Symposium in Memory
of **George Placzek** (1905-1955)
21-24 September 2005
Czech Republic
Brno

Symposion is organized by

- *Masaryk University in Brno*
- *Brno University of Technology*
- *City of Brno*
- *Brno Centre for European Studies*
- *Union of Czech Mathematicians and Physicists*

in cooperation with

- *The Academy of Sciences of the Czech Republic*
- *Czech Technical University in Prague*
- *Charles University in Prague*
- *University of Vienna*

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Programme

Wednesday, September 21, 2005
Centre of the Brno University of Technology, Antonínská 1, Brno

15:00 – 18:00 Registration

20:00 – 22:00 Welcome reception

Thursday, September 22, 2005

Centre of the Brno University of Technology, Antonínská 1, Brno
10:00 – 12:00 Morning session (Chairman: J. Fischer)

Opening of the Symposium: Petr Fiala, Rector of Masaryk University

A. Gottvald: Story of Georg Placzek

R. Davis: George Placzek's grandfather: A naturalist and his garden

Centre of the Brno University of Technology, Antonínská 1, Brno
13:30 – 16:30 Afternoon session (Chairman: S. Zajac)

M. Cardona: Einstein, Placzek and the Physics of solids

Coffee break

H. Rauch: Neutron optics

J. Kulda: Neutron inelastic scattering at the edge of 21st century

Brno New Town Hall, Dominikánské náměstí 1, Brno
18:00 – 20:30 Evening session (Chairman: M. Černohorský)

Petr Spielmann: Tradition of German-Jewish and Czech culture in Brno

Reception given by Mayor of the City of Brno

Friday, September 23, 2005

Centre of the Brno University of Technology, Antonínská 1, Brno

9:30 – 12:00 Morning session (Chairman: S. Pospíšil)

P. Mikula: Past and Present Status of Neutron Scattering at the Research Reactor LVR-15 in Řež

Coffee break

C. Granja: Nuclear spectroscopy with neutrons

J. Jakůbek: Neutron imaging

Náměstí Svobody 3

12:30 – 12:45 Unveiling a commemorative plague of George Placzek

15:30 – 17:00 In the footsteps of the Placzeks family in Brno
Guided tour (meeting point Antonínská 1, Brno)

19:00 – 21:00 Party at Castle Špilberk wine bar

Saturday, September 24, 2005

Austerlitz Castle

9:00 Departure (meeting point Antonínská 1, Brno)

9:45 – 10:45 Music of Napoleonian wars
(Chamber Wind Harmony Brno)

11:00 – 12:00 Excursion - Austerlitz Castle

Mayor's Foreword for the Bulletin "Symposion in Memory of George Placzek"

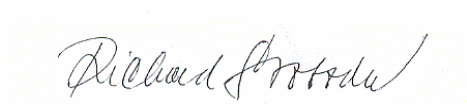
The city of Brno became famous in many different ways in the past: with the fortress of Spilberk, with its distinct architectural style called functionalism and the Tugendhat Villa, as well as with its international trade fairs. The name of the city, however, used to be and still is mentioned in the context of famous personalities, who lived and worked there, such as the founder of genetics Johann Gregorius Mendel or the music composer Leoš Janáček, and even famous Brno natives such as the writers Milan Kundera and Bohumil Hrabal.

It is less generally known, though, that Brno is the birthplace of several outstanding scientists: the physicist and philosopher Ernst Mach, the physicist and mathematician Kurt Gödel, and (all good things are three) again a physicist, whose life path we are commemorating right now, George Placzek. Unfortunately, none of the three scholars has left a remarkable trace in Brno. George Placzek left his birthplace initially to get his university degree, and later he had to choose places for living not threatened by Nazism. He then asserted himself in excellent positions within the best scientific teams, both in Europe and in the USA.

We, as Brno citizens, can only regret that at the given time our city could not give Placzek's prodigy the support that he later found in his new abodes. Had history taken a slightly

different path, George Placzek might have stayed in Brno for good, gather world science elite and a top center of theoretical physics could rise in our city. That is certainly a beautiful fancy. And there still is a chance for it to come true – an excellent university background already exists in Brno, a state-of-the-art university campus is under construction, there are research and development opportunities, and both domestic and foreign investors keep coming in. Luckily, the city's political climate has become relatively peaceful as well.

The name of this Brno native, the world-renowned scientist George Placzek, is not generally famed in his birthplace. You will not find a mention of it in the Brno tourist guides. Hence the international conference held in commemoration of his works, as well as the dedication of a memorial plaque to George Placzek, should contribute to the rediscovery of this extraordinary person.



