



13/1 (2015), 99–110

tmcs@math.klte.hu
http://tmcs.math.klte.hu

Teaching
Mathematics and
Computer Science

Outstanding mathematicians in the 20th century: András Rapcsák (1914-1993)

TÜNDE KÁNTOR

Abstract. In this paper we commemorate the life and work of András Rapcsák on the occasion of the centenary of his birth. He was an outstanding professor and a scholar teacher. He was head of the Department of Geometry (1958-1973) and the director of the Institute of Mathematics at the University of Debrecen (Hungary). He played an important role in the life of the University of Debrecen. He was the rector of this university between 1966 and 1973.

At the beginning of his career he taught at secondary schools in several towns. He wrote mathematical schoolbooks with coauthors. He also taught at Teacher’s College in Debrecen and in Eger.

He became to interested in differential geometry under the influence of Ottó Varga. The fields of his research were line-element spaces and related areas. He was elected an Ordinary Member of the Hungarian Academy of Science in 1965. He wrote 21 papers, 8 school and textbooks and 3 articles in didactics of mathematics.

Key words and phrases: András Rapcsák, centenary commemoration, differential geometry, path geometry, Finsler geometry, scholar teacher.

ZDM Subject Classification: A30, G90, I60.

Life and work

András Rapcsák was born on 12th December 1914 in Hódmezővásárhely, died on 16th October 1993 in Debrecen. His father Péter Rapcsák rented an inn. His mother Mária Bereczki had a small grocery.

He had two brothers, Péter Rapcsák, who became a Calvinist priest, and István Rapcsák, who became a radiologist.



Figure 1. András Rapcsák (1914–1993)

His studies

He attended primary and secondary school in Hódmezővásárhely. Between 1925 and 1933 he attended Calvinist Grammar School of Hódmezővásárhely, and he took his final examination here in 1933. He was not an excellent student. Márton Sain, who later became a famous teacher of mathematics, was one of his classmates.

The years spent at the secondary school had a great influence on his whole life. In 1993 he recalled this period with the following words:

‘I started secondary school at the age of 11, and I went there eight long years. When I first entered through its immense gate with oak panels, I immediately caught sight of the inscription carved in the floor: ‘Blessing on all the stones of this house.’ My teachers taught me everything in this spirit. It was here that I learnt how to hold out in life and to complete my duties. I learnt here that I must devote my life to beauty and truth and that I must live with dignity. Furthermore, my passion for mathematics and poetry also began here.’

He was sent to a national competition in mathematics at the age of 18. It was also at this time that he got acquainted with the life and works of Farkas Bolyai and János Bolyai and that his attention turned to the mathematical problem of space. He also gave a lecture on this topic in the school literary society.

He started to study mathematics and physics at Szeged University in 1933. He was a member of the Loránd Eötvös College from the first year, where his tutor was László Kalmár, and the Szeged Society of Young Artists, together with the poet Miklós Radnóti and the literary historian Gábor Tolnai. He also joined the campaign of discovering and supporting talented young people from the country,

which was patronized by the famous Hungarian writer László Németh among others.

At the university he learnt mathematics from excellent professors, such as Alfréd Haar, Béla Keréjártó, Frigyes Riesz and Gyula Szőkefalvi-Nagy. He also liked young István Lipka very much.



Figure 2. András Rapcsák's lecture book

He was mainly interested in geometry. Two of his essays were awarded with a prize. Unfortunately, his university years were not trouble-free. At the age of 19 he received a diagnosis of osteosarcoma as the cause of his constant leg pain. Its development was stopped by X-ray therapy, but he could only walk with the help of a stick for several years. He had to live together with his illness during his whole life. Finally, his leg was amputated when he was 72 years old. Owing to his illness he had to suspend his university studies for three years. Besides his studies, he also worked as a tutor in a student hostel in Hódmezővásárhely, in order to alleviate his parents' financial difficulties.

His teacher's activity

Having obtained his university degree in 1942, he started to work at the Lutheran School in Rozsnyó (Rožňava). There he made acquaintance with Jolán Baranyai, who was a teacher specializing geography and history, and whom he married afterwards.

