

The Most Cited Hungarian Geometer of the Geometric Institution of the Technical University of Wien

Róbert Oláh-Gál

Babeş-Bolyai University, Extension of Miercurea-Ciuc, Romania

(Postal adress: 530212 Miercurea-Ciuc, Str. Revolutia din decembrie Nr. 15. Ap. 17. Jud. Harghita, Romania.)

E-mail: ogrogr@gmail.com

Abstract

Klug was born in Gyöngyös in 1854 and he died in Budapest in 1944. The circumstances of his death have been unclear up to now. In 1944 the ninety-year-old scientist walked out of his home in Budapest and he never came back. Probably he was the victim of racial hate. In 1891 at the University of Budapest he was private teacher of the synthetical geometry, in 1897 he became extraordinary professor of the University of Kolozsvár (Cluj). In 1900 he became ordinary public professor on the University of Kolozsvár (Cluj). He published his work entitled "The Elements of the Projective Geometry with the support of the Hungarian Academy of Science".

Several of his works were published in German by the Akademie der Wissenschaften (Academy of Sciences) of Wien. His students became the future generations of mathematicians. His work is comparable maybe only to that of dr. Leopold Fejér, who also pursued his first scientific research on the old University of Kolozsvár (Cluj).

First we should clarify what we understand in this article by saying "the most cited".

In the library of the Geometric Institution of the Technical University of Wien every teacher and/or important geometer has a box with his works. But for example Paul Stäckel has two boxes of his publications. Those with less publications, like Gyula Strommer, László Fejes Tóth, Ferenc Kárteszi share a box with their colleagues.

There is only one Hungarian geometer who has a box of his own, with his name written on it.

Who can he be?

This person was a geometer, and he was one of the "three professors of the Joseph Franz University rewarded in 1918/19".

The answer is given by Edward Teller on a recording which can be downloaded free from the Internet:

„My father had an older friend who was a retired Mathematics professor. His name was Leopold Klug, and he is probably the man who had the greatest influence on my life. He was a

retired mathematics professor, and he got me a book. Algebra by Leonhard Euler. I was ten years old. The problems that came up were too difficult for me to solve, but not too difficult to understand. Klug gave me that book and I read it. It was my favorite book."

„Klug was the first grown-up whom I met who loved what he was doing. Who did not get tired. He even enjoyed explaining things to me. That, I think, is when I made up my mind very firmly that I wanted to do something that I really did want to do."

Let us read how the historiography remembers this period of the Joseph Franz University:

"Beside these traditional departments starting from the turn of the century new departments were established according to the scientific demand. From 1900 to 1917 Leopold Klug was the professor of Descriptive Geometry, and from 1902 to 1905 a department for Plants Taxology was set up for Vince Borbás. Neither of the two had a successor.

In 1913 a second department for Chemical Technology was set up, for this Bela Ruzitska private teacher was nominated. The third , Applied Physics department was established, its professor was going to be Peter Pfeiffer private teacher.

The faculty in 1918/19 had three rewarded teachers (Gyula Farkas, Leopold Klug, Aladar Richter), seven ordinary public teachers (Béla Ruzitska, Rudolf Ortway, Béla Pogány). In the examined period only four of them left for Budapest . After the University of Kolozsvár (Cluj) had been closed, Szadeczky and Ruzitska stayed, the others left to Szeged." (György Gaal, University in the Farkas street, The Precedents, Periods and Influences of the Joseph Franz University, Hungarian Scientific Society of Transylvania, KV, 2001)

Who was this quiet, almost forgotten "rewarded" geometer? Leopold Klug was maybe the most important Hungarian projective or synthetic geometer.

It is without doubt that recently Edward Teller brought him in the spotlight, by his recollection mentioned above.

The author of this article could not find a photograph of Leopold Klug although he was looking for it care fully in Kolozsvár (Cluj), Szeged and Budapest. Maybe by reading this article somebody in possession of it will turn up.

Klug was born in Gyöngyös in 1854 and he died in Budapest in 1944. The circumstances of his death have been unclear up to now. In 1944 the ninety-year-old scientist walked out of his home in Budapest and he never came back. Probably he was the victim of racial hate. I know from the original letter of Klug found in his legacy that he lived on the Kertész St., 38, I/4, in the 7th. District. The Tellers lived there, too, at least in the 1920ties.

He was representing the synthetic and projective geometry, whose best-known representative was Coxeter.

The most beautiful and most humane memory about him is maybe the interview with Kárteszi made by Gyula Staar entitled "the scientist-teacher". In this the charismatic personality of the scientist is revived. 2 (Gyula Staar, The lived mathematics, Idea, BP, 1900, p.310-311).

But his biggest sacrifice brought for the society of mathematicians is the Klug Foundation , which he saved up from his pension of two and half decades.

Let us read how the No.13 of August 1942 of the Hungarian Jewish Paper relates this.