Richard Svoboda
Mayor of Brno

ABSTRACTS

Story of Georg Placzek
(New facts about his remarkable life and work)

Aleš Gottvald (Institute of Scientific Instruments, Academy of Sciences of the CR Královopolská 147, 612 64 Brno, Czech Republic)

The world-line of Georg Placzek spans 50 years between his birth on September 26, 1905 in Brno, and his passing away on October 9, 1955 in Zürich. His remarkable life and work inspire us to think about him from many perspectives: as a world-distinguished theoretical physicist, as a unique personality beyond science, as a witness and stimulus of historical moments of "nuclear era", as a member of a remarkable family, as a man symbolizing success and tragedy of a human being in the 20th century. The mosaic of our contemporary knowledge on Georg Placzek emerges from many scattered sources, some of them being discovered just very recently. Though this mosaic is still rough and fuzzy in many parts, it conveys a truly monumental picture of an incredibly rich and devoted life.

Until recently, the most obvious and painful gap in our knowledge of Georg Placzek's life concerned his family roots and early years in Brno. Some first clues were discovered in Brno archives around 1984, involving basic data about his closest relatives and their tragic fate during WW2. Several documents concerning his gymnasial studies in Brno and university studies in Wien and Praha had also been discovered, but not much beyond. This primary level of knowledge was summarized in Placzek's biographies by J. Fischer [1] and Cassidy [2], (upgraded by some new facts and corrections in [3]), integrating also obituaries written soon after Placzek's death by Amaldi, Weisskopf, Peierls, and van Hove.

What do we know about Georg Placzek's family? Are there any traces of this family in Brno or elsewhere? Who inspired

young Georg for his unusual scientific career? Are there any photographs, documents and testimonies still available? Are there any buildings and places linked to this story? Yet one year before this Symposium, practically nothing could be offered to answer these questions, and situation did not look very optimistic. A turning point came when we recognized importance of a tiny overlooked note on "Alexowitz bei Eibenshitz" in an archive file from Georg's gymnasium. It focused our local search to Alexovice near Ivančice, and we finally succeeded to find out several contemporaries who not only used to live very close to the Placzeks family, but also preserved unique photographs, documents and memories related to our story. With their invaluable contribution, we are happy to say that many fundamental facts about "Moravian" footsteps of Georg Placzek and his large Jewish family escaped from being lost forever.

With fascination we realize how positively the Placzeks dynasty and their large textile factory Skene & Co. changed the fate of Alexovice and the life of (not only) Jewish community in Brno. We newly appreciate a remarkable personality of Georg's grandfather, Dr. Baruch Placzek; he used to be not only an influential Moravian rabbi, but his secret scientific life, involving correspondence with Charles Darwin and close friendship with Johann Gregor Mendel, might became a major source of inspiration for Georg's life in science. With new documents and testimonies, we can trace the "Moravian" fate of the Placzeks family until their tragedy as Shoah victims during WW2. Stories and life struggles of Georg's parents Alfred and Marianne, his brother Fritz and his sister Edith, up to an incredible history of Winton's list involving Georg's cousins Erika and Daisy Türkl, emerge from an abbys of time again.

Also Georg Placzek's life and work in the time of WW2 had never been given proper emphasis and we even did not know some essential facts about its paramount importance for nuclear physics and whole history of WW2. Today we appreciate

Placzek's role in a straightforward experimental proof of nuclear fission (together with Otto Frisch), in a discovery of the role of U235 (together with Niels Bohr), in a research about theory and technology of nuclear chain reactions, etc. Not only that: now we are recognizing important Placzek's role in the Manhattan project, and even in an underlying philosophy and actions of its "fathers" (Oppenheimer, Teller, Bethe, Szilard). As the only citizen of Czechoslovakia, Placzek witnessed historical moments at Los Alamos and Alamogordo in 1945, with their historical consequences for science and polity worldwide.

To convey a realistic image of a multifaceted and complex personality of somebody like Georg Placzek is clearly beyond the scope of a one-hour lecture and even this symposium. Yet his interaction with so many distinguished collaborators and friends in physics is fascinating and worth discussing: Bohr, Landau, Bloch, Heisenberg, Weisskopf, Peierls, Oppenheimer and many other great personalities of modern theoretical physics. Also Placzek's extensive travels and fellowships, truly unique and monumental in its scope and impact, offer an extensive material for illuminating shadows and correcting some mistakes in previous biographies. Consequently, we shall focus on those aspects of Placzek's life and carrier where we feel the most obvious gaps in his previous biographies, and where some new facts have recently been discovered. In particular, we present a collection of rare photographs, documents and testimonies about Georg Placzek and his remarkable family.

