

数学名人漫记系列

Mathematicians Born
in Scotland

苏格兰

杜飞 何娟 / 编

英文版

数学家

(一)



远方出版社

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前 言

入世后,我国经济和社会发展与世界接轨的进程加快,需要大量的国际化的复合型人才。为迎接入世挑战,培养出更多的国际化的复合型人才,进一步深化素质教育,我国实施了新一轮的中小学课程改革。

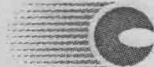
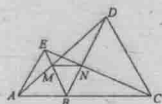
在此改革中,“双语教学”已成为外语教学改革中一道亮丽的风景线。当前,我国大中城市的部分高校及中小学、一些境外来华办学机构以及有些民办学校已在实施“双语教学”。“双语教学”已成为教育界的热门话题,并呈现出良好的发展前景。

为顺应“双语教学”的新潮流和大趋势,我们出版了《数学名人漫记系列》,本丛书介绍了苏格兰数学家、爱尔兰数学家、奥地利数学家、比利时数学家、荷兰数学家、希腊数学家、匈牙利数学家、意大利数学家,他们的伟大成就吸引着我们,激励着我们去学习、去拼搏。与此同时,

还可以使您漫步在英语翠林中,轻松领略数学家们的才华,并且使您真正提高阅读能力、巩固和扩大英语词汇量、增强使用英语的自信心。

本丛书在选编过程中由于涉及面广,时间仓促,有误之处,敬请广大读者朋友们热忱对此书提出批评和建议,以便今后修订完善。

编 者

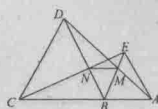


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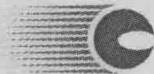
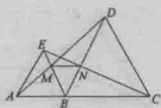
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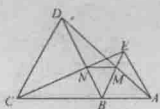
William Davidson Niven

Born: 1843 in Peterhead, Scotland

Died: 29 May 1917 in Sidcup, Kent, England



William Niven was one of three distinguished mathematical brothers. He graduated from the University of Aberdeen in Scotland which was his local university as Peterhead is not far from Aberdeen. From there, as was the tradition of the Scottish Universities at that time, Niven went to study at the University of Cambridge.



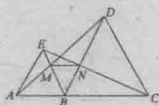
At Cambridge Niven studied mathematics at Trinity College, where he graduated as third Wrangler in 1866. The following year he was elected to a fellowship at Trinity College.

Niven left Cambridge to take up an appointment as professor at Woolwich. There he worked on gunnery and ballistics. However the attraction of Cambridge was great and he returned there becoming a firm friend of Maxwell.

After Maxwell's death, Niven helped to edit the second edition of Maxwell's Electricity and Magnetism. Inspired by Maxwell and his mathematics, Niven turned increasingly towards the study of spherical and ellipsoidal harmonics.

In 1882 Niven was appointed to a chair at the Royal Naval College in Greenwich. In the same year he was honoured by being elected a Fellow of the Royal Society.

Niven was an active member and staunch supporter of the London Mathematical Society and he served as its President from 1908 until 1910.



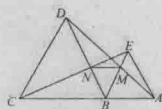
John Playfair

Born: 10 March 1748 in Benvie (near Dundee), Scotland

Died: 20 July 1819 in Burntisland, Fife, Scotland



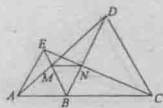
John Playfair was the eldest son of the Reverend James Playfair, minister of Benvie, a small town near Dundee (then in Perthshire, now in Tayside), Scotland. He was educated by his father at home until the age of fourteen, when he was sent to the University of St Andrews to study for a general degree with the aim of entering the Church. Playfair



was awarded a scholarship to the University in 1762, and there his aptitude and keenness to study gained him both the respect and friendship of his professors. His progress in the mathematical sciences was so rapid that the professor of natural philosophy (physics was still called natural philosophy in St Andrews when I [EFR] studied it in the 1960s), Professor Wilkie, when suffering from an illness, found him to be the person best qualified to deliver his lectures on natural philosophy. Playfair graduated from the University of St Andrews with an M.A. in 1765.

In 1766, while still only eighteen, Playfair entered a contest for the Chair of Mathematics at Marischal College in Aberdeen. In this contest, which lasted eleven days, he distinguished himself and gained great recognition. The extent of mathematical knowledge required to be successful in such a contest was immense. Playfair was unsuccessful, however, finishing third out of the six candidates, behind the Reverend Dr Trail, who was appointed to the Chair, and Dr Hamilton, who succeeded him in the Chair. However Playfair, at a very young age, had proved his extraordinary talent combined with his comprehensive knowledge of mathematics.

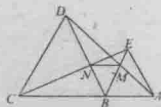
Going on to study divinity at the University of St An-



draws, Playfair undertook his theological studies at St Mary's College, St Andrews. On completion of his studies in 1769, he left the University, and from then on spent much of his time until 1773 in Edinburgh. There he mixed with the luminaries of the Scottish Enlightenment (see [2]); which included such great scholars as Dugald Stewart the mathematician (son of Matthew Stewart), Adam Smith the economist, Joseph Black the chemist, James Hutton the geologist, Robert Adam the architect and engineer, and Principal Robinson the historian.

During the period between 1769 and 1773, Playfair had twice attempted to obtain an academic post. His first attempt was in 1769 but it was unsuccessful. He continued, however, in his vocation as a minister and was licensed to preach by Dundee Presbytery in 1770. In 1772 Playfair applied for the Chair of Natural Philosophy in the University of St Andrews, which was left vacant after the death of his friend Wilkie but again another candidate was appointed. Having failed to obtain an academic post Playfair returned to Edinburgh where he remained until his father's death in 1772.