"Prof. Dr. Leopold Klug

In the Hungarian Scientific circles it has been lively discussed for weeks that Prof. Dr. Leopold Klug, internationally recognized mathematician, made a foundation of ten thousand Hungarian pengő at the University of Kolozsvár (Cluj), where he was ordinary public teacher before the Romanian occupation.

The news proved to be real. The offer of the substantial foundation really took place. The council of the University of Kolozsvár (Cluj) accepted with thanks the gesture of patronage of the Jewish scientist. The Ministry of Religion and Education approved the constitution of the foundation.

From the foundation of Leopold Klug - according to our information- in the first place those students will get rewarded who prove to be excellent in the seminar works in the field of Descriptive Geometry. On the second place those will be rewarded who show extraordinary interest and special talent in Geometry. This subject was dr. Leopold Klug's favourite.

Dr. Leopold Klug, the new patron of a university foundation, was born in Gyöngyös in 1854, as a child of a Jewish family; in 1891 at the University of Budapest he was private teacher of the synthetical geometry, in 1897 he became extraordinary professor of the University of Kolozsvár (Cluj). In 1900 he became ordinary public professor on the University of Kolozsvár (Cluj). He published his work entitled "The Elements of the Projective Geometry with the support of the Hungarian Academy of Science".

Several of his works were published in German by the Akademie der Wissenschaften (Academy of Sciences) of Wien.

His students became the future generations of mathematicians. His work is comparable maybe only to that of dr. Leopold Fejér, who also pursued his first scientific research on the old University of Kolozsvár (Cluj).

Dr. Leopold Klug, at the age of a patriarch, living constantly in Budapest but spending this summer in the emergent Kolozsvár (Cluj), at his formal working place wishes now to serve the Hungarian science by financially supporting the first steps of the talented mathematicians and geometricians. "

Klug's work was explored by Ferenc Zigány, professor at the Technical University, who received for that the Leopold Klug Prize. We quote from Zigány's work, because maybe his statements are more topical and real now than in 1943.

"With time things change. And the scientific research is not an exception, its diverse problems are sometimes en vogue, sometimes pushed into the background, giving space for new ones. While in the past two centuries the geometers chose their themes from the field of projective Geometry, from the domain of second degree curves and surfaces, the interest in this topic has significantly decreased nowadays. Leopold Klug was an enthusiast of the flourishment of projective Geometry, and with in that, of the synthetic method, which inspired many great minds in the past. As big as the love was with which he promoted the projective geometry based on the sybthetical method with, as big was the bitterness after he realized the decrease of interest in it.

The spine of his work is represented by two textbooks: The Elements of the Projective Geometry and The Projective Geometry. The first describes the problems in the plane. The second extends over the space. A very interesting and more extensively worked out detail of the first one is the different projectivities and involutions, and the relations of some of these (for ex. The adjuncteds), as well as the conic with double tangential point. Both of these topics were Klug's favorites and several of his

dissertations deal with them. A beautiful detail from of the second work is the part concerning the polaric tetraeder in chapter entitled "Hyperboloid", and in the chapter entitled "The Third Order Space Curve" the relations of this curve with the 0 system and the components of the hyperboloid intersecting the curve. On the third place there is his textbook entitled "Descriptive Geometry", a work written with an excellent pedagogical sense and with a great choice of material, then the fourth one: "The Synthetic Discussion of the Third Order Space Curves".

Besides these textbooks a high number of his articles enrich our geometry literature.³ (Ferenc Zigány, Leopold Klug's work, Mathematical and Physical Papers, 1943 (50), p.205-222).

Report on the Leopold Klug Prize of 1948:

"In the case of the first Leopold Klug Prize the committee of our Association sent the following commission to forward the proposal: Jenő Égerváry, Béla Keréjártó, László Rédei, Gyula Szőkefalvi-Nagy. The report of this commission is the following:

The committee had the desire already from the first announcement of the foundation - first of all to make the achievement of the purpose easier and to express the respect and honor for the founder - to reward from the first price the author of a report reviewing and favoring Leopold Klug's scientifically work. The association received only one such report, whose author is Dr. Ferenc Zigány, professor at the Technical University.

The commission qualified Zigány's work as being clear, thorough and adequate to the purpose of the commission and suggests to give half of the first Leopold Klug Prize to him. The commission wishes even at the first time - according to the real purposes - to give this prize to dr. László Fejes (Tóth) university assistant for his successful geometrical research.

László Fejes (Tóth) published by now thirteen studies in mathematics, and other six are set up for printing. From these nineteen works fifteen have the geometry as subject matter. The main directions of his work in geometry are the following: 1. The approach of the convex curves with polygons, 2. The extremal properties of polyhedra, 3. The problem of densest packing of circles, and the questions in connection with this issue.

The following three theorems of Fejes's great results belong to these three directions:

1. There is an n-angle, written in the circumference l_n , and written around the circumference L_n so that $\frac{L_n - l_n}{L_n} \leq 2 \sin^2 \frac{\pi}{2n}$. This inequality cannot be corrected.