Many people contributed to the project of contemporary biography of Georg Placzek [4]. I am particularly indebted for invaluable contributions of M. Fuhrmann, M. Nešpůrková, J. Kocourková and J. Fischer. I am also very grateful for various contributions of L. Tisza, J. Klenovský, A. Franková, R. Davis, K. Kruger, G. Wiemers, M. Němečková, M. Havlíčková, J. Široký, K. Figer, M. Lenc, J. Janík, C. Granja and many others, to whom I cannot express my thanks here individually.

References

[1] J. Fischer: "Georg Placzek (1905-1955)". Čs. čas. fyz. A 35 (1985), pp. 607-611
[2] D. Cassidy: "Placzek, George". In: Dictionary of Scientific Biography 18 (F. L. Holmes, Ed.), Charles Scribners Sons, 1990, pp. 714-715
[3] J. Fischer: "George Placzek – an unsung hero of physics". CERN Courier 45 (2005), 7, pp. 25-27
[4] A. Gottvald: "Kdo byl Georg Placzek (1905-1955)". Čs. čas. fyz. 55 (2005), 3, pp. 275-287

Fig. 1 : The "summer" house No. 1 in Alexovice where the Placzeks family lived in from 1913 until the occupation in spring 1939. In the photo foreground, Georg's sister Edith is sitting in the bench. The photo was taken around 1930. (Photo - J. Kocourková archive.)

Fig. 2 : The Placzeks family in April 1918. The siblings Fritz and Georg (in the middle) with their parents Marianne and Alfred Placzek, together with their just born sister Edith. (Photo – J. Kocourková archive.)

Fig. 3: The villa of the Placzeks family at former address Kounicova 18, in the neighbourhood of Janáček's museum. The photo was taken before 1929. The villa was destroyed near the end of WW2. (Photo – J. Kocourková archive.)

Fig. 4: Georg Placzek with Heisenberg's research fellows in Leipzig, at the end of 1930. Rudolf Peierls and Werner Heisenberg (foreground), Giuseppe Gentile, Georg Placzek, Gian Carlo Wick, Felix Bloch, Viktor Weisskopf, Franz Sauter. (Photo Internet, http://werner-heisenberg.unh.edu, R. Peierls archive.)

Fig. 5: Georg and Els Placzek around 1943. (Photo – M. Fuhrmann archive.)

Fig. 6: Georg Placzek in his late years (Photo – E. Segré archive.)

George Placzek's grandfather: A naturalist and his garden

Ruth Davis (Czech & Slovak Jewish Communities Archive, 86-17 139th St., Jamaica, New York, NY 11435, USA)

Baruch Placzek (1834-1922), rabbi of Brno and chief rabbi of Moravia, was an enthusiastic ornithologist and naturalist, a friend of Gregor Mendel and admirer of Darwin. His articles on songbirds, bird habitats and behaviors drew primarily on his observations in his garden below the Spilberk Castle in Brno, a short walk from Mendel's garden at the Augustinian Monastery.

Immensely erudite in classical languages, Placzek ransacked ancient Hebrew, Aramaic, Greek and Latin literature for a historic perspective on wildlife. His studies, "The Apes," (1881), "Birdsong: Its tendency and development" (1884), and "Cats and Weasels" (1888) show his awareness of new ideas about evolution and heredity, as does a letter he wrote Darwin in 1880. Baruch Placzek's deepest interest, however, was in the interrelationship among human beings, birds, and animals and in the enrichment of human culture by Earth's wealth of living creatures. His article, "Bird Preservation or Insect Preservation" (1896) is a pioneering work of ecology.

Baruch Placzek loved gardening: "He did not just garden, he experimented," according to a granddaughter; it seems that long after Mendel's death, he pursued experiments with plant hybridization, recording copious notes. Sadly, in World War II his notebooks vanished.

Baruch Placzek and his grandson George were extremely close.

Einstein, Placzek and the Physics of solids

Manuel Cardona (Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, 70569 Stuttgart, Germany)

Einstein is usually revered as the father of special and general relativity. In this article I shall demonstrate that he is also the father of Solid State Physics, or even his broader version which has become known a Condensed Matter Physics (including liquids). His 1907 article on the specific heat of solids introduces for the first time the effect of lattice vibrations on the thermodynamic properties of crystals, in particular the specific heat. His 1905 article on the photoelectric effect and photoluminescence opened the fields of photoelectron spectroscopy and luminescence spectroscopy. Other important achievements include Bose-Einstein condensation and the Einstein relation between diffusion coefficient and mobility. In this article I shall discuss Einstein's papers relevant to this topic and their impact on modern day condensed matter physics.

