



蔡天新 / 文 Robert Berold, Gu Ye / 译

数学家和诗人都是作为先知先觉的预言家存在我们的世界上。只不过诗人由于天性孤傲被认为狂妄自大，而数学家由于超凡脱俗为人们敬而远之。因此在文学艺术团体里诗人往往受制于小说家，正如在科学技术协会里物理学家领导数学家一样。但这只是表面现象。

“我做不了诗人”，晚年的威廉·福克纳彬彬有礼地承认，“或许每一位长篇小说家最初都想写诗，发觉自己写不来，就尝试写短篇小说，这是除诗以外要求最高的艺术形式。再写不成的话，只有写长篇小说了。”相比之下，物理学家并不那么谦虚，但无论如何，对每一个物理学家来说，物理认识的增长总是受到数学直觉和经验观察的双重指导。物理学家的艺术就是选择他的材料并用来为自然规划一幅蓝图，在这个过程中，数学直觉是不可或缺的。一个不争的事实是，数学家改行搞物理学，计算机或经济学，就像诗人转而写小说，随笔或剧本一样相对容易。

数学通常被认为是与诗歌绝对相反的，这一点并不完全正确，可是无可否认，它有这种倾向。数学家的工作是发现，而诗人的工作是创造。画家德加有时也写十四行诗，有一次他和诗人马拉美谈话时诉苦说，他发现写作很难，

Mathematicians and poets exist in our world as uncanny prophets. The difference between them is that poets are thought to be arrogant because they tend to be proud and lonely by nature, while mathematicians are thought to be unapproachable because they exist on a transcendent plane. Thus in art and literary circles poets are often considered to be socially inferior to novelists in the same way that mathematicians are considered socially inferior to physicists in scientific and technological associations. But these things are only superficial.

“I'm a failed poet,” the novelist William Faulkner said humbly in his later years. “Maybe every novelist wants to write poetry first, finds he can't and then tries the short story which is the most demanding form after poetry. And failing at that, only then does he take up novel writing.” Physicists, by comparison, are not so modest. Nevertheless, for a physicist every increase in knowledge of physics is always guided in two ways, by mathematical intuition and empirical observation. The art of physics is to design experiments in order to derive the laws of nature. In this process mathematical intuition is indispensable. In fact it is easy for mathematicians to switch to studying



数学之桥，相传牛顿设计，剑桥皇后学院（蔡天新摄）

尽管他有许多概念，实际上是概念过剩。马拉美回答：诗是词的产物，而不是概念的产物。另一方面，数学家主要搞概念，即把一定类型的概念组合起来。换句话说，数学家运用了抽象的思维，而诗人的思维方式较为形象，但这同样不是绝对的。

数学和诗歌都是想象的产物。对一位纯粹数学家来说，他面临的材料好像是花边，好像是一棵树的叶子，好像是一片青草地或一个人脸上的明暗变化。也就是说，被柏拉图斥为“诗人的狂热”的“灵感”对数学家一样的重要。举例来说，当歌德听到耶路撒冷自杀的消息时，仿佛突然间见到一道光在眼前闪过，立刻他就把《少年维特之烦恼》一书的纲要想好，他回忆说：“这部小册子好像是在无意识中写成的。”而当“数学王子”高斯解决了一个困扰他多年的问题（高斯和符号）之后写信给友人说：“最后只是几

physics, computer science or economics, just as it is for poets to turn to writing novels, essays or plays. Of course there are exceptions.

Mathematics is usually seen as the diametric opposite of poetry, although there are exceptions here too.. Although the opposition is not always true, yet it stands there basically undeniable. Mathematicians work to discover, while poets work to create. The painter Degas occasionally wrote sonnets, and once complained to the poet Mallarmé. He said that he had many ideas, in fact too many, he found it difficult to write. Mallarmé replied, “poems are made not with ideas but with words.” On the other hand, mathematicians, work mainly on concepts, combining concepts of the same kind. In other words, mathematicians think in an abstract way, while poets think in a concrete way. But again this is not always the case.



牛顿的苹果树，剑桥三一学院（蔡天新 摄）

天以前，成功了（我想说，不是由于我苦苦的探索，而是由于上帝的恩惠），就像是闪电轰击的一刹那，这个谜解开了；我以前的知识，我最后一次尝试的方法以及成功的原因，这三者究竟是如何联系起来的，我自己也未能理出头绪来。”

数学虽然经常以与天文、物理及其它自然科学分支相互联系、相互作用的方式出现。但从本质上说，它是一个完全自成体系的（对它本身来说又是极为宽广的）、最具有真实性的知识领域。这一点正如真正的文字语言，它不仅用来记载和表达思想及思维过程，并且反过来（通过诗人和文学家）又把它们创造出来。可以说数学和诗歌是人类最自由的智力活动。匈牙利数学家保尔·图拉认为：数学是一座坚固的堡垒。这应验了福克纳的话：人只要有向往自由的意志，就不会被毁灭。

Both mathematics and poetry are products of imagination. For a pure mathematician, his or her materials are like lacework, leaves on a tree, a patch of grass or the light and shade on a person's face. In other words, "inspiration", which Plato denounced as "a mania of poets," is equally important to mathematicians. For example, Goethe fancied that he saw a flash of light when he heard of his friend Jerusalem's suicide. He immediately came up with the outline of *The Sorrows of Young Werther*. He recalled that he "seemed to have written the book unconsciously." Another example: Gauss, 'the prince of mathematics' wrote to tell a friend after solving a problem (symbols of Gaussian summation) which had been bothering him for years, "Finally, two days ago, I succeeded – not on account of my hard efforts, but by the grace of the Lord. Like a sudden flash of lightning, the riddle was solved. I am unable to say what the conducting thread was that connected what I previously knew with what made my success possible."