Between 1942 and 1949 he worked as a teacher in various schools in Debrecen, namely in the Unified Boys' School, in the Calvinist Grammar School, and after the nationalization of schools in the Primary School of Péterfia street and in the Primary School of Nyulas.

He started to give lectures in higher mathematics at the University of Debrecen and in the Teacher Training College in 1945.

At that time, the leader of the Institute of Mathematics was Ottó Varga, an internationally renowned differential geometer. It was he who discovered András Rapcsák’s mathematical talent and who oriented him to differential geometry. The title of his PhD thesis was *‘Theory of surfaces in Minkowski space’*, and he obtained his PhD in 1947. The aim of his thesis was to explore the connections between Minkowski and Finsler geometry.

He gave lectures from the beginning at the Teacher Training College of Eger, which was founded in 1948, and he was the leader of the Department of Mathematics from 1949 to 1951. These years had a great influence on his teaching method. He had 42 classes a week, he had to get along with one single room, he had to organize teaching, get textbooks, and also to do administrative work.

‘I had to be a professor, associate professor, senior lecturer and assistant lecturer in one person.’- he said about the period at the Teacher Training College.

Béla Pelle, mathematics Professor of the Teacher Training College of Eger, said the following about András Rapcsák: *‘A few of us in Eger did our PhD under his supervision. He was one of the reviewers of my geometry textbook. He played an important role in saving the Department of Physics in Eger. He talked to the government official until he succeeded in dissuading him from dissolving the department. He also gave demonstration classes at the teacher training school. When he entered the classroom, he already knew the name of all the children. His classes were marvellous.’*

There is a classroom at the Károly Eszterházy Teacher Training College in Eger which was named after him.

What did András Rapcsák teach to his students?

‘I emphasized that success in mathematics depends upon understanding things. Cramming formulae results in a hate of mathematics, because students are drowning in the flood of data, and without a lifebelt they will never reach the shore of spirit. A teacher must have a profound knowledge, and instead of brooding on what he should teach, he should rather concentrate on how he can reach his aim. Students are the most terrible, but at the same time the fairest judges as well. A teacher cannot conceal his ignorance before them. On the other hand, young people esteem openness and knowledge very much. Do not try to deceive them, otherwise you will be completely discredited. Young minds must always be polished with humanity.’



Figure 3. With Professor Matsumoto and the members of the Department of Geometry

András Rapcsák was often visited by his grateful students even decades later, and he was also often invited to give a lecture.

In 1951 he was moved to Debrecen again. He was an associate professor at Lajos Kossuth University from 1951 to 1961, and a professor from 1961. He became a Candidate of Sciences in 1955, a Doctor of Science in 1960, a Corresponding Member of the Hungarian Academy of Sciences in 1968 and an Ordinary Member in 1982. Between 1958 and 1973 he was the head of the Department of Geometry.



Figure 4. László Gyarmathi, András Rapcsák, Béla Barna, Barna Szénássy

Leader at Lajos Kossuth University

Between 1965 and 1968 he also led the Department of Analysis. Between 1977 and 1980 he was the director of the Institute of Mathematics. Moreover, in

1984 he was also the head of the Department of Probability Theory and Applied Mathematics. He retired in 1985.

He also played an important role in the life of Lajos Kossuth University. He had several leading positions: he was the vice dean of the Faculty of Sciences in 1954 and 1955, a vice rector from 1955 to 1957 and from 1959 to 63, the dean of the Faculty of Sciences in 1965 and 1966, and he was the rector of the university between 1966 and 1973. He could always find the adequate style, thus he could easily get on with everyone. His manner was always open and straightforward. His way of thinking was clear, simple and logical. He was an expansive, honest, puritan and humane man. He always tried to resolve conflicts. To this end he was ready even to tell a joke. His friends called him ‘Banci Bácsi’ (‘Uncle Andrew’), but for his students and others he was simply ‘Rapcsák’.

From 1960 he was a member of the Mathematical Committee of the Hungarian Academy of Sciences. He also took part in the work of the Debrecen Academic Committee and in the editing of several mathematical journals, namely: *Publicationes Mathematicae*, *Acta Mathematica Academiae Scientiarum Hungaricae*, *Periodica Mathematica Hungarica* and *Matematikai Lapok* (Mathematical Journal, Hungarian).

