion. Amongst the conversion experiences of mystics and saints, "the most controversial diagnosis is associated with the sudden conversion of St Paul . . . Paul had a notorious reputation for the thoroughness with which he hunted down and persecuted Christians". Writers in favour of and against the theory that Paul's conversion was due to epilepsy are quoted, so also are views on the theological and psychiatric aspects of conversion in situations other than epilepsy. Dewhurst and Beard conclude that, regarding patients with TLE, religious conversion does not occur as a direct result of the epileptic discharge; it is facilitated by an alteration in the level of consciousness and aspects of the patient's own religious background. Preceding stress may be a factor.

In what way does Paul's conversion (if it included an epileptic component) contrast with the cases described by Dewhurst and Beard? While "religion was important" in five out of the six patients none were reported to be undergoing a struggle of conviction

before their seizures, as it seems likely Paul was. In one of the three accounts of the Damascus road event (Acts 26:14) Jesus says to Paul "You hurt yourself by kicking at the goad", indicating that Paul had been resisting a growing conviction which was at variance with his hitherto outward pose of ruthless persecution of the early Christians. His conversion was therefore not due to a stark ictal event alone. Again, all six patients displayed, to some extent, some psychotic symptoms after conversion, whereas Paul shows no evidence of psychosis and remained of sound mind and intellectual excellence.

### 5 Post-ictal blindness

If Paul sustained an episode of TLE on the Damascus road, what was the cause of the blindness? Post-ictal blindness is a rare sequela of an epileptic attack. Ashby and Stephenson<sup>25</sup> reported blindness following epileptic seizures in eleven children. In all except one there was complete recovery of sight within days or weeks. Miller<sup>26</sup> described a child who on at least two occasions became blind for 10 to 14 days following a seizure, also an adult who developed a homonymous hemianopia lasting 10 days following a seizure, with complete recovery. Kosnik *et al*<sup>27</sup> reported three cases of post-ictal hemianopia, in one of which blindness preceded the hemianopia. All recovered within 24 hours. Sadeh *et al*<sup>28</sup> reported post-ictal blindness in adults. The summary of their paper reads: "Cortical blindness following grand mal seizures occurred in five adult patients. The causes of seizures included idiopathic epilepsy, vascular accident, brain cyst, acute encephalitis and chronic encephalitis. Blindness was permanent in one patient, but the others all recovered within several days. Since most of the patients were either unaware of or denied their blindness it is possible that this event often goes unrecognised. Cerebral hypoxia is considered the most likely mechanism".

The author has seen a young Taiwanese male adult with idio-pathic epilepsy whose seizures begin with loss of vision, an olfactory aura, and are followed by total blindness lasting from 15 minutes to 7 days.

On the Damascus road Paul may have had an attack of TLE, perhaps ending in a convulsion, which was startling and dramatic. The blindness which followed may have been post-ictal. This event was the climax of a spiritual odyssey which Paul had embarked upon weeks or months earlier.

A differential diagnosis from post-ictal blindness may be made for basilar artery insufficiency, migraine and a blow on the head. In the minor syndromes of basilar insufficiency<sup>29</sup> vertigo is common, so also are drop attacks, nausea, anorexia and visual disturbances, though complete blindness is rare. In Paul's case the onset of symptoms was sudden. Bilat-

eral occlusion of the posterior cerebral artery or its calcarine branch, produces cortical blindness, sometimes with retained tunnel vision. In about a quarter of the cases the blindness is permanent.<sup>30</sup> But Paul was still comparatively young, perhaps about 30 years old, and it would be very unlikely that he had arterial degeneration. Considering the gruelling physical activity in which he was involved during the rest of his life, he is unlikely to have had a cardiac lesion from which emboli would come. Moreover, there are no later episodes recorded which would suggest further attacks of vascular insufficiency. An episode of basilar artery migraine may produce symptoms resembling vertebro-basilar ischaemia, but the onset would be more gradual than in Paul's case, and prolonged neurological sequelae, such as hemianopia from a posterior cerebral artery occlusion, are rare. A prolonged bilateral hemianopic event caused by migraine would seem to be very unlikely. There is no evidence that Paul received an occipital injury which might cause cortical blindness.

