

The science of longevity: medicine, mathematics and finance

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The Genevan schemes rested on an understanding of mortality that was still empirical. The eighteenth century was a period of decisive progress in this field. Mathematicians developed the calculus of probabilities and applied it to the duration of human life. Administrators and scholars gathered data on births and deaths. Physicians took an interest in the causes of mortality and in the means of reducing them.

Smallpox was one of the principal causes of death at the time, particularly among children. Inoculation, which consists in inducing an attenuated form of the disease in order to immunise the person, spread across Europe during the eighteenth century. The Genevan physician Théodore Tronchin, famous throughout Europe, was one of its promoters and inoculated, among others, the children of great French families.¹ The Basel mathematician Daniel Bernoulli published an analysis of the effects of inoculation on life expectancy, one of the first works of mathematical demography applied to a question of public health.²

The presence of such expertise in Geneva and in the Swiss lands was not unconnected with the success of the Genevan schemes. The bankers could rely on reputable physicians to select the lives and on a scientific culture that valued calculation and observation. This meeting of medicine, mathematics and finance foreshadowed modern actuarial science, which today underpins life insurance and the management of pension funds.

Switzerland today occupies an important place in global insurance and reinsurance. Several of the world's largest reinsurers are established in the country, where actuarial expertise is highly developed.³ Geneva also hosts insurance-related activities, notably in the fields of commodity trading and wealth management. The distant experience of the thirty maidens forms part of the prehistory of this expertise.

1 Notes

1. Dictionnaire historique de la Suisse (DHS; Historical Dictionary of Switzerland), art. “Variole”: “in 1756, Théodore Tronchin was called to Paris to inoculate the children of Duke Louis Philippe d'Orléans”; DHS, art. “Tronchin, Théodore”: born 24 May 1709 in Geneva, died 30 November 1781 in Paris, pupil of Boerhaave at Leiden, honorary professor of medicine in Geneva (1754), physician to the Duke of Orléans in Paris from 1766, physician to Voltaire. ↩
2. Daniel Bernoulli, “Essai d’une nouvelle analyse de la mortalité causée par la petite vérole, et des avantages de l’inoculation pour la prévenir”, read to the Académie royale des sciences on 16 April 1760, published in the Histoire et Mémoires de l’Académie royale des sciences in 1766: gain in life expectancy of approximately three years (Petites histoires des sciences, “1760, Bernoulli et la variole”, 17 April 2020). ↩
3. Wikipedia (en), “Swiss Re”: “Swiss Re was founded in Zürich as the first Swiss reinsurance company in 1863”; “one of the world’s largest reinsurers, as measured by gross premiums written”, which became the world’s largest after the acquisition of GE Insurance Solutions (2006); revenues of USD 43.1 billion and 14,893 employees at the end of 2025. ↩

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