Scientific results

His research area is differential geometry. He is considered an internationally renowned researcher of path geometry. His works live their renaissance in the last decades. He described the complete invariant system of a regular Cartan space. He studied various extensions of the notion of a plane in a Finsler space, characterizations of Finsler spaces with vanishing projective curvature, metrization questions of a path space and geodesics. In his nicest papers he studied path preserving mappings of affinely connected and Finsler manifolds.

He wrote 34 works, papers, textbooks, didactical and other articles. His more excellent works are: [14], [16], [17], [18]. In the first monograph of Finsler geometry (The Differential Geometry of Finsler spaces, Springer, 1959) the author, Hanno Rund quoted his results. Among many others, the eminent Japanese professor, Makoto Matsumoto, appreciated Rapcsák’s scientific achievements. His most cited result was achieved in 1961 [15], and was baptized ‘Rapcsák equation’ by Matsumoto and later by Zhongmin Shen.

Scholar teacher

He was a real scholar teacher. As a secondary school teacher he did didactics research work, he wrote schoolbooks for the students of technical secondary schools with coauthors (L. Gyarmathi, I. Csánk, S. Török). This books were very popular and they had 10-19 editions. The figures were drawn by his teacher fellow J. Erdősi. With his college L. Magyari they wrote also a schoolbook, but it could not appear in printed form at the time of the World War II. He wrote a supplement for the students of the technical secondary schools titled *Complex Numbers*(1953).

He was open minded to problems of teaching mathematics. In his article - *The treatment of geometry in secondary schools* - he investigated the problem of teaching geometry by the help of axioms.



Figure 5. Schoolboks

He was an excellent and very popular lecturer. On his lectures he presented such kind of methods whose application made easy to solve seemingly hard problems. He used demonstrative methods for instruction, so the students took part on his lectures with pleasure.

‘*To research, to teach and to educate*’- he followed this saying in his whole life. He was one of the professors who recognized: if somebody teaches well, then this provides an assurance for the development of science. The task of the outstanding professor is to explain clearly, on high level and didactically carefully. He had made a special point of teaching, had done for the love of teaching. He had recommendations and plans, made teaching experiments, e.g., in teaching of calculus.

‘*The role of science is to think things again and again*’- as he repeated.

András Rapcsák and Lajos Tamássy were the coauthors of the lectures notes Rapcsák - Tamássy: Differential Geometry I-II-III. His university seminars were very famous and popular, preparing the students for their final state examination. Concerning his academic genealogy, we mention his aspirant Endre Szolcsányi and his university doctorants, Károly Bélteky and Tünde Kántor.



Figure 6. Rapcsák-Tamássy: Differential Geometry I-II-III

He had an affection to themes of philosophy, especially to Kant’s philosophy. He set out themes of philosophy for diploma theses.

About his family

He had three children.

- András (1943-2002) took his Physicist Diploma and the doctor’s degree at the University Lajos Kossuth (Debrecen). Later, he became mayor of the town of Hódmezővásárhely. He was a popular politician and he was elected to the Hungarian Parliament.
- Marianna (1948-2014) was a biologist and Candidate of Science. She was a senior lecturer at the Department of Physiology of the University of Debrecen. She dealt with space, sport and muscle physiology.
- Tamás (1947-2008) was a well-known mathematician. He worked in the field of operational research, he achieved the degree ‘Doctor of Sciences’ (DSc). He was head of Laboratory and Department of Operations Research and Decision Systems. For his memory, his widow founded the Foundation Rapcsák Tamás.

His leisure activity

Rapcsák András liked company, liked to play chess and tarot cards.

His favourite poet was Ady. He often recited stanzas from his verse: ‘Thanks, thanks, thanks.’ He liked to read books, his books were decorated with nice drawings (ex libris).