The talk will conclude with some bibliometric data of Albert Einstein and George Placzek.

Neutron optics

Helmut Rauch (Atominstitut der Oesterreichischen Universitaeten, Stadionallee 2, 1020 Wien, Austria)

George Plaszek was a pioneer in neutron physics which will be mentioned in my talk, where I want to show how he contributed to the understanding of neutron thermalization and to the

resonance behaviour of the neutron-nuclear interaction. The well-known Placzek wiggles represent a tricky effect in any kind of reactor calculations. In the second part of my talk I will report on some more recent results in the field of neutron optics which is mainly relevant to the understanding of quantum mechanics and provides a basis for advanced technologies where quantum state engineering becomes feasible.

Neutron inelastic scattering at the edge of 21st century

Jiří Kulda (Institut Laue-Langevin, Grenoble, France)

In the 1930's Georg Placzek has completed the theory of Raman scattering and almost twenty years later he has published a concise theory of neutron coherent inelastic scattering. In this way he has laid theoretical foundations to two methods, which have furnished most of our knowledge about elementary excitations in crystalline solids. The neutron technique, although much more exotic due to its necessity of nuclear reactors or large particle accelerators as radiation sources, has the ultimate advantage of probing a large range of reciprocal space of a crystal and hence providing a detailed information on correlated motion of atoms both in space and in time. Its importance has been recognized some 40 years after Placzek's work by a Nobel prize, awarded to B. Brockhouse (together with C. Shull) for his pioneering experimental work, based on Placzek's theoretical predictions.

In my contribution, after this brief historic introduction, I would like to give a review of neutron inelastic scattering activities at the Institut Laue-Langevin in Grenoble (France), which at

present operates world's most brilliant thermal neutron source, catering a suite of state-of-the-art experimental facilities for neutron physics. The access to them is open also to scientists from Czech republic, which financially contributes to the ILL operation as a scientific member since 1998.

Tradition of German-Jewish and Czech culture in Brno

Petr Spielmann (Faculty of Fine Arts, Brno University of Technology, Brno, Czech Republic)

A lecture on Jews in Brno, their contribution to the cultural life of the city, and their relationships and joint efforts with the Czech culture creators:

1. An overview of the Jewish settlement in the Czech lands from the time of Charles IV until the end of the 19th century.

2. Jewish Brno in the 20th century.

3.1 Jewish culture in Brno (both German and Czech) between 1918 and 1938.
3.2 An exhibition of contemporary culture.
3.3 Brno Jews in literature, music, fine arts, and architecture (with special focus on functionalist Jewish schools).
3.4 Jews in politics and social movements.

4. Jewish emigration from Brno.

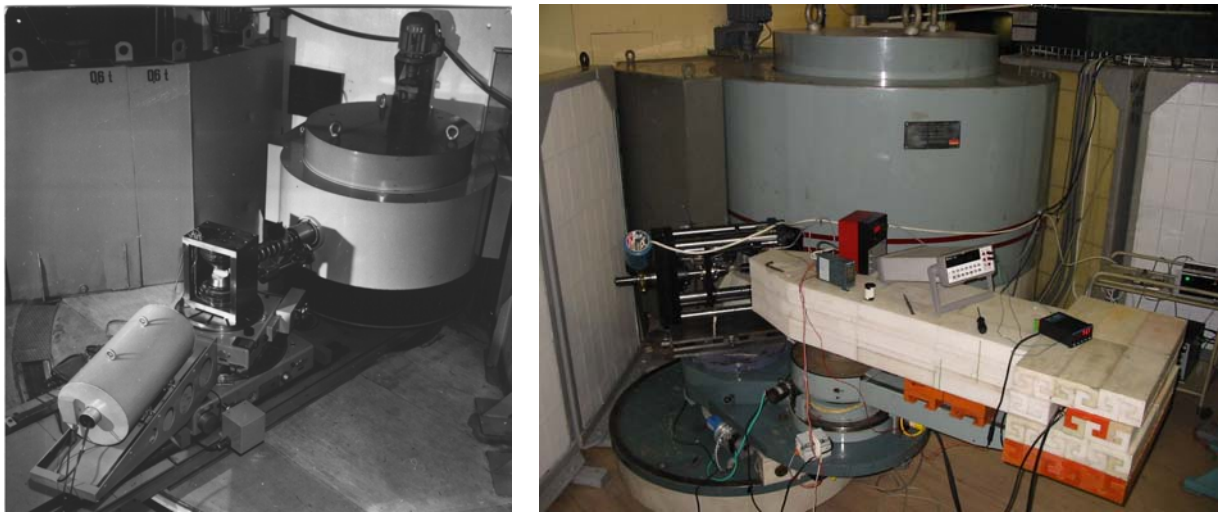
Past and Present Status of Neutron Scattering at the Research Reactor LVR-15 in Řež

