放眼世界的数学星空

Mathematicians Born in France

法国数学家

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石雷 张宝义 / 编

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责任编辑:胡丽娟
封面设计:李　新

课外英语
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出　　版	远方出版社
社　　址	呼和浩特市乌兰察布东路666号
邮　　编	010010
发　　行	新华书店
印　　刷	北京华盛印刷厂
版　　次	2004年8月第1版
印　　次	2004年8月第1次印刷
开　　本	850×1168　1/32
印　　张	480
字　　数	4980千
印　　数	5000
标准书号	ISBN 7-80595-981-1/G·342
总 定 价	1248.00元
本册定价	22.50元

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《放眼世界的数学星空》丛书，本丛书介绍了法国数学家、俄罗斯数学家、中国数学家、印度数学家，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，还可以使您在英语字母点缀的星空里，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提出批评和建议，以便今后修订完善。

编　者

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Mathematicians Born in France

Gabriel Lamé

Born: 22 **July** 1795 **in Tours, France**

Died: 1 **May** 1870 **in Paris, France**

Gabriel Lamé was a student at the École Polytechnique, entering in 1813 and graduating in 1817. Already during these undergraduate years Lamé was writing research papers, and he published his first paper Mémoire sur les intersections des lignes et des surfaces in Gergonne's Journal in 1816—17. After graduating from the École Polytechnique, Lamé studied engineering at the École des Mines in Paris, graduating from there in 1820. While at the École des Mines Lamé published his sec-

ond work, this time on a method he had invented to calculate the angles between faces of crystals.

In 1820 Lamé, together with his colleague Emile Clapeyron, went to Russia. We should give some background to this event which, on the face of it, looks rather a strange career move for the two young mathematicians. Alexander I was emperor of Russia from 1801 to 1825. The French Revolution and events in France which followed it, had shown Alexander the importance of scientific knowledge and its applications to military techniques and industrial development. He understood that for Russia to be powerful it must follow suit. He looked towards Europe and European scientists and tried to introduce policies to encourage them to cooperate with Russian scientists. He encouraged teachers to go to Russia to teach the latest scientific theories and to create scientific contacts between Russia and Europe. In line with this policy, the Russian government made a request to France who responded by sending Lamé and Clapeyron to St Petersburg.

Lamé was appointed professor and engineer at the Institut et Corps du Genie des Voies de Communication in St Petersburg. At first things were rather difficult for Lamé but later his visit proved highly productive. He lectured on analysis, phys-

ics, mechanics, chemistry, and engineering topics. He published papers in both Russian and French journals during his 12 years there, some jointly with Clapeyron. They published in, for example, the Journal des voies de communications, the Journal du genie civil, the Bulletin des sciences mathématiques, the Receuil des savants etrangers, and Journal für die reine und angewandte Mathematik (Crelle's Journal) after it began publication in 1826.

In [6] an interesting episode which occurred during Lamé's time in St Petersburg is related. It concerns Lamé's attempt to spread Cauchy's new ideas of rigorous analysis. A professor at the Institute where Lamé taught had written a book which contained a proof of Taylor's theorem. Lamé produced a manuscript criticising the proof using Cauchy's arguments. Another side to Lamé's work in St Petersburg was his involvement in helping with plans that were being drawn up for building bridges and roads around the city. At this time he became more aware of the vast potential of railway development, and this would be a topic of great interest to him after his return to France. Before that, he was present when the Liverpool — Manchester line opened in England on 15 September 1830.

Bradley [4] gives a lot more detail regarding Lamé's time

in Russia. She concludes in her paper that:—

… the repressive atmosphere in France during the period of the Bourbon restoration had made work abroad seem more attractive for research and the application of new ideas. Lame and Clapeyron seized an opportunity offered to them by successful French engineers already established in Russia who had taken with them the spirit of the early years of the École Polytechnique. Important engineers like Betancourt and Bazaine helped them to pursue their careers in a land of scientific opportunity where their ideological convictions were strengthened through contact and discussion with their compatriots.