2. A polyeder, with maximal volume, with a given number of summits, written in a regular closed convex surface must have every side a triangle.

3. Among n points on a unit sphere there are always two with the distance not bigger than

$$\left(4 - \operatorname{cosec}^2 \frac{n}{n-2} \frac{\pi}{6}\right)^{\frac{1}{2}} \text{ between them.}$$

This inequality cannot be corrected when n=3, 4, 6 and 12, and if n is very high the inequality gives the result of the most dense placing on the circle.

The commission unanimously accepted the proposal from this report at the meeting from 25 February 1943, and gave the Prize divided in two equal parts, to Dr.

László Fejes (Tóth) and Dr. Ferenc Zigány, completing both half-prizes with 300-300 pengős from the wealth of the Association¹.

Klug was born in a Jewish family in Gyöngyös on 23 of January. His parents were Miksa Klug and Hani Neufeld. After he graduated the University in Budapest, he was a high school teacher in Pozsony (Bratislava) in the Science High school between 1874-1897. He took his Ph.D. degree during this time, and he was appointed at the Joseph Franz University as private teacher of the Descriptive Geometry. After 2 years he became the professor of Descriptive Geometry, for around twenty years, until 1917, when he retired and moved back to Budapest.

He spent his years of retirement with scientific work and publishing, it is not accidental that the Technical University of Wien keeps a whole box with his works. In the meantime he worked a lot together with young talents like Ferenc Kárteszi and Edward Teller. I have already reported his sorrowful death. I am presenting now three of his letters, which I have found in the legacy of Leopold Fejér. (The dates are hard to read on the original manuscript.)

The first letter:

"Honorable Professor, dear Colleague,

I've looked over the correction and I've added a few lines, it is interesting rather than superfluous. I couldn't write it better even now, and maybe nobody else could - ; I wish it to have readers, but I'm afraid it's still true what my teacher Gyula König said thirty-eight years ago: "If the mathematics had so many readers in Hungary as teachers!"

I'm telling you what you already know, that I retired, and that my daughter obtained the Music teacher's diploma, and she's learning the eighth language, the Turkish, because she has been reading novels and epic poems on Spanish and Russian for a long time.

Your sincere friend and follower, Leopold Klug,
Budapest, the 30 October 1917"

I truly think that the idea cited from Gyula König is very topical today. We know from the Kárteszi's memory that Klug buried two of his children. From the letter just presented we know that one child obtained the music teacher's diploma.

The second letter:

"Dear Colleague,

I kindly ask you to annex the two pages attached below to the end of my study written for the Mathematical and Physical Papers and sent a year ago.

I don't intend to write more because my eyes have become so because of the reading and writing in all these years, that I'm not allowed to tire them with geometry work.

Your sincere friend and follower, Leopold Klug,
Budapest, (Kertész st. 38, I/4), the 16 April 1918)

If the date is right then it is probable that Leopold Klug's eyes became weak, but they got well again.

The third letter:

I wrote the study attached with the title "The Construction of Osculating Circle of the (Conics and its Evolutes) with five illustrations for the Mathematical and Physical Papers, because I couldn't find these constructions of osculating circle (only in their summits) leafing through the recently published second volume of the Descriptive

¹ Report from the Leopold Klug Price from 1943, Mathematical and Physical Papers.

Geometry by Prof. Romsauer of the Technical University, and I didn't find either the tangent couple in the double points (in the point of intersection) of the intersection of the tangent plane of a torus, which appeared more than 80 years ago in Levoy Dast. Geometry, but which construction is different from that in my study and happens with the use of the osculating circle of the conic.

Everything I've written here I've already presented on my lectures in Kolozsvár (Cluj) and my ex-students who may have interest in them will be happy to read them. But I think maybe others who haven't heard of these, or learned them discussed in another way, will be interested in them, maybe even more than in something very new.

I also mention that in my work I explain the middle point of the osculating circle of the conics with the method of the kinematics which is also pleasant to read if somebody hasn't deal with it.

With kind regards your follower, Leopold Klug"

I've collected and presented lots of text collages to compensate for the gaps in Leopold Klug's portrait. There is much more to research about him, and I'm not wrong when I say: he was the greatest Hungarian projective and synthetical geometer.

Acknowledgments

The work of the author was supported by the Research Programs Institute of Foundation Sapientia, Cluj, Romania.

Bibliography

1. Kárteszi F, 1960. Találkozásaim Klug Lipóttal (My meetings with Lipót Klug), Matematikai Lapok, Budapest, pp. 219-223.
2. Jelentés az 1943. évi Klug Lipót-jutalomról (Report from the Leopold Klug Price), Matematikai és Fizikai Lapok, Budapest, 1943 (50), p 86-87.
3. Magyar Zsidók Lapja (Hungarian Jewish Journal) , 1942. Budapest, 1942 augusztus 13.
4. Staar Gy, 1990. A megélt matematika (The lived mathematics), Gondolat, Budapest, pp. 310-311.