Figure 7. Béla Barna, András Rapcsák, Ernő Gesztelyi are playing chess

His honours

Silver grade of the Medal of People’s Republic of Hungary (1952), Eminent Pedagogue (1955), Silver grade of the Order of Labour (1965), Honorary doctor of Taras Shevchenko University of Kiev (1968), Golden grade of the Sport Medal (1969), Golden grade of the Order of Labour (1974), The freedom of Debrecen city (1974), Commemorative plaque on the 25th anniversary of the Faculty of Sciences (1975), Pro Universitate Award (1977), Order ‘for the Socialist Hungary’ (1984), Commemorative plaque (1985), Doctor honoris causa of Lajos Kossuth University (1988).

Appreciation

In 1992 he took part in Mártély on the meeting of Hódmezővásárhely leaving people. In 1993 he was chairman of the final examination at Bethlen Gábor Secondary School in his native town. He presented 22 Separatum and a lot of books to his Alma Mater. After his death, in 1995 on the corridor of the first floor of his Alma Mater a relief was placed with his bronze plaquette, which was made by István Máté sculptor.

On the centenary of his birth the Kossuth Lajos Friendly Society of the University of Debrecen and the Institute of Mathematics dedicated a relief on the southern front of Chemistry Building. This bronze plaquette was made also by István Máté.

The Department of Geometry of the University of Debrecen organized a festive scientific session and an exhibition in the Centre of the Regional Committees of the Hungarian Academy of Sciences at Debrecen to his memory.

List of his publications

- [1] Felületelmélet a Minkowski térben, Debrecen (1947) Egyetemi doktori disszertáció.
- [2] A Moore-Smith limesfogalom és alkalmazása a Lebesgue integrálra. Kézirat, Debrecen (1952).
- [3] Kurven auf Hyperflächen im Finslerschen Räumen. Hung. Acta. Math. I. 4. (1949) 21-27.
- [4] Normálkoordináták egy újabb értelmezése a Finsler-térben, Acta Univ. Debrecen 1 (1954), 109-116; Additamentum ad 1 (1955), 17.
- [5] Invariante Taylorsche Reihe in einem Finslerschen Raum, Publ. Math. Debrecen 4 (1955-1956), 49-60.
- [6] A differenciálinvariánsok teljes rendszere reguláris Cartan térben. Kandidátusi értekezés, Debrecen, 1955.
- [7] Über das vollständige System von Differentialinvarianten im regulären Cartanschen Raum, Publ. Math. Debrecen 4 (1955-1956), 276-293.
- [8] Theorie der Bahnen in Linienelementmannigfaltigkeiten und eine Verallgemeinerung ihrer affinen Theorie, Acta Sci. Math. (Szeged) 16 (1955), 251-265.
- [9] Eine neue Charakterisierung Finslersche Räume skalarer und konstanter Krümmung und projektiv-ebene Räume, Acta Math. Acad. Sci. Hungar. 8 (1957), 1-18.
- [10] Metrische Charakterisierung der Finslerschen Räume mit verschwindender projektiver Krümmung, Acta Sci. Math. (Szeged) 18 (1957), 192-204.
- [11] Hipersíkok a Finsler térben, Acta Univ. Debrecen 4 (1959), 85-87.
- [12] Über die Begründung der lokalen metrischen Differentialgeometrie, Publ. Math, Debrecen 7 (1960), 382-393.
- [13] Metrikus és affinösszefüggő pályaterek pályatartó leképezései, Doktori értekezés, MTA Mat. Fiz. Oszt. Közleményei 11 (1961), 339-369.
- [14] Über die bahntreuen Abbildungen affinzusammenhängender Räume, Publ. Math. Debrecen 8 (1961), 233-238.
- [15] Über die bahntreuen Abbildungen metrischer Räume, Publ. Math. Debrecen 8 (1961), 285-290.
- [16] Über die Metrisierbarkeit affinzusammenhängender Bahnräume, Annali di Mat. Pura et Appl. 57. (1962), 233-238.

- [17] Die Bestimmung der Grundfunktionen projektiv-ebener metrischer Räume, Publ. Math. Debrecen 9 (1962), 164-167.
- [18] Varga Ottó (1909-1969), Matematikai Lapok (1970), 21. 19-30.
- [19] Varga Ottó, Magyar Tudomány (1970),2. 118-119.
- [20] Az Appendix hatása a modern matematikára, Matematikai Lapok 31 (1978-1983), 23-28.
- [21] Varga Ottó munkássága és hatása, Matematikai Lapok 33 (1982-1986), 5-7.

