

Memoir of the late Griffith Davies, Esq., F.R.S.; abridged from a more extended one, by his Nephew, THOMAS BARLOW, Esq., of the Metropolitan Life Assurance Society.

MR. GRIFFITH DAVIES was born on the 28th of December, 1788, at the foot of Cilgwyn Mountain, in the parish of Llandwrog, Carnarvon. His father, Owen Davies (or, in Welsh, Owen Dafydd), who was a most industrious and worthy man, held a small tenement, and devoted his spare time to work in the neighbouring slate quarries. His family consisted of four sons and three daughters. A short time previous to the birth of his second child, Griffith, a brother of his died whose name was Gryffyth Dafydd, and out of respect for his memory Mr. Davies was called after him; otherwise he would have been named "Gryffydd Owen," in accordance with the custom of the country, which gives for a surname to the son the Christian name of the father. Mr. Davies, when a child, was exceedingly delicate, so much so that his parents entertained great fears as to whether they would be able to rear him; but his health somewhat improved as he grew to manhood.

The spot on which he was ushered into life was at that time completely isolated. There were no schools of any kind whatever either in the parish of Llandwrog or in any of the parishes adjoin-

ing, and on that account Mr. Davies' father, like most of his neighbours, had never been taught to read in any language; but his mother, who was a delicate woman, possessing nevertheless a large amount of common sense and mental power, had by some means learnt to read the Welsh language tolerably well. The first instruction Mr. Davies ever received was at a Welsh Sunday-school, originated and conducted by a poor man who worked in the slate quarries. This poor fellow met with considerable opposition in this good work from many of the inhabitants, who thought that learning to read was by no means proper employment for Sunday. Mr. Davies, however, as long as he lived, considered himself very much indebted to that worthy man; and by means of this and similar efforts he soon acquired the art of spelling and reading the Welsh language, and also a little writing; but in consequence of his delicate state of health his progress was much retarded.

When about seven years old, a school for teaching English was opened in the adjoining parish, the master of which lodged at a house where an aunt of Griffith Davies was in service. On one occasion this person asked Griffith to perform some little errand for him, and rewarded him with a penny, telling him at the same time to buy a book and come to school. Griffith went home full of joy, and related to his parents all that had passed between him and the schoolmaster; and, the penny book being procured, he was forthwith despatched to school, a distance of two miles across a rough and rugged country, taking with him a little refreshment merely.

At the end of the first week he brought home his penny book, stating that he had learnt it all and that he wanted a spelling-book, which was promptly procured, and he continued in his attendance there for five or six quarters, at the rate of 2s. 6d. per quarter; but, although he was beginning to acquire the art of reading English tolerably well, yet, from the circumstance of all his relations and his associates being exclusively Welsh, he could make but little progress in understanding the meaning of what he read.

Being now between eight and nine years old, Griffith, or Guto as he was called in the country, was taken home from school to render what little assistance he could upon the land held by his father. When about the age of twelve, he was sent to an English day-school established in the parish where he was born; but, owing to the straitened circumstances of his parents and the dearth of provisions, occasioned by the bad harvests of the years 1800 and 1801, he was again taken from school before six months had elapsed, and hired to a distant relation on a neighbouring farm,

to drive horses, assist in manuring and ploughing land, and for similar duties, his wages being at the time his only support.

At the age of fourteen he became permanently engaged in the slate quarries; and, having passed through the usual ordeal of apprenticeship, he in a short time began to earn a man's wages, support himself, and save a little money. By this means, at the age of seventeen he placed himself again in an English day-school at Carnarvon, and at this comparatively advanced age began to learn for the first time the principles of the numeration table. It is worth observing, that although he had manifested considerable acuteness and ingenuity in the manufacture of various articles of ornament and utility, it had never before been discovered that he had a capacity or liking for figures in any way whatever; but in three months' time he was enabled to go through an elementary system of arithmetic, and made considerable progress in spelling, reading, and writing the English language, although the principles of grammar were as yet entirely unknown to him. On his return to the quarry at the expiration of the three months he became fully conscious that he possessed some power which he was before unconscious of, and which was continually becoming developed. Every moment now that he could spare, he might be seen with his iron pen covering some of the slates which he had to manufacture with arithmetical calculations, and no doubt by this means he made considerable progress in acquiring that expertness and dexterity in computations which in afterlife proved so useful to him.