In 1832 Lamé returned to Paris and at first he formed part of an engineering firm set up jointly with Clapeyron and two others. After only a few months, and still in 1832, Lamé accepted the chair of physics at the École Polytechnique. He did not restrict his interests to teaching and research, however. for in remained an engineer ready for consulting work in that area. In 1836 he was appointed chief engineer of mines and he was also involved in the building of the railway from Paris to Versailles and of the railway from Paris to St Germain, which

was opened in 1837.

Lamé was elected to the Académie des Sciences in 1843 when Louis Puissant died leaving a vacancy in the geometry section. In the following year he left his chair of physics at the École Polytechnique and accepted a post at the Sorbonne in mathematical physics and probability. He was appointed to the chair of mathematical physics and probability at the Sorbonne in 1851.

He worked on a wide variety of different topics. Often problems in the engineering tasks he undertook led him to study mathematical questions. For example his work on the stability of vaults and on the design of suspension bridges led him to work on elasticity theory. In fact this was not a passing interest, for Lamé made substantial contributions to this topic. Another example is his work on the conduction of heat which led him to his general theory of curvilinear coordinates.

Curvilinear coordinates proved a very powerful tool in Lamé's hands. He used them to transform Laplace's equation into ellipsoidal coordinates and so separate the variables and solve the resulting equation. The trademark of Lamé's career was moving from one topic to another in a quite logical way but he often ended up studying problems very far removed from the

original. This happened with curvilinear coordinates for he was led to study the equation

$$(x/a)^n+(y/b)^n+(z/c)^n=0$$

which, in non-homogeneous form he wrote as

$$(x/a)^n+(y/b)^n=1$$

which, with $a = b$ is $x^n+y^n=a^n$ so he was led to Fermat's last theorem. Although he was basically an applied mathematician, Lamé made a substantial contribution to the problem by solving the case $n = 7$. In fact he believed that he had solved the whole problem at one stage but he had overlooked the lack of unique factorisation in certain subrings of the complex numbers.

He also did important work on differential geometry and, in another contribution to number theory, he showed that the number of divisions in the Euclidean algorithm never exceeds five times the number of digits in the smaller number.

As we noted above, he worked on engineering mathematics and elasticity where two elastic constants are named after him. He studied diffusion in crystalline material.

Lamé was considered the leading French mathematician of his time by many, in particular Gauss who was never once to give praise easily held this opinion. Rather strangely he was more highly thought of outside France than inside, for the

French seemed to feel that he was too practical for a mathematician and yet too theoretical for an engineer. His own opinion was that curvilinear coordinates were his most important contribution, but there are strange twists and turns in the history of mathematics and very soon after Lamé introduced them curvilinear coordinates became obsolete through the generalisations introduced by Hermite, Klein, and Bôcher.

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Bernard Lamy

Born: 15 **June** 1640 **in Le Mans, France**

Died: 29 **Jan** 1715 **in Rouen, France**

Bernard Lamy studied at the Oratorian college in Le Mans. At the age of 18 he went to Paris and entered the Maison d'Institution. After a year he went to Saumur where he studied philosophy. He was admitted to the Congregation of the Oratory in 1662. Malebranche was also a member of the Congregation of the Oratory and they met as students and remained friends for the rest of their lives.

In 1661 Lamy was appointed professor of classics at Vendome. He held this post for two years before being appointed to a similar post in Juilly.

Lamy was ordained in 1667 and studied theology, also at Saumur, from 1669 until 1671. After this he became professor of philosophy at the College of Saumur, moving to a similar post at the College of Angers two years later.

Lamy taught Descartes's philosophy at Angers and for this he was exiled by order of the King in 1676. After four years his exile ended and he was able to teach in Grenoble.

He published Traité de Mécanique in 1679 in which the parallelogram of forces law is given. Varignon discovered the parallelogram of forces law independently, at about the same time, and he saw more consequences of it than did Lamy. Lamy also published Traité de la grandeur en general (1680) and Les éléments de géometrie (1685).

In 1686 Lamy obtained permission to live in Paris but trouble over a theological work had him sent away in 1689 and he lived from 1690 in Rouen, remaining there for the rest of his life. He published several books while in Rouen, including Traité de perspective (1701).

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