Mathematics often appears to be connected to and interactive with astronomy, physics and other branches of natural science, but it is a completely self-referential and vast field of knowledge with a reality more enduring than other sciences. It is like a true language, which not only records and expresses ideas and the process of thinking, but also creates itself through poets and writers. It could be said that mathematics and poetry are the freest intellectual activities of human beings. The Hungarian mathematician Paul Turán maintained that "Our mathematics is a strong fortress." His words correspond to Faulkner's "People will never be destroyed as long as they yearn for freedom", when he talks about creative writing.

Through years of study and practice, I have come to believe that the process of mathematical research is more or less an exercise or an appreciation of intelligence. This is perhaps one of the main reasons for its great charm. I fully understand what the philosopher George Santayana said in his later years, "If my teachers had begun by telling me that mathematics was pure play with presuppositions, and wholly in the air, I might have become a good mathematician, because I am happy enough in the realm of essence." Of course, I cannot rule out the possibility that a great thinker can yield to the intellectual fashions of his times as a man or a woman can do to fashions in dress.

Compared with other disciplines, mathematics is often an undertaking for the younger. The Fields Medal, the most renowned mathematical prize, goes only to mathematicians under forty. Riemann died at forty, Pascal at thirty-nine, Ramanujan at thirty-three, Eisenstein at twenty-nine, Abel at



高斯出生的房子，不伦瑞克(蔡天新摄)



哥廷根的高斯饭店(蔡天新摄)

通过多年的研究实践，我认为数学研究的过程或多或少是一种智力的锤炼和欣赏的过程，这或许是数学研究之所以有如此吸引力的一个重要原因。我非常能够理解哲学家乔治·桑塔耶纳晚年说过的一席话：“如果我的老师们真的曾在当初就告诉我，数学是一种摆弄假设的纯粹游戏，并且是完全悬在空中的，我倒可能已经成为优秀的数学家了。因为我在本质王国里感到十分幸福。”当然，在此我不能排除伟大的思想家追求时代智力风尚，就如同妇女在服饰上赶时髦一样。

与任何其它学科相比，数学更加是年轻人的事业。最著名的数学奖——菲尔兹奖是专门奖给四十岁以下的数学家的。黎曼死于40岁，帕斯卡尔死于39岁，拉曼纽扬死于33岁，艾森斯坦死于29岁，阿贝尔死于27岁，伽罗华死于20岁，而他们作为伟大数学家的地位却已经奠定。有些数学家虽然长寿，但他们的主要工作大多是在青年时代完成的，例如牛顿和高斯。另一方面，我们可以开列一长串早逝的诗人名单：普希金、洛尔迦和阿波利奈尔死于38岁，兰波死于37岁，王尔德死于34岁，马雅可夫斯基死于32岁，普拉斯死于31岁，雪莱和叶塞宁死于30岁，诺瓦利斯死于29岁，济慈和裴多菲死于26岁^[注1]，洛特雷阿蒙死于24岁。而以绘画为例，高更、卢梭和康定斯基都是三十岁以后才开始艺术生涯的。因此，我们有理由认为，在科学、艺术领域里，数学家和诗人是最需要天才的。不同的是，对诗人来说，一代人要推倒另一代人所修筑的东西。而对数学家来说，

twenty-seven, and Galois at twenty; by the time they died they had all left their deep traces on the history of mathematics. Some mathematicians, such as Newton and Gauss, lived long lives, but they completed their major work in their youth. Of course there are exceptions here too.

Likewise we can draw up a long list of poets who died young: Pushkin, Lorca and Apollinaire died at thirty-eight, Rimbaud at thirty-seven, Wilde at thirty-four, Mayakovsky at thirty-two, Plath at thirty-one, Shelley and Yesenin at thirty, Novalis at twenty-nine, Keats and Petofi at twenty-six, and Lautréamont at twenty-four. Whereas if we look at painting, Gauguin, Rousseau and Kandinsky began their artistic careers after they turned thirty. Thus more often than other servants of creation, poets and mathematicians tend to burn up the flower of their talent in the midst of the youth. Poets may destroy the shapes common to the forms of their predecessors, in order to renew the form and language; mathematicians may be, by the nature of their industry, more prone to continuity. Again, there are exceptions.

The language of poets is renowned for its conciseness. Ezra Pound is praised as a master of the concise; no one seems to do better than him in this regard. But the language of mathematicians is also noted for its conciseness. The British writer Jerome K. Jerome gave an example, as follows:

When a twelfth-century youth fell in love he did not take three paces backward, gaze into her eyes, and tell her she was too