Having now arrived at the age of nineteen, and finding that almost all those who had learnt a little English succeeded in attaining to something higher than mere manual labour, Griffith began to feel a strong inclination to go in search of some employment in England, so as to have an opportunity of improving himself in the language. Determined as he was upon this adventure, his ideas at the time were not by any means exalted: all he seemed to care for was, to have something to do in any part of England by means of which he could maintain himself whilst he made further progress in the English tongue, and then to return to his native country.

Having collected together the little money which he had managed to save, and procured a few letters of recommendation to persons in the metropolis, he sailed from Carnarvon on or about the 6th of September, 1809. The vessel arrived in London on the 15th September, 1809; and Griffith, having no relations or friends in London, was kindly allowed by the master to remain on board

for a few days, and was taken about by him, so as to learn his way, and seek some employment in the great city.

Before Griffith left home, a neighbouring farmer had requested him to carry half a guinea as a present to his nephew, who was at a school at Cambridge Heath, Hackney Road, which errand Griffith willingly undertook to perform; and on his calling at that school he was first introduced to the lady of the house, who, observing his extreme timidity, and that he was but imperfectly acquainted with the English tongue, called a Welshman who was then engaged at the school, to speak to him. His fellow countryman received him kindly, and, learning what his object was, suggested to him that, if he had the means, the best plan would be to place himself at a school—adding, that he had no doubt he would be able to get a situation as an usher at the then ensuing Christmas vacation. Having performed his errand, Griffith adopted this suggestion at once, and lost no time in seeking lodgings and a school on his way to the vessel that very day.

The assistant at Cambridge Heath School advised Griffith to try to improve himself in writing and grammar; but when he went to school, so little was his delight in the one or the other of those studies, that his mind even recoiled from them, and from every subject whatever except arithmetic: and finding the master at this school unable to be of any great assistance to him in that science, he changed to another, and from that to a third school, till at last he met with a man of the name of Westbrook, in Westminster, much of the same disposition as himself, and who acted towards him more as a father than a stranger: he used to assist him in seeking to obtain situations, and even drew up an advertisement for him with that object, suggesting also that he should leave his address at some of the school stationers, stating himself to be in want of employment.

Failing in these endeavours, and seeing no chance of being employed in any intellectual capacity, he fully made up his mind to seek a situation as a porter or messenger, and went about for that purpose; and it is due to him to remark, that he never shunned work of any kind, whether mental or manual. Having been one whole day thus engaged, and being unsuccessful, he returned home quite broken-hearted, not knowing what to do, unless to return to his own country; but on his reaching his lodgings, a ray of light shone upon him in the shape of a letter from a schoolmaster in the neighbourhood of Sadlers' Wells, of the name of Rainalls, requesting that he would call upon him, which he did, and was

engaged as the arithmetical tutor of his school, at a salary of £20 a year, with his board and residence. This was in January, 1810; and as he had nothing else to do but to attend to the arithmetical and mathematical departments, he had a good deal of time at his disposal, which he assiduously devoted to the cultivation of his own mind, especially as regarded English grammar and mathematics, in the latter of which he soon made such proficiency as to be able to calculate the times of the eclipses and exhibit their mode of occurrence by diagrams.

With this gentleman Mr. Davies remained until the summer of 1811, when, some apprentices of the establishment having become capable of undertaking the duties of it, Mr. Davies' services were required no longer. It now having become known that he was about to leave Mr. Rainalls, a Mr. Birt, schoolmaster in the Barbican, informed him that there was a schoolroom vacant, at a very low weekly rent, in James Street, Old Street, and suggested to him the propriety of hiring that room and beginning on his own account. This Mr. Davies ventured upon, and Mr. Birt was obliging enough to let two of his own sons attend there at the commencement, Mr. Rainalls still employing him to give private lessons at his establishment. In order at the same time to prosecute his own studies, he joined the Mathematical Society, whose meetings were held in Crispin Street, Spitalfields; and he was often heard to say, that the extensive library possessed by that Society, and the assistance rendered him by some of its intellectual members, were of incalculable benefit to him.

In the summer of 1812 he ventured upon a good-sized house in Lizard Street, Bartholomew Square, Saint Luke's, and most of his old scholars followed him thither, and in the month of November he thought his prospects justified his taking a wife; but soon after that important step, most of the younger members of his school left him on account of the streets, which were new and unpaved, becoming almost impassable, and during the greater part of that winter his prospects were materially clouded. He did his utmost to maintain himself and wife by correcting the press of a Welsh magazine then published; and about this time he also commenced writing his *Key to Bonnycastle's Trigonometry*. In the month of October, 1813, his first child, a daughter, was born—his joy for which event was no doubt greatly alloyed, in his then straitened circumstances, by his consciousness of the increased responsibility which it involved.