Pavol Mikula (Nuclear Physics Institute of CAS and Research Centre Řež Ltd., 250 68 Řež, Czech Republic)

Theoretical and experimental research in the field of neutron scattering started after the second world war when first intensive neutron sources – nuclear research reactors were constructed. Soon, however, neutrons have appeared as excellent probes of all kinds of matter. At present, many variations of the scattering process are used which give the technique of neutron scattering enormously wide applicability in studies of structure and properties of the condensed matter. Therefore, at each research reactor or pulsed neutron source there are installed many related experimental devices.

Construction of the research reactor in the former Czechoslovakia started in 1955 and the first chain reaction was realized in it on September 25, 1957. The commissioning of this reactor of the Russian type VVR-S and of the power of 2 MW belongs to the key milestones in the development of research activities in neutron physics (generally), reactor physics and production of radioisotopes in our country. Later on, after two reconstructions the present tank type light water reactor LVR-15 (which uses decreased 235U fuel enrichment from 80 % to 36 %) operates at the power of 10 MW. Thus, the reactor LVR-15, as one of a few of Central Europe neutron sources has become a good basis for basic and applied research. First investigations were focused on pure nuclear and reactor physics. However, after construction of the first diffractometer SPN-100 in 1965, according to the trends in the world, an enormous expansion of investigations in the field of condensed matter physics and neutron optics by neutron scattering have been recorded. At present, there are installed 6 scattering devices at the horizontal

beam channels of the reactor LVR-15. Besides the neutron optics the research program carried out at the diffractometers is mostly focused on material research as e.g. residual phase specific strain/stress studies, in-situ studies of martensitic transformation in shape memory alloys, studies of structure inhomogeneities by small-angle neutron scattering, texture measurements, structure studies of new generation of zeolites and high-temperature superconductors etc.



Diffractometer SPN-100 after its introduction into operation in 1965 for studies of magnetic properties of crystalline materials by polarized neutron diffraction and a modern type diffractometer TKSN-400 used for in-situ strain/stress studies of polycrystalline materials.

Nuclear spectroscopy with neutrons

Carlos Granja (Institute of Experimental and Applied Physics, Czech Technical University, Prague, Czech Republic)

Outline of the highlights and major developments in the use of neutrons for nuclear spectroscopy and nuclear structure studies. Impact and significance of the work and achivements of George

Placzek to this field. A review of the current status and perspectives of development specially in the Czech Republic is included.

Neutron imaging

Jan Jakůbek (Institute of Experimental and Applied Physics, Czech Technical University, Prague, Czech Republic)

Neutron radiography can serve as a complementary diagnostic method to X-ray radiography. It can produce contrast images of light materials which are almost indistinguishable in X-ray images (e.g. materials containing Hydrogen as plastics or biological samples). A brief overview of principles used for neutron detection and imaging as well as several images of real objects demonstrating the capabilities of the technique will be presented. A review of the current status and perspectives in this field especially in the Czech Republic will be given.

In the footsteps of the Placzeks family in Brno and Alexovice

(a guided tour on September 23, 2005)

Nám. Svobody (former Grosser Platz): in the house No. 3, Georg Placzek was born on September 26, 1905.

Kounicova ul. : villa at former address Kounicova 18 was a major living place of Alfred, Marianne and Edith Placzek from mid-1920th to spring 1939; the villa was destroyed at the end of WW2. Now there is a park with a statue of "Liška Bystrouška", just in the neighbourhood of Janáček's museum.

Komenského nám. 6 : former Deutsches Staatsgymnasium, where Georg Placzek was studying from September 1918 to June 1924 (now JAMU – Janáček Academy of Music and Performing Arts in Brno).

Údolní ul. (former Talgasse):

house No. 7 – Baruch and Caroline Placzek (until 1911);
house No. 20 (earlier No. 16 or 18) – Alfred and Marianne Placzek with their children;
house No. 22 (earlier No. 20 or 18) – Sarah Türkl née Placzek with her family.

Jiráskova ul. (former Tivoligasse): the house at former address Tivoligasse 38 was used by Baruch and Caroline Placzek since 1911, together with the Seidler family (Irma).

Veveří ul. (former Eichhorngasse): building No. 18 was given by Georg Placzek as his address in 1920 (c/o Marianne Placzek).

Orlí ul.: the building No. 28 appears on the list of three buildings which the nazis confiscated to Alfred Placzek in 1939.

ul. Cejl: the building No. 5 was used as an administrative center of Skene & Co.