Textbooks

- [22] Differenciál- és integrálszámítás, Egyetemi jegyzet, Debrecen (1947).
- [23] Matematika az ipari technikumok I. osztálya számára (with I. Csánk, L. Gyarmathi, S. Török) , Tankönyvkiadó, Budapest (1952).
- [24] Matematika az ipari technikumok II. osztálya számára (with L. Gyarmathi, S. Török), Tankönyvkiadó, Budapest (1953).
- [25] Matematika az ipari és mezőgazdasági technikumok III. osztálya számára. (with L. Gyarmathi Tankönyvkiadó, Budapest (1954).
- [26] Komplex számok. Kiegészítés a villamosipari technikumok II. osztályának matematika anyagához, Tankönyvkiadó, Budapest (1953).
- [27] Differenciálgeometria I. Egyetemi jegyzet, Tankönyvkiadó, Budapest(1966) (with L. Tamássy).
- [28] Differenciálgeometria II. Egyetemi jegyzet, Tankönyvkiadó, Budapest (1970) (with L.Tamássy).
- [29] Differenciálgeometria III. Egyetemi jegyzet, Tankönyvkiadó, Budapest (1972) (with L. Tamássy).

Didactical and other articles

- [30] A geometria axiomatikus tanítása a gimnáziumban. Protestáns Tanügyi Szemle (1943), XVII. 8. 181-186.
- [31] A matematikaoktatás tapasztalatai a Debreceni Tudományegyetem Természettudományi Karán, Felsőoktatási Szemle 1 (1952), 285-287 (with L. Gyarmathi).
- [32] A matematikai tudományok fejlődése hazánkban, 1944-1969, in: Az MSZMP Hajdú-Bihar megyei Bizottsága és Oktatási Igazgatóságának kiadványa. Vol. 1., Debrecen, 1970, 349-359.

References

- [1] Archives of the Rapcsák family.
- [2] Az általános iskolai tanárképzés 25 éve az Egri Tanárképző Főiskolán, Eger, 1973.
- [3] Bibliographia Universitatis Debreceniensis, Facultas Scientiarum Naturalium (1914-1955), Budapest, 1956.
- [4] L. Tamássy, Emlékbeszédek az MTA elhunyt tagjai felett: Rapcsák András (1914-1993), in: *Emlékbeszédek 1999-2000*, Magyar Tudományos Akadémia, Budapest, 2001.
- [5] Hódmezővásárhelyi Református Főgimnázium Évkönyvei 1926-1933.
- [6] 25 éves a Kossuth Lajos Tudományegyetem Természettudományi Kara, 1949-1974, A KLTE TTK kiadványa, Debrecen, 1975.
- [7] T. Kántor-Varga, *Biographies, A Panorama of Hungarian Mathematics in the twentieth century*, (J. Horváth, ed.), Springer, 2006, 565–607.
- [8] S.né Kántor, Tudós matematikatanárok Hajdú Bihar, Szabolcs-Szatmár és Szolnok megye középiskoláiban (1850-1948), Second enlarged edition, 2009, ISBN 978-963-06 7231-3, <http://MEK.oszk.hu/07200/07238/>.
- [9] S.né Kántor, Rapcsák András, *Pedagógusok Arcképcsarnoka*, Debrecen (2002), 193–195.
- [10] J. Merza, Rapcsák András 60 éves, *Mat. Lapok* **25**, no. 1–2 (1974), 1–11.
- [11] L. Tamássy, A Varga Ottó által alapított differenciálgeometriai iskola jelenleg, *Mat. Lapok* **33**, no. 1–3 (1986).
- [12] L. Tamássy, *Differential Geometry, A Panorama of Hungarian Mathematics in the twentieth century*, (J. Horváth, ed.), Springer, 2006, 385–413.

TÜNDE KÁNTOR
DEPARTMENT OF GEOMETRY
UNIVERSITY OF DEBRECEN
DEBRECEN
HUNGARY

E-mail: tkantor@science.unideb.hu

(Received January, 2015)