It was to the first edition of Bonnycastle's *Trigonometry* that

Mr. Davies originally wrote his *Key*, and which contained in particular one extremely difficult problem he had for a long time laboured to solve, seeking the assistance of a celebrated writer in the *Lady's Diary*, who after several weeks of trial did not seem to be more successful than himself; but at last Mr. Davies, with unwearied application, devised some mechanical means to assist his conception, and succeeded in solving the problem. Unfortunately, however, as he was about to put the *Key* to press, a second edition of the work appeared, in which the problem in question had been omitted, and a number of other alterations made—and this, of course, rendered it necessary for him to write the *Key* afresh; but so poor was he at the time, that he had not a sufficient sum of money to buy himself a copy of the second edition, and he was actually obliged to take some books from his then scanty library, which were almost equally indispensable to him, to a bookseller's shop, in exchange for a copy of the new edition. In spite of all difficulties, the *Key* to the Trigonometry came through the press in the summer of 1814.

Although the publication of this work was of but little pecuniary advantage to him, still it answered the purpose well, in bringing his name before the public and establishing his character as a mathematician. Soon after this he began to receive private pupils; and amongst the first of these was a gentleman connected with an Assurance Office, who, being desirous of studying the theory of life assurance, was recommended by a Mr. Crossley, the then President of the Mathematical Society, to Mr. Davies, as a person likely to be able to give him instruction. This was at a time when Mr. Davies had no knowledge whatever, either theoretical or practical, of the subject of life assurance; but he set his pupil to learn algebra, whilst he procured the necessary books and prepared himself to give lessons on life annuities and assurances; and by the time the pupil had gone through a limited course of pure mathematics, more particularly algebraical equations, the master was quite conversant with the subject of annuities and assurances, having concentrated his whole force for a time on that one point. This is the simple account of the circumstances which led Mr. Davies to a study which it is well known ever afterwards chiefly occupied his attention. This gentleman, being much pleased with Mr. Davies's teaching, introduced a second pupil, and he a third, and so on, several of whom became very useful and influential men in society, and continued, during their lives, on the most friendly terms with Mr. Davies. Amongst others whom he had the honour of teaching was the

celebrated Sir John Franklin, who, after many years of service at sea, came to him to perfect himself in some of the higher branches of the science of navigation. Mr. Davies entertained the most profound regard for that eminent navigator; and in conversation, whenever the melancholy loss of Sir John Franklin was alluded to, would invariably speak of him as one of the most unassuming and gentlemanly men that he had ever met with.

Mr. Davies' prospects now beginning to brighten a little, receiving many pupils, both public and private, he, in the summer of 1815, removed to Bartholomew Square, and for the first time arranged to have his school elsewhere. In 1816 he removed to Cannon Street, where he opened a more select school, for a limited number of pupils, chiefly in mathematics, and during his half holidays he engaged himself in giving lessons to several of the scholars of the Merchant Tailors' School. He received an offer of payment for the whole year, on condition that he would keep himself free to give lessons during college vacation only.

Amongst others, he now began to teach gentlemen holding the appointment of actuaries to Life Offices, and even made calculations for some of those institutions; and as he had, by means of study and tuition, become somewhat familiar with the theory and practice of life assurance, he was encouraged to aim at becoming himself an actuary; but he found it difficult to get anyone to recommend him; and feeling this, he introduced himself to the late venerable William Morgan, of the Equitable Life Assurance Society, stating his intention of becoming a candidate for the situation of an actuary, and requesting that Mr. Morgan would be good enough to examine him on such subjects as an actuary of a Life Office ought to be familiar with, and would favour him with a written opinion as to his acquirements. Mr. Morgan received him most courteously; he did not formally examine him, but elicited from him sufficient to enable him to furnish the required certificate. Mr. Davies was, however, unsuccessful in his first application to become connected with an Assurance Office.

In December, 1819, he was advised to submit to the Society of Arts a sundial of a peculiar kind, engraved on slate by him some years previously, which dial showed the following particulars:—

1. The hour of the day in London.
2. The hour of the day at Pekin.
3. The sun's place in the ecliptic, and the curves traced out by the shadow of the summit of the gnomon at the entrance of the sun into each of the twelve signs of the zodiac.