Hilleho ul. (former Anastasius Grün Gasse): the building No. 5 was given by Georg Placzek as his address in 1919 (c/o Johanna Tandler).

tř. kpt. Jaroše (former Schmerlingstrasse): the buildings No. 42 (41?) was given in 1911 by Alfred Placzek as his working address in Brno.

Jewish Cemetery in Židenice: graves of Dr. Baruch Placzek, Fritz Placzek, a symbolic grave of Alfred, Marianne and Edith Placzek (Shoah victims), Irma Seidler née Placzek, JUDr. Emil Pollack, many members of Löw-Beer family, ...

Alexovice near Ivančice:

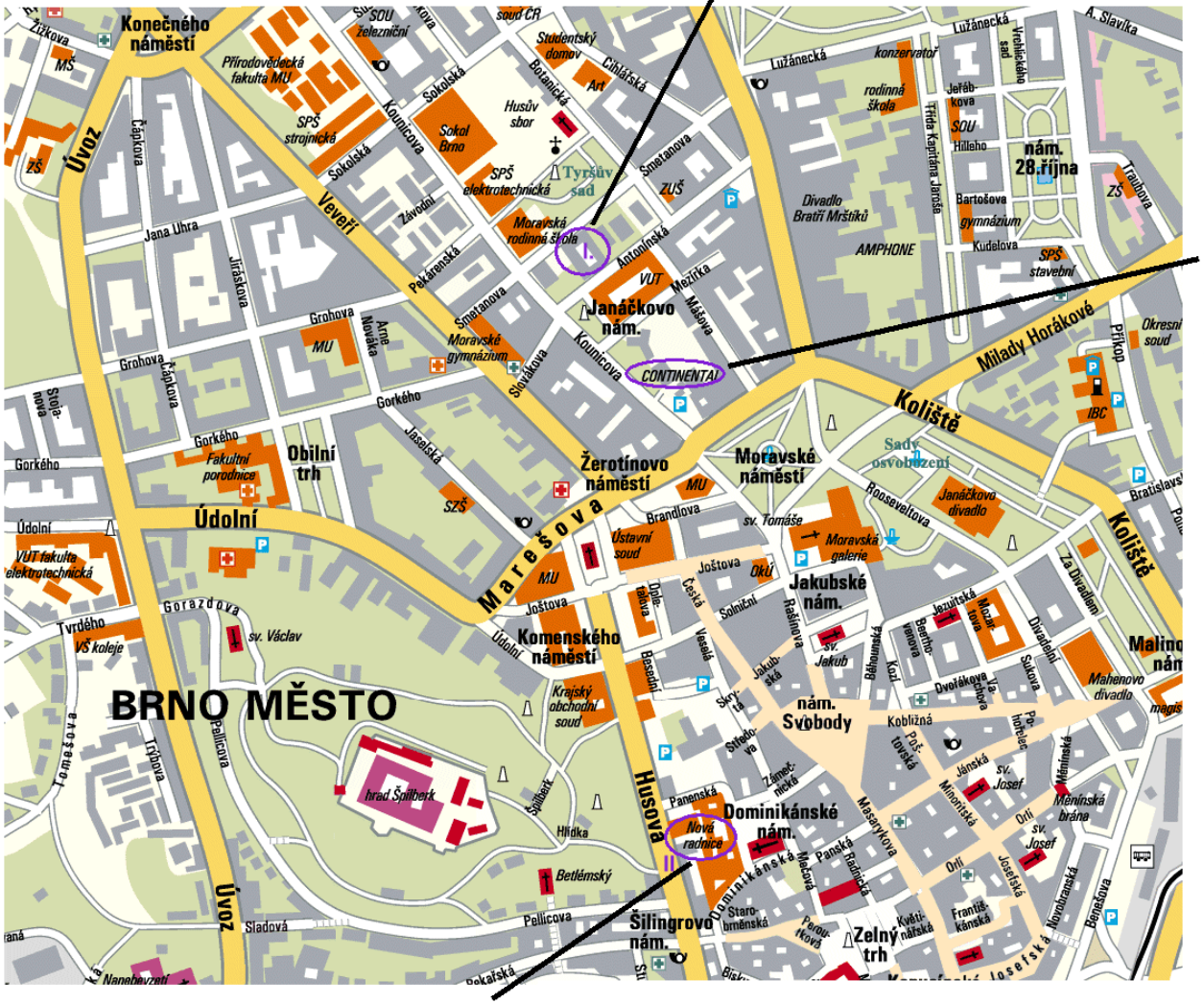
house No. 4 was used by the Placzeks family until 1913, and later in part by the Türkl family (Erika, Daisy), together with the Michls, the Schmirgels and the Stefans families

a large house No. 1 inside the "Skene & Co." was used by the Placzeks starting from 1913 until the spring 1939; here Fritz Placzek took his life on March 23, 1939.