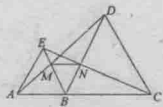
Playfair was nominated by Lord Gray to succeed his father as the Parish Minister of Liff and Benvie and he moved



to Liff to supervise the education of his brothers and sisters. Almost a year had elapsed, however, before his nomination was confirmed, as Lord Gray's rights of presentation were disputed by the Crown of Lawyers. The case went before the Court of Session and, in August 1773, Playfair received confirmation by a resolution of the General Assembly of the Church. He was then ordained the Minister of Liff and Ben-
vie in succession to his father.

During this period Playfair did not neglect his own academic studies, and beside making occasional visits to Edinburgh, he made an excursion in 1774 to Schiehallion, Perthshire, to conduct experiments with Neville Maskelyne, the Astronomer Royal. They became lifelong friends and Maskelyne introduced him to the leading scientific men of the day. He persuaded Playfair to submit his first successful paper on mathematics to the Royal Society of London and this was published in the Philosophical Transactions in 1779. This first mathematical paper by Playfair On the Arithmetic of Impossible Quantities, has been described as exhibiting [11]: -

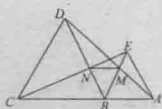
... a greater taste for purely analytical investigation than shown by any of the British mathematicians of that age.



Playfair became Moderator of the Synod but soon after this he received, in 1782, a lucrative offer to resign his church position and to become the tutor to the two sons of Ferguson of Raith. He tutored Ronald Ferguson and his brother from 1782 until 1787. This involved moving closer to Edinburgh, and he was thus able to participate in the city's intellectual life. Playfair became involved in the establishment of the Royal Society of Edinburgh in 1783 and was one of the original Fellows of that Society. During a vacation he made his first visit to London, where Maskelyne introduced him to the scientific world.

In 1785 Playfair was appointed Joint Professor of Mathematics in the University of Edinburgh, a position which he was to hold for twenty years. Two years later, after completing his tutoring duties for the Ferguson's, he moved to Edinburgh, joining his mother and sisters, who had for some years been resident in Edinburgh. From 1787 Playfair published on various topics in the Transactions of the Royal Society of Edinburgh and also contributed to the Edinburgh Review.

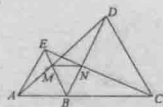
In 1793 Playfair's brother James, who was established in London as an architect, died suddenly. Playfair interrupted



his studies to make the family's arrangements. In the following year, he adopted James's eldest son, William Henry Playfair, then only six years of age. William would follow in his father's footsteps and also become an renowned architect.

In the eighteenth century geometry was systematically studied from Euclid's Elements in the universities, while the schools were generally content to accept the theorems and constructions without proof. However, mathematicians began to demand more rigour with the growing interest in analytic investigation. In 1795 Playfair published an edition of the Elements which he intended for use by his students. The main innovation was Playfair's use of algebraic notation to abbreviate the proofs which he taught in his class. This was intended to avoid the "tediousness and circumlocution" of geometric theory.

The difficulties encountered by those who studied the Elements in the eighteenth century centred around two problems. Firstly, there was the contentious "parallel" postulate. The second problem was Euclid's theory of proportion, derived from Eudoxus. Robert Simson of Glasgow University had, in his 1756 edition of the Elements, given a proof of the parallel axiom based on another assumption. Playfair solved

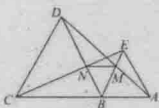


this difficulty in 1795 with Playfair's Axiom, his alternative to Euclid's parallel axiom: -

Given a line and a point not on the line, it is possible to draw exactly one line through the given point parallel to the line.

This form of axiom was certainly not new as it had already been given in the fifth century by Proclus. It is curious that Playfair's name should be associated with this axiom, particularly since he clearly points out that he derived the axiom from Proclus.

Playfair standardised the notation for points and sides of figures in the first six books of his edition of Euclid. To these books, which specifically deal with plane geometry, Playfair added three more books intended to supplement the preceding six; On the Quadrature of the Circle and the Geometry of Solids, Elements of Plane and Spherical Trigonometry and The Arithmetic of Sines. He also included a section of notes in the form of an appendix, which gave his reasons for the alterations made throughout the volumes, and an illuminating discussion on the difficult topic of parallel lines. The fact that it ran to six editions shows the popularity of Playfair's edition of Euclid. The author of [14] claims that: -



... *Playfair's intervention saved Euclid for a hundred years from its inevitable fate!*

Playfair suffered a severe attack of rheumatism, during the early part of 1797. This did not prevent him writing however, and during this time he wrote *An Analytical Treatise on the Conic Sections*, and an *Essay on the Accidental Discoveries Which Have Been Made By Men of Science, Whilst In Pursuit of Something Else, Or When They Had No Determinate Object in View*.

The death of his friend, James Hutton, moved Playfair to compose a biographical memoir, which gradually became a reply to the critics of Hutton's theories of geology. This in turn gave rise to Playfair's geological work *Illustrations of the Huttonian Theory of the Earth*. Playfair presented Hutton's theories in a different style from Hutton's original presentation. Hutton had a rather peculiar style of presentation which made his theory less intelligible and, as a result, he had received less acclaim than he deserved. It was a style which led to many erroneous misrepresentations and to attacks from the few who had read it. Playfair's simple and eloquent style consisted of a series of chapters clearly stating the Huttonian theory, giving the facts to support it, and the