#### Other theories

Albert Schweitzer<sup>2</sup> states that Paul, in addition to undergoing hardships and dangers of constant journeyings, imprisonment, stonings, scourgings and beatings (2 Corinthians 11:22–28), was a sick man. He suffered from attacks of some kind, calculated to humiliate him in the eyes of men. "The most natural hypothesis is therefore that Paul suffered from some kind of epileptiform attacks . . . It would agree with this, that on the road to Damascus he hears voices during an attack, and suffers afterwards from a temporary affection of the eyesight, if his experience at his conversion really happened during such an attack". "A rapture into paradise", during which he heard unspeakable words, is thought of by Paul as a special mercy which has been granted to him.

Stern<sup>3</sup> reviews the extensive German literature on the problem of Paul's epilepsy and finds that most writers support this presumptive diagnosis. In his view such a diagnosis is untenable because: (a) it is based upon a single event on the Damascus road, with no record of any further attacks; (b) it is extremely unlikely that a distinct conversation such as Paul is supposed to have had with Jesus would form part of an epileptic aura; (c) "spitting" took place in ancient times in the presence of other unpleasant illnesses besides epilepsy; (d) there is "no evidence of an epileptic equivalent". Stern believes it is more probable that Paul had already struggled through previously, to his conversion to his belief in Jesus, and that the event on the Damascus road was the historically embellished record of the experience of a visionary dreamer, followed by psychogenic blindness cured by suggestion.

Manchester and Manchester<sup>6</sup> postulate that on the

Damascus road the heat and bright sunlight in the desert caused ultra-violet burns of the cornea and infra-red radiation burns of the retina, leaving Paul temporarily blind, but later with permanently impaired vision caused by central scotomata. Bullock<sup>7</sup> suggests six possible causes for Paul's blindness on the Damascus road: vertebro-basilar artery occlusion, occipital contusion, vitreous haemorrhage secondary to a retinal tear, lightning-stroke injury, digitalis poisoning and thermal corneal burn. Levin<sup>8</sup> calls upon an apocryphal description of Paul written in the Second Century ("The Acts of Paul and Thecla") and relates this description to some of the features of dystrophia myotonica, particularly baldness, the facies, muscular dystrophy and cataracts. He postulates Paul suffered from this disease, though the dystrophy was of late onset. At their first sight of him the Galatians might be revolted. Selby<sup>9</sup> cites Ramsay's conjecture<sup>10</sup> that Paul's "thorn in the flesh" was recurring attacks of malaria, contracted in the low lying district of Pamphylia on the Mediterranean coast.

Lennox and Lennox,<sup>1</sup> in writing about *Epileptics of Worth and Fame*, state, "the case of Saul of Tarsus, later St. Paul, is controversial". Tertullian in the second century suggested his thorn in the flesh was headache. Paul had periods of despondency because of some unidentified infirmity, his eyes troubled him and he had a "soul-shaking experience on the Damascus road". The Damascus road experience suggests an emotional reaction to the voice of conscience, possibly complicated by a migraine-like syndrome with syncope, blindness and anorexia.

#### Conclusion

Numerous attempts have been made to identify the nature of Paul's "thorn in the flesh", his possible amblyopia and a physical component in his conversion experience. Not much attention has been paid to the ecstatic vision described in his second letter to the Corinthian church. This experience resembles the pleasurable aura of TLE. Of the other "visions" mentioned in Paul's own writings and in the historical book of Acts, some were probably ictal, others were instances of spiritual conviction. The question of his having permanently defective vision does not appear relevant to the present argument.

While the true state of Paul's health cannot be known, with TLE as a hypothesis for the cause of his ecstatic visions it is suggested that his "thorn in the flesh" was the occasional supervention of grand mal attacks, and that he may have had an attack of TLE on the road to Damascus, followed by post-ictal blindness—this taking place while he was undergoing a profound spiritual change, his conversion to the Christian faith.

I thank Dr CJ Earl, Dr RW Ross Russell, Dr Denis Williams and Rev Boris Anderson for their helpful criticism, and Drs CJ Earl and M Trimble for permission to refer to a patient under their care.