4. The day of the month.
5. The sun's declination.
6. The time of the sun's rising.
7. The time of the sun's setting.
8. The length of the day.
9. The time from the sun's rising.
10. The sun's altitude.
11. The sun's azimuth.
12. The equation of time to mean noon.
13. The day and hour when the sun is vertical at several places situated between the tropics.

14. The proportional quantity of solar rays falling obliquely on a given surface, as compared with the quantity falling vertically on a like portion of surface.

Of the construction of this dial, a full description will be found, with plates, in the *Transactions of the Society of Arts* for the year 1820, in the summer of which Mr. Davies had the honour of receiving the large silver medal of that Society, through the hands of its then President, the Duke of Sussex.

About the beginning of the year 1821, Mr. Davies, having been engaged to give lessons to a gentleman connected with a certain Life Assurance Office, but who was preparing to become one of the principal officers of another, then about to be formed under the name of the "Guardian Assurance Company," was invited to attend to give his advice and assistance to the projectors of the proposed Company at their preliminary meetings, to discuss and decide upon the nature of its constitution. He was also engaged to construct the requisite tables; and at the close of the same year the Company was fairly established at its present well known house in Lombard Street. Not long after this, he was appointed consulting actuary to that Company; and about the same time he obtained the appointment of actuary to a Company then being established by Sir George Stevens, for the purpose of purchasing reversionary property—a branch of business which, up to that period, had been confined chiefly to individuals. For this Company he constructed most elaborate and useful tables, concerning which more perhaps will be said on future occasions. But in passing, it may be useful to glance at one paragraph of the first of the valuable reports which he made to that Company, dated August, 1823, as it refers to a subject which must be full of interest to all, viz., the gradual diminution of mortality in this country, and shows that Dr. Farr does not stand alone in the opinion which he has

from time to time expressed as to the Northampton Table of Mortality:—

“By laborious investigations, I have ascertained, upon indubitable evidence (which I could not think it prudent at present to disclose, as it is my intention to publish a work on the subject at the earliest opportunity), that a gradual diminution has taken place in the mortality among the inhabitants of this country throughout the last 100 years; and that, taking all ages together, out of the same population, that

106 persons died annually from 1720 to 1730									
Only	104	”	”	”	”	1730	”	1740	
”	92	”	”	”	”	1740	”	1750	
”	85	”	”	”	”	1750	”	1760	
”	84	”	”	”	”	1760	”	1770	
”	86	”	”	”	”	1770	”	1780	
”	79	”	”	”	”	1780	”	1790	
”	75	”	”	”	”	1790	”	1800	
”	70	”	”	”	”	1800	”	1805	
”	66	”	”	”	”	1805	”	1810	
”	61	”	”	”	”	1810	”	1815	
and	62	”	”	”	”	1815	”	1820	

Supposing therefore, the Northampton Table to have been a correct index of human life at the time it was formed (from 1735 to 1780), it follows as a necessary consequence that it cannot at present be looked upon as giving anything like the real duration of British lives.”

At the close of the year 1823, in consequence of the unprecedented success of the *Guardian*, Mr. Davies was appointed the regular and permanent actuary to that Company; an appointment which he honourably held for nearly a third of a century.

Towards the close of the year 1825 Mr. Davies casually heard that the celebrated Mr. Charles Babbage was conducting through the press a work on life annuities, containing a table of mortality deduced from the experience of the *Equitable*; and as he considered a table, deduced by himself from the same source, one of the leading features of his own work, which he had no prospect of completing for some time, he immediately had an extra number of the tables comprised in his intended work printed off, to which he prefixed a few pages of practical examples, and a short explanation of his new columnar method of computing the values of annuities and assurances, which he considered both an improvement and an extension of Barrett's method, and published them in the shape of a tract on life contingencies, in the winter of 1825-6, before Mr. Babbage's work made its appearance.

His reputation had now become established as an actuary, and references were made to him from various Assurance and Annuity

Societies in England, Scotland, Ireland, America, and the continent of Europe. In 1829 the Honourable Court of Directors of the East India Company, wishing to have the state of the Bombay Military Fund investigated and reported on, submitted the whole documents concerning it to the attention of Mr. Davies, who made elaborate investigations into its present state and future prospects; and from this period up to about the year 1851 he had, it may be said, constantly under his attention the affairs of some one of the Indian funds. He wrote not less than nine reports on the funds in Bombay, six on those in Madras, and five on those established in Bengal, each of such reports containing extensive tables, grounded on an investigation into the contingencies of life, death, marriage, and fecundity found to prevail in them. He was also engaged from time to time for the Bank of England.