Centre of Brno University of Technology, Antonínská 1

Brno New Town Hall, Dominikánské nám. 1

CENTRE OF BRNO UNIVERSITY OF TECHNOLOGY
ANTONÍNSKÁ 1

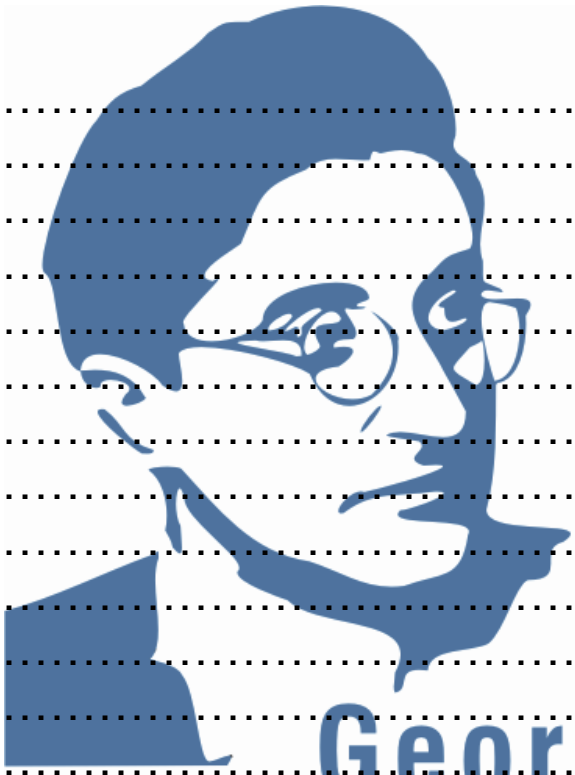


HOTEL CONTINENTAL

BRNO NEW TOWN HALL
DOMINIKÁNSKÉ NÁM. 1

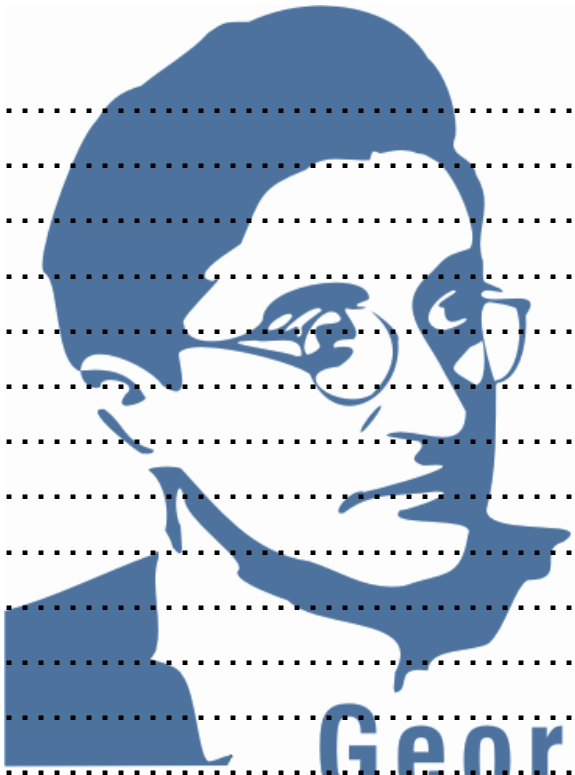
George Placzek

(1905-1955)



George Placzek

(1905-1955)



