Gheorghe Țițeica

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May 18, 2024

Figure: source: Wikipedia

- Born on October 4, 1873, in Turnu Severin, son of Anca (née Ciolănescu) and Radu Țitei.
- His surname, Țiteica, is a combination of his parents' surnames.
- He showed an early interest in science, music and literature. Music remained his passion: he played violin.
- Graduated from Carol I High School in Craiova in 1892. During high school, he contributed to the school's magazine, writing the columns on mathematics and studies of literary critique.
- He graduated in 1895 from the University of Bucharest, Faculty of Sciences, with a bachelor's degree in mathematics.
- Next year, he passed the exam for becoming a secondary school teacher in Galați.

Figure: source: Link to thesis

- In 1897, on the advice of teachers and friends, Țițeica went to Paris to complete his studies at a preparatory school. Among his mates were Henri Lebesgue and Paul Montel.

- He ranked first in his class and earned a second undergraduate degree from the Sorbonne in 1897.

- He then went to École Normale Supérieure, where some of his professors were Paul Appell, Gaston Darboux, Charles Hermite, Gabriel Koenigs, Émile Picard or Henri Poincaré.

- His PhD thesis was supervised by Darboux and defended in 1899. The title of the thesis is *Sur les congruences cycliques et sur les systèmes triplement conjugués*.
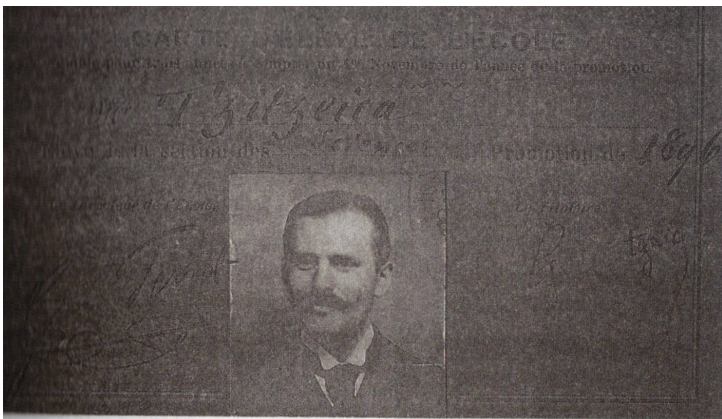
Carnet de elev la École Normale Supérieure
(Școala Normală Superioară), 1896

Figure: source: [1]

Gheorghe Țițeica, al doilea din stânga pe rândul de sus, ca elev al Școlii Normale Superioare din Paris, 1897
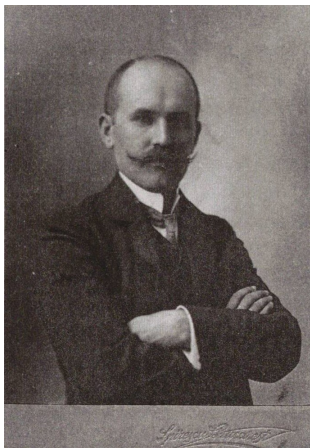
Figure: source: [1]

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- Țițeica was appointed assistant professor at the University of Bucharest. He was promoted to full professor on 3 May 1903, retaining this position until his death in 1939.
- He also taught mathematics at the Polytechnic University of Bucharest, starting in 1928.
- In 1913, at age 40, Țițeica was elected as a permanent member of the Romanian Academy, replacing Spiru Haret. He also held some leading positions in this institution.
- He was granted the title of *doctor honoris causa* of the University of Warsaw.
- Among his Ph.D. students we can mention Dan Barbilian and Grigore Moisil.

Copiii familiei Țițeica: Șerban, Radu și Gabriela, împreună cu mama lor, la Bușteni

Figure: source: [2]

- Married Florence Thierrin, originary from Switzerland, and had three children: Radu (physicist, engineer, specialized in spectroscopy), Gabriela (mathematician, engineer) and Șerban (physicist, PhD under Heisenberg's supervision) [2].
- Dies on February 5, 1939, at the age of 65, while still in activity.

Main works

- Țițeica wrote about 400 articles, most of them addressing problems of differential geometry.
- He discovered a new class of surfaces and a new class of curves which now carry his name.
- He founded a new chapter in mathematics, named *affine differential geometry* (a type of differential geometry which studies invariants of volume-preserving affine transformations). The basic difference between affine and Riemannian differential geometry is that affine differential geometry studies manifolds equipped with a volume form rather than a metric.
- He also studied webs in n-dimensional space, defined through Laplace equations.
- An equation bears his name. The Tzitzeica equation is a nonlinear partial differential equation devised in 1907 in the study of differential geometry, describing surfaces of constant affine curvature.It has also been used in nonlinear physics, being an integrable $1+1$ dimensional Lorentz invariant system.
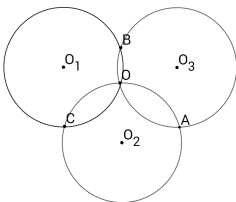
$$u_{xy} = \exp(u) - exp(-2u) \qquad (1)$$

Figure: source: Wikipedia

Theorem (Johnson-Tzitzeica)

There are given three circles of equal radii that have a common intersection point. Taking them two by two, one obtain another three points of intersection. These three points are on a circle with equal radius to the three initial circles.

These circles have been further studied by Roger Arthur Johnson and are known today as Johnson circles.
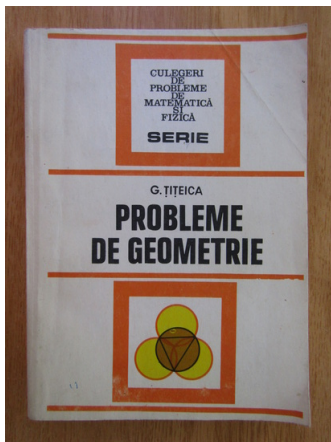
- Țițeica published a geometry problems book that contains about 2000 problems, some of them being remarkable results.
- He was one of the founders of Romanian mathematical magazine "Gazeta matematică" (1895), which appeared continuously even during the two world wars.
- He also co-founded "Natura" magazine, where he published popular science articles, especially on physics topics.

Gheorghe Țițeica.
Probleme de geometrie... și dincolo de ele.
Sigma, 2008.

Radu Țițeica.
Escalade și creste alpine.
Editura România pitorească, 2020.