In the year 1831 Mr. Benjamin Gompertz, formerly of the Alliance Life Assurance Society, who had been Mr. Davies' rival candidate for three several appointments as actuary, invited Mr. Davies to accompany him to a meeting of the Royal Society, of which Mr. Gompertz had been a respected member for many years; and soon after, on the personal recommendation of Mr. Gompertz, Mr. Davies was elected a Fellow of that honourable Society. Mr. Davies, in afterlife, used to speak in the most unqualified terms of the generous disposition and kindness of Mr. Gompertz towards him—the more remarkable, after the rivalry which had so frequently occurred between them.

Mr. Davies' knowledge of languages was but limited. He knew his native tongue (the Welsh) well, as it had been the only medium by which he could convey his thoughts to others until he had nearly attained the age of manhood; and not only was he a fluent speaker in that language to the day of his death, but had also studied it grammatically, and had lectured and written on various subjects in it; and although he had but a very slight acquaintance with Latin, and had not had the advantage of knowing Greek, French, or German, still he had, without doubt, made himself, in spite of all difficulties, a good English scholar; and so much had he exercised that language as an instrument to communicate his thoughts, that he could use it with remarkable success. He had a great horror of verbosity, as he knew from experience how easy it is to encumber a train of thought with a multiplicity of words. He had also the same feeling with regard to the language of notation, his aim always being to simplify it as much as possible. He could not bear to have many letters in his formulæ: "they are fatiguing

to the mind," he would say, "and sometimes calculated to mislead."

Mr. Davies was a man of very deeply religious feelings from his youth, and he became still more impressed with a sense of religion on his arrival in the metropolis. He endeavoured to make every worldly pursuit subordinate to that of his eternal welfare. For many years he was a faithful member, and one of the principal supporters, of a chapel in Jewin Street, Cripplegate, belonging to a body of Dissenters called the "Welsh Calvinistic Methodists," the service being performed in the Welsh language, and the tenets very similar to those of the Established Church of England. Mr. Davies, for several years before his death, had absented himself from all society; when in a state of health able to leave the house, the only two places he frequented were his office and his chapel: and the Bible had at that time become his almost exclusive study.

He rendered considerable assistance to his family, and supported his parents for many years—more particularly his father, who lived to the age of 93, and died on the 21st March, 1854, exactly one year prior to his own decease.

Mr. Davies was married twice—the first time in 1812, to an English person, to whose memory it is due to remark that she never murmured at his poverty or want of success; but, on the contrary, devised every possible means to keep up his spirits under their pressure. She died in the year 1836, when Mr. Davies had removed to Palmer Terrace, and was living in very different circumstances from those in which he had commenced his career with her. They had four daughters, of whom the youngest only survived to the age of maturity, and who is now married to a respectable solicitor. The loss of his three children and his beloved wife was a severe trial to him.

He married, the second time, in the year 1841, a widow lady, a native of Wales, who, from her quiet and domesticated habits, was a very suitable partner for him in his less active days. They had one child, a son, who is now grown up to be an intelligent youth, bearing his father's name.

In the winter of 1847 Mr. Davies was afflicted with a severe influenza, which fixed on his lungs a chronic bronchitis, from which he suffered during the remainder of his days. In February, 1853, he had another severe attack of bronchitis, which confined him to his room for several weeks together, but which he gradually recovered from for a time.

On the evening of the 5th December, 1854, after being en-

gaged for several hours in a conversation of a nature tending rather to excite him, he had a paralytic stroke, which was followed by all the consequences of such an attack; and he gradually sank until he died, on the 21st March, 1855, after several weeks of intense suffering. The able medical men who attended him during his illness, and performed a post-mortem examination, reported that he died from the combined effects of bronchitis and paralysis. It may be interesting to the phrenologist to know that both physician and surgeons gave evidence that his brain, though not very large, was one of the most compact and healthy they had ever seen.

Thus ended a career which will be ever memorable as connected with the mathematics of life assurance, and which affords another remarkable instance of the successful pursuit of knowledge under difficulties and disadvantages of no ordinary description. For those who are in the habit of consulting the pages of this *Journal*, the events here recorded will scarcely fail to possess some interest; nor will probably the general reader regard with entire indifference the circumstances of a life distinguished, as was that of the subject of this memoir, by so signal a triumph over the early "encumbrances of fortune."