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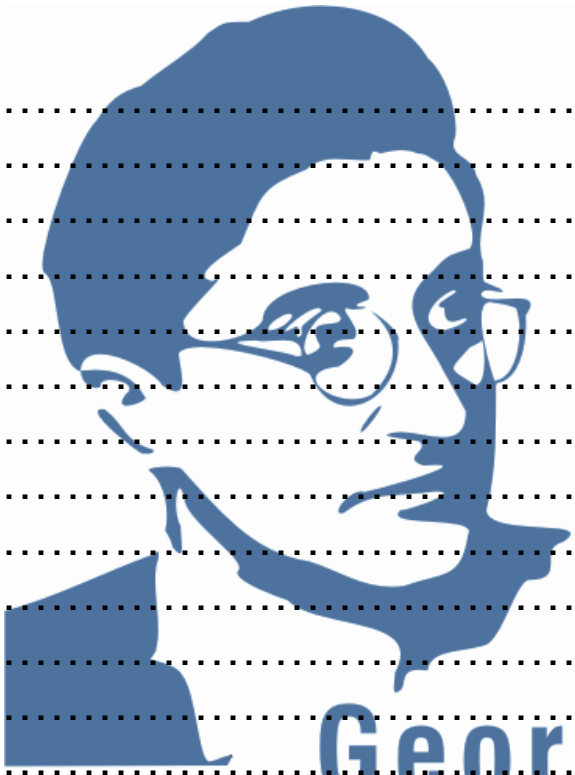
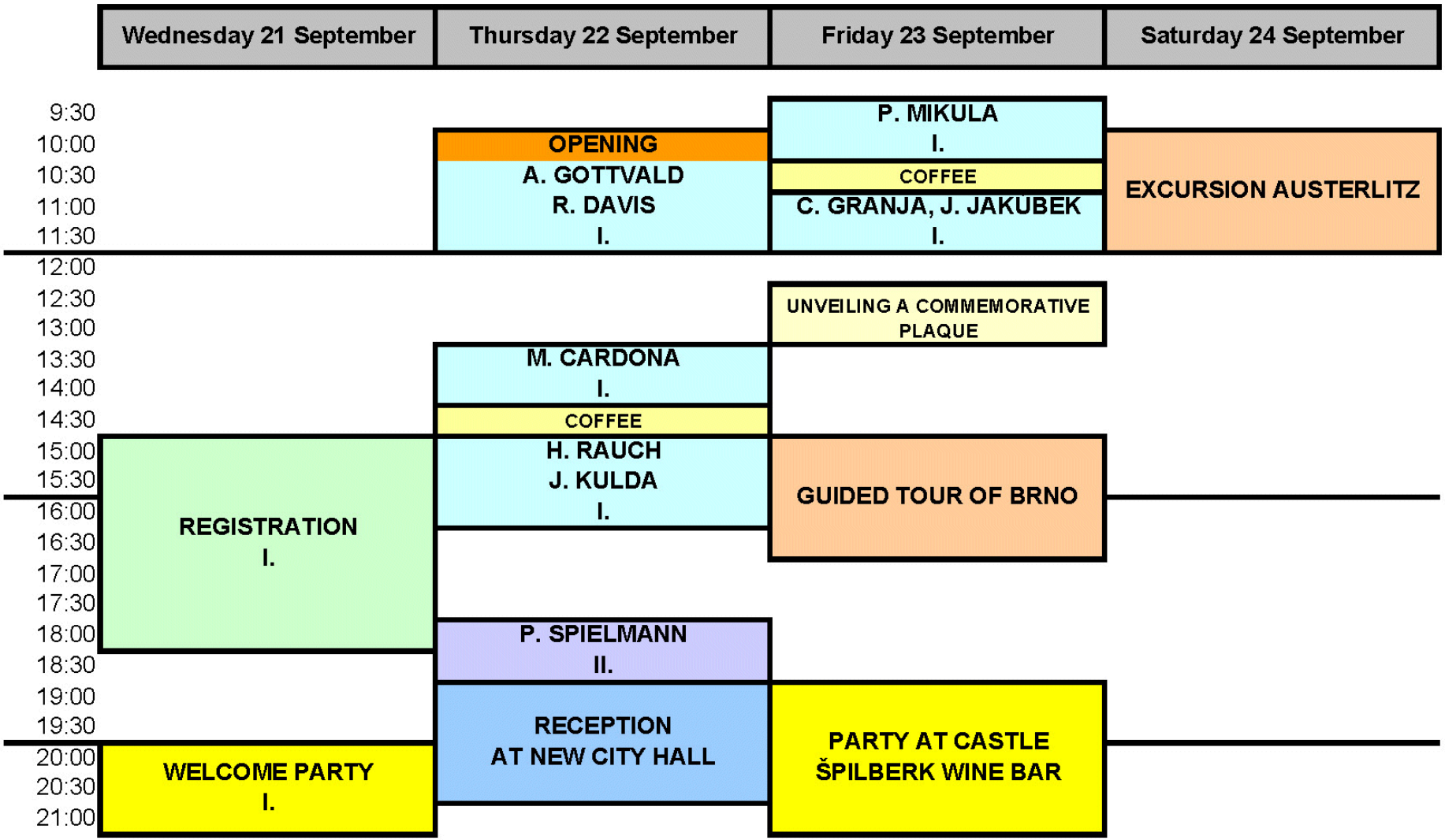
(1905-1955)



George Placzek

(1905-1955)



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II. New City Hall, Dominikánské náměstí, Brno