#### References

- 1 Lennox WG, Lennox MA. *Epilepsy and Related Disorders*. London: Churchill, 1960:700–11.
- 2 Schweitzer A. *The Mysticism of Paul the Apostle*. London: Adam & Charles Black, 1967:152–4.
- 3 Stern A. Zum Problem Der Epilepsie Des Paulus. *Psychiat Neurol Basel* 1957;133:276–84.
- 4 Tasker RVG. *The Second Epistle of Paul to the Corinthians—an introduction and commentary*. London: Tyndale Press, 1958:170–9.
- 5 Barclay W. *The Letters to the Corinthians—The Daily Study Bible*. Edinburgh: St Andrew Press, 1975: 255–9.
- 6 Manchester PT, Manchester PT. The blindness of St. Paul. *Arch Ophthalmol* 1972;88:316–21.
- 7 Bullock JD. The blindness of St. Paul. *Ophthalmology* 1978;85:1044–53.
- 8 Levin S. St. Paul's sickness. *Med Proc* 1963;9:264–5.
- 9 Selby DJ. *Towards the Understanding of St. Paul*. Englewood Cliffs NJ: Prentice-Hall, 1962:145–8.
- 10 Ramsay W. *The Church in the Roman Empire*. London: Hodder & Stoughton, 1893:59–68.
- 11 Jewett R. *Dating Paul's Life*. London: SCM Press, 1979:99–104.
- 12 Williams D. The border-land of epilepsy revisited. *Brain* 1975;98:1–12.
- 13 Moffatt J. Introduction. In: *The Moffatt Translation Of The Bible*. London: Hodder & Stoughton, 1935: xxiv–xxvi.
- 14 Caird GB. Paul the Apostle. In: Hastings J, ed. *Dictionary of the Bible 2nd Ed*. Edinburgh: Clark, 1963:731–6.
- 15 Rieu CH. Introduction, Notes. In: *The Acts Of The Apostles*. Translated by Rieu CH. Penguin Classics, 1957:9–39, 133–6, 170–1.
- 16 Gowers WG. *Epilepsy and Other Chronic Convulsive Disorders 1st Ed*. London: William Wood, 1881:49–57.
- 17 Williams D. The structure of emotions reflected in epileptic experiences. *Brain* 1956;79:29–67.
- 18 Earl CJ, Trimble M. Personal Communication.
- 19 Williams D. Temporal Lobe Epilepsy. *Br Med J* 1966; 1:1439–42.
- 20 Gowers WG. *Epilepsy and other Chronic Convulsive Disorders 2nd Ed*. London: Churchill, 1901:72.
- 21 Geschwind N. Behavioural changes in temporal lobe epilepsy. *Psychol Med* 1979;9(2):217–9.
- 22 Geschwind N. Behavioural changes in epilepsy. *Epilepsia* 1983;24 (suppl 1):S23–S30.
- 23 Williams D. Temporal Lobe Syndromes. In: Vinken PJ, Bruyn GW, eds. *Handbook of Clinical Neurology Vol 2:700–24*.
- 24 Dewhurst K, Beard AW. Sudden Religious Conversions in Temporal Lobe Epilepsy. *Br J Psychiatry* 1970;117: 497–507.
- 25 Ashby H, Stephenson S. Acute amaurosis following infantile convulsions. *Lancet* 1903;1:1294–6.
- 26 Miller NR. *Walsh & Hoyt's Clinical Neuro-Ophthalmology*. 4th Ed Vol 1. Baltimore: Williams & Williams, 1982:142–4.
- 27 Kosnik E, Paulson GW, Laguna JF. Postictal Blindness. *Neurology* 1976;26:248–50.
- 28 Sadeh M, Goldhammer Y, Kuritsky A. Postictal blindness in adults. *J Neurol Neurosurg Psychiatry* 1983; 46:566–9.
- 29 Williams D, Wilson TG. The diagnosis of the major and minor syndromes of basilar insufficiency. *Brain* 1962;85:741.
- 30 Symonds CP, MacKenzie I. Bilateral loss of vision from cerebral infarction. *Brain* 1